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ORIGINAL INVESTIGATION

Level and change in economic, social, and personal resources for people retiring from paid work and other labour market statuses

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Abstract
Well-being in retirement is thought to depend on person's level of resources and how his or her resources change during retirement. However, to date few studies have directly investigated resource trajectories during retirement. The current study therefore examines how economic, personal, and social-relational resources change during the retirement transition for people retiring from paid employment and for people retiring from other, non-working labour market statuses (e.g. disability pension, homemaker, unemployment). Based on four representative baseline samples of the German Ageing Survey (1996, 2002, 2008, and 2014) and their respective 6-year follow-up interviews, we identified $N = 586$ retirees. We then used dual change score models to separately estimate the level and change in income, health, activity, family and non-family network size, and social support for people retiring from paid work ($n = 384$) and people retiring from other statuses ($n = 202$) adjusted for age, gender, education, region, period, and time since retirement. Overall, we found that resources changed only modestly during the retirement transition. Resource changes did, however, differ by last labour market status and sociodemographic characteristics. Income and social support declined and family networks increased for both those retiring from paid work and those retiring from other statuses. Leisure activities increased only for those retiring from paid work. No changes in health or non-family networks were observed. People with many resources before retirement also had many resources after retirement. We conclude that retirement affects resources less than researchers often expect. Accordingly, differences based on labour market remain despite retirement.

Keywords Retirement · Resources · Last labour market status · Life course

Introduction

Resources—defined generally as the means to attaining valued outcomes—are assumed to be important drivers of well-being in general (Hobfoll 1989) and adjustment to retired life in particular (Szinovacz 2003; Wang et al. 2011; Wang 2012; Wang and Shi 2014). Surprisingly, however, there is little empirical evidence about how resources change during retirement, and to date, very few studies have considered how the shape of resource trajectories may depend on individuals' pathway to retirement. Our study adds to the literature by using dual change score models and nationally representative data from Germany to examine trajectories of economic, personal, and social-relational resources for people retiring from paid work and for people retiring from other, non-working statuses.

Motivation: resources as drivers of retirement adjustment

The extent to which people successfully adjust to retired life is thought to be the direct result of their level of different resources before and after retirement, as well as how their resources change as a result of retiring (Szinovacz 2003; Wang et al. 2011; Wang 2012; Wang and Shi 2014). People with more resources are thought to be better equipped to restructure their lives in retirement and have higher levels of well-being (e.g. Kim and Moen 2002; Hansson et al. 2018). Regarding resource change, people who experience

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resource decreases as a result of retiring are thought to likewise experience decreases in well-being (e.g. Wang et al. 2011). According to Kim and Moen (2002), the most relevant types of resources for well-being in retirement are (a) economic resources (e.g. income), (b) personal resources (e.g. health, activity), and (c) social-relational resources (e.g. social network size, social support).

The general idea that resources are associated with well-being in retirement has received considerable empirical support (see Barbosa et al. 2016). In a recent study, for instance, Hansson et al. (2018) showed that access to different resources pre-retirement predicted how life satisfaction changed during retirement. Specifically, having more financial resources, better health, and more social support at baseline were each associated with an overall increase in life satisfaction after retirement, while the absence of basic financial resources, poor health, and low social support were generally associated with decreased life satisfaction.

Although Hansson et al. (2018) demonstrated a link between resources and well-being in retirement, their study included only a baseline measurement of resources and thus provided no information about how resources themselves *change* during retirement. Indeed, most studies on the relationship between resources and well-being in retirement have been based on either completely cross-sectional data (64% of the studies included in the review by Barbosa et al. 2016) or a single assessment of resources (e.g. Damman and van Duijn 2017; Hansson et al. 2018). The few studies on the relationship between resources and well-being based on longitudinal data on resources before and after retirement have been based on small, selective convenience samples of retirees (Segel-Karpas et al. 2013; Yeung and Zhou 2017; Yeung 2018). Thus, despite the popularity of the "resources-as-drivers" of well-being in retirement hypothesis, little is in fact known about whether and how retirement actually affects people's resources.

Literature review: how retirement affects different types of resources

The limited available evidence suggests that retirement has different effects on different kinds of resources. On the whole, retirement is generally associated with decreases in economic resources. In nearly all industrialized countries, people earn significantly less after retirement than before (e.g. 51% of pre-retirement earnings in Germany for 2016; Organisation for Economic Co-operation and Development [OECD] 2018). Previous scientific studies based on samples of retirees in Germany (Fasang 2010, 2012; Strauß and Ebert 2013) and Hong Kong (Yeung and Zhou 2017; Yeung 2018) have likewise found that financial resources tend to decrease during retirement. Similarly, a longitudinal study based on unionized workers in Israel found that 45% of the sample experienced no change in income, while 13% experienced income increases and 42% experienced income decreases (Segel-Karpas et al. 2013).

Results about how personal resources like health and leisure activities change during retirement have been less clear cut. Indeed, retirement does not appear to affect health and leisure activity in a uniform way (Dorfman 2013; Gallo 2013). Studies have found that retirement is associated with maintenance (e.g. Ekerdt et al. 1983; Segel-Karpas et al. 2013; Yeung 2018), declines (e.g. Behncke 2012) but also improvements (e.g. Mein et al. 2003) in health. How leisure activity changes with retirement appears to depend on the specific kind of activity analysed (e.g. volunteering, physical activity). Most studies suggest that, on the whole, leisure activity remains more or less stable, but how it changes also depends on sociodemographic characteristics (see Dorfman 2013 for a review). One recent study found that leisure activities do not seem to abruptly change, but rather gradually decrease over time (Wetzel and Huxhold 2016).

Social resources include both relatively objective (e.g. social networks) and more subjective (e.g. social support) components. So far, social resources on the whole appear to remain stable during retirement (Yeung and Zhou 2017; Yeung 2018). While much attention has been devoted to the development and composition of social networks over the life course in general (e.g. Cornwell and Schafer 2016), just one study seems to have analysed how social networks change for men retiring from paid work (see van Tilburg 2009, 1377). For previously working men, retirement does generally not appear to affect social network *size*, but it does appear to affect social network *composition* (e.g. fewer colleagues, more friends, and neighbours). Regarding social support, Damman and van Duijn (2017) showed based on cross-sectional data that retirees generally receive little social support from their children. To our knowledge, the only longitudinal study that compared social support before and after retirement found no evidence that social support changed during retirement (Bosse et al. 1993).

Analytical framework: a differential approach to how retirement might affect different resources

In addition to the general lack of research, another gap in the literature on resource trajectories during retirement is that few studies have considered different pathways to retirement. For people retiring from paid work, retirement marks an end to the opportunities and benefits, but also the constraints and stressors, associated with the working role. Hence, the potential for resource change would seem to be higher for people retiring from paid work relative to people retiring from other, non-working statuses (cf. Hansson et al. 2018 for a similar argument regarding abrupt and gradual retirement). We therefore argue that resource

trajectories during retirement may depend not only on the type of resource, but also on whether a person retires from paid work or from another, non-working status.

Previous research provides some empirical support for our argument that resource trajectories during retirement depend on a person's last labour market status. It is well known that resource levels *prior* to retirement are highly associated with labour market status. For instance, unemployed people have lower levels of self-rated health (e.g. Ezzy 1993) and even a higher mortality risk (e.g. Morris et al. 1994) than employed people. They also volunteer less often and engage in fewer leisure activities (see Wilson 2000). Unemployed people also tend to feel less like part of the society than employed people (e.g. Wetzel and Mahne 2016). Such pre-existing resource differences prior to retirement may lead to differential resource trajectories during retirement, and hence to differences in how well people are able to adapt to retirement (Hansson et al. 2018; Kim and Moen 2002).

While more and more studies have examined how changes in well-being with retirement depend on retirement pathways (e.g. Halleröd et al. 2012; Wetzel et al. 2016; Schmälzle et al. 2019), to date little research has separately investigated resource trajectories for people retiring from different labour market statuses. One notable exception is the study by Motel-Klingebiel and Engstler (2008) which found that people retiring from paid work experienced small reductions in economic resources, while people retiring from other labour statuses experienced no income changes. The results from Motel-Klingebiel and Engstler (2008) support our assumption that resource trajectories during retirement depend on individuals' last labour market status.

A person's access to resources depends not only on their labour market status, but also on their social status. Sociodemographic characteristics (e.g. age, gender, education) indicate an individual's position in the social structure (Ross and Mirowsky 2006). Social groups with more resources at one point in time are better able to increase the same and other resources at later points in life, a phenomenon often referred to as "cumulative (dis)advantage" (CAD, Dannefer 2003). Consistent with the CAD phenomenon, we argue that resource level and change during retirement also depend on a person's sociodemographic characteristics. To date, no study has investigated how sociodemographic characteristics are related to resource trajectories during retirement. Wetzel et al. (2016) showed that, over the long term, life satisfaction declined for less-educated retirees, whereas life satisfaction remained stable for highly educated retirees. Presumably, highly educated retirees had more access to resources before and also after retirement, leading to a more favourable trajectory in life satisfaction.

Current study

Resource level and change during retirement are thought to drive how well people adjust to retired life (Wang et al. 2011). Despite the importance of resources for the adjustment process, to date little is known about resource trajectories during retirement, nor about whether resource trajectories depend on retirement pathways and/or sociodemographic characteristics. We therefore add to the literature by separately examining trajectories of economic, personal, and social-relational resources of people retiring from paid employment and people retiring from other, non-working statuses. Specifically, we examine pre-retirement levels and change in income (economic resource), physical health and leisure activity (personal resources), and network size and social support (social-relational resources). Past research has found that these specific resources are associated with well-being in retirement (see Barbosa et al. 2016) and "successful aging" in general (Rowe and Kahn 2015). We also examine how resource level and change are related to age, education, gender, and region.

The current study was based on representative data from German retirees. Compared with other countries, retirement in Germany is a relatively homogeneous experience. The pension system follows the "Bismarck" model in which the state organizes the distribution of earnings-related pensions, which are equally financed by employees and employers. Accordingly, Germany has a strong first pillar pension system with corporate and personal pension programs contributing less heterogeneity. People generally enter retirement when they become eligible for pension benefits at age 65 (currently increasing to age 67). Thus, relative to other countries without a mandatory retirement age, retirement timing is less related to idiosyncratic circumstances (e.g. having other sources of revenue) or personal characteristics.

Regarding economic resources, we expected that people retiring from paid work would have higher pre-retirement income relative to people retiring from other labour market statuses. We expected that income would decrease for people retiring from paid work but remain stable for people retiring from non-work statuses. Nevertheless, we expected that people retiring from paid work would have higher post-retirement income relative to people retiring from other labour market statuses (Motel-Klingebiel and Engstler 2008).

Regarding personal resources, we expected that people retiring from paid work would have better health and greater leisure activity pre-retirement relative to those retiring from other labour market statuses (Ezzy 1993; Morris et al. 1994). We did not expect changes in either health or leisure activity for either group (Dorfman 2013; Gallo 2013). Hence, we expected that people retiring from paid work would continue to have better health and greater leisure activity

post-retirement relative to people retiring from other labour market statuses.

Regarding social-relational resources, we expected to find smaller family network size, smaller non-family network size, and less social support among those not working pre-retirement. Our hypothesis was based on previous research that unemployment is associated with negative social feelings (e.g. being not part of society, Wetzel and Mahne 2016) and lower well-being (e.g. Wetzel et al. 2016), which are in turn both related to fewer social contacts and smaller networks (Huxhold et al. 2013). With retirement, we expected that non-family network size would remain stable (van Tilburg 2009), independent of a person's last labour market status. We expected that family network size would remain stable for people retiring from non-working statuses but increase for people retiring from paid work due to fewer work-related time constraints. We did not expect that social support would change for people retiring either from paid work or from other statuses (Bosse et al. 1993).

Finally, we expected that more privileged social groups (e.g. highly educated retirees) would experience more favourable resource changes during retirement than less privileged retirees, consistent with previous research (Wetzel et al. 2016).

Method

Data source

We used data from the German Ageing Survey, a longitudinal population-based study of non-institutionalized German adults aged 40–85 at baseline (Klaus et al. 2017). In 1996, 2002, 2008, and 2014, large-scale random samples of adults participated in baseline interviews, and follow-up interviews were conducted every 6 years for each sample (i.e. in 2002, 2008, and 2014, respectively). We identified retirees based on a change in labour market status between two waves. Hence, only respondents who participated at least twice were eligible for inclusion in the sample. In order to maximally exploit the strengths of the representative sample, we analysed data only from participants who indicated retiring between a baseline and the first follow-up interview. This subsample of participants is less biased by attrition than, for example, the subsample of participants who retired between the first and the second follow-up occasion. The sample was further restricted to people who retired between age 60 and 65. The upper bound of age 65 was based on the maximum statutory pension age in Germany (65 years until 2011, currently slowly increasing to 67 years). The lower bound of age 60 was based on early retirement options available for several occupational groups.

Accordingly, the potential sample consisted of people who were interviewed in 1996 and re-interviewed in 2002 (32%), those who were part of the 2002 baseline sample and re-interviewed in 2008 (32%), and those who were part of the 2008 baseline sample and were re-interviewed in 2014 (41%). Of the $N = 14{,}127$ people in the three baseline samples, $N = 3694$ were aged between 55 and 65 years at baseline (meaning that they could potentially retire between age 60 and 65), of which $N = 1505$ also participated in the first follow-up interview. We identified $N = 666$ people who reported either being employed or having a non-working labour market status in the first interview and receiving a pension in the follow-up interview. We excluded 28 cases who reported a retirement year in which their age was below 60 years, 32 cases who reported a retirement year in which they were older than 65 years, and 20 cases who did not report a retirement year. Our final sample consisted of $N = 586$ retirees.

Measures

Table 1 displays the questionnaire items and how they were coded, as well as the descriptive statistics (mean, standard deviation) of all study variables.

Last labour market status

During the first measurement occasion, respondents indicated whether they were employed or had any other labour market status (e.g. unemployed, homemaker, or not working due to other reasons).

Economic resources: income

Since a person's financial situation strongly depends not only on his/her own income but also on their household arrangements (e.g. partner's income, number of people living in the household), we used the OECD (weighted) net equivalized household income as an indicator of economic resources (OECD 2018). This indicator is less sensitive to individual labour market changes than personal income but also better reflects individuals' actual economic power (see also Fasang 2012; Strauß and Ebert 2013).

Personal resources: health and activity

Participants indicated whether they had any of 11 chronic conditions. We used the reverse sum score (i.e. 11 minus the number of conditions) as a measure of *physical health.* Higher scores indicate better health. Participants used a list of 13 activities to indicate the number of *leisure activities* they engaged in at least monthly (Wetzel and Huxhold 2016).

Table 1 Variable descriptions and descriptive statistics by last labour market status

	Item[c]	Coding algorithm	*M* (SD)		
			Work ($n=384$)	Other ($n=202$)	Total ($N=586$)
Resource variables[a]					
Available income (logaritmized)	What is the total net monthly income of your household? By that, I mean the sum total of all wages/salaries, income from self-employment, and retirement benefits after deduction of all tax and social security contributions. Please include income from public aid, income from rentals and leases, interest, child benefits and other sources of income	Net household income weighted by 1 for the first adult in a household, 0.5 for each further adult, and 0.3 of each person below age 14; controlled for inflation (reference year: 2010)	7.43 (0.46)	7.21 (0.48)	7.35 (0.48)
Physical health	We would now like to talk about your state of health: Which of the following illnesses and health problems do you have […]?[d]	Total self-reported chronic conditions (max. 11); reverse coded	8.84 (1.63)	8.72 (1.70)	8.80 (1.65)
Leisure activities	If you think back over the past 12 months: How often on an average do you engage in the following activities? Please tell me how often you do each activity on this list[e]	Total leisure activities conducted at least monthly (max. 13)	5.68 (2.08)	5.47 (2.01)	5.61 (2.10)
Family network size	We now want to look at people who are important to you and who you maintain regular contact with. These can include co-workers, neighbours, friends, acquaintances, relatives, and members of your household. Which people are important to you? If there are several, please just name the eight most important. What is your relationship to < display person name > ? Please give me the relevant code number from this Person Card	Number of family members in network (e.g. parents, (grand-) children, siblings) (max. 8)	3.32 (2.41)	3.60 (2.54)	3.42 (2.47)
Non-family network size		Number of non-relatives in network (e.g. friends, colleagues, neighbours)	1.45 (1.73)	1.24 (1.62)	1.38 (1.69)
Social support	(1) When you have important personal decisions to make, do you have anyone you can ask for advice? → If yes: And how often in the past 12 months have you asked someone for advice in making an important decision (2) Do you have someone you can turn to when you need comfort or cheering up, for example, when you are feeling sad? → If yes: And how often in the past 12 months did someone comfort you or cheer you up? (3) And what about the other way around: has someone who does not live in your household helped you in the past 12 months with housework such as cleaning, small repair jobs, or shopping? (4) Have you, in the past 12 months, been given money, major gift items, or financial support?	Item (1) and (2): Potential support is yes and frequency more than "never" → yes in domain Total social support (sum score; max. 4)	1.72 (0.94)	1.77 (0.98)	1.74 (0.95)

Table 1 (continued)

Item[c]	Coding algorithm	*M* (SD)		
		Work ($n=384$)	Other ($n=202$)	Total ($N=586$)
Sociodemographic and other control variables[b]				
Period	Retirement between: 1996 and 2002 = −1.07; 2002 and 2008 = −0.73; 2008 and 2014 = 0.93	0.02 (0.88)	−0.34 (0.92)	0.00 (0.90)
Region	West = −0.37; East = 0.63	−0.02 (0.47)	0.04 (0.49)	0.00 (0.48)
Gender	Male = −0.48; Female = 0.52	−0.04 (0.50)	0.07 (0.50)	0.00 (0.50)
Education	Lower/middle (ISCED 0 to 4) = −0.41; Higher (ISCED 5 and 6) = 0.59	0.05 (0.50)	−0.09 (0.47)	0.00 (0.49)
Age at retirement	Year of retirement minus year of birth; grand mean = 62.52	0.14 (1.85)	−0.27 (2.12)	0.00 (1.96)
Time since retirement	Year of follow-up observation minus year of retirement; grand mean = 2.83	−0.30 (1.66)	0.56 (1.80)	−0.00 (1.75)

[a]All resource variables were z-standardized with mean ($t0$) = 0 and standard deviation ($t0$) = 1. We took the first observation for calibration purposes. Accordingly, the results can be interpreted as increases or decreases relative to the pre-retirement level of the relevant variable

[b]All sociodemographic and other control variables were centred at their grand means. Accordingly, model intercepts can be interpreted as the population mean

[c]English translation of the original German items provided by the DEAS project

[d]List of chronic conditions: back or joint diseases, cardiovascular diseases, diseases of the eye, circulatory problems, diseases of the ear, respiratory diseases, diabetes, bladder trouble, gastrointestinal diseases, liver or kidney diseases, cancer

[e]List of leisure activities: going for walks, gardening, meeting friends and acquaintances, crossword puzzling or quizzes, arts and crafts or similar, playing sports, playing board games, computer, visiting cultural events, visiting sporting events, artistic activities, visiting classes/lectures, participating at political meetings

Social-relational resources: family and non-family network size and social support

Respondents indicated a maximum of eight people who were important to them and with whom they maintained regular contact, along with their relationship to that person (e.g. spouse, sibling, friend, colleague, neighbour). The number of family members was used as a measure of *family network size*, and the number of non-kin was used as a measure of *non-family network size*. *Social support* was based on a sum of responses to four items regarding whether someone had provided them with advice, comfort, instrumental support, and/or money in the past year.

Sociodemographic characteristics

Because resources may change with age and also differ between men and women (e.g. Kim and Moen 2002), across educational levels (e.g. Wetzel et al. 2016), and between former East and West Germany (e.g. Motel-Klingebiel and Engstler 2008), we included *age, gender*, *region* (East/West), and *educational level* (low/middle or high based on the International Standard of Classification) as predictors of level and change in resources.

Additional control variables

Because retirement adjustment is a longitudinal process (Wetzel et al. 2016; Schmälzle et al. 2019), we controlled for the *time since retirement*. Finally, because the stability of work biographies, pension regulations, and resource levels have changed over historical time, we also controlled for *period* (baseline in 1996, 2002, 2008).

Analytic strategy

Item non-response was low (circa 10% for income and physical health, ≤ 3% for all other resource variables). To handle item non-response, we used full information maximum likelihood estimation, which is an efficient way of dealing with item data missing at random (Acock 2005).

We used dual change score models (see McArdle 2009) and Mplus 6.11 (Muthén and Muthén 2010) to analyse trajectories of economic, personal, and social-relational resources for people retiring from work and for people retiring from other labour market statuses. Figure 1 displays the structural equation model. Dual change score models can be used to estimate both the level ($Y[0]$) and the change (ΔY) in resources between the two measurement occasions. Additionally, the model controlled for a second change parameter—the autoregression between pre-retirement resource level $Y[0]$ and change over time (i.e. the extent to which change in resources is related to pre-retirement resource levels). We used a multi-group approach to examine differences between those retiring from work and other statuses. The model also assessed the relationships between the sociodemographic variables and resource level and change and statistically controlled for time since retirement and period. All resource indicators were z-standardized ($M = 0$, $SD = 1$, both at baseline) to be able to compare pre- and post-retirement level and degree of change across resources.

We followed the same model succession for each resource variable. First, we estimated all parameters freely. Second, we set the pre-retirement levels ($Y[0]$) to be equal for people retiring from paid work and people retiring from non-work. Third, we additionally set the changes associated with retirement (ΔY) as equal for the two groups of retirees. We then evaluated models in which the changes were set as identical and the levels were estimated freely. In the next steps, we tested whether first setting the levels and then the changing the parameters to zero significantly reduced model fit. We applied Chi-square difference tests to determine which of two models fit the data better. "Appendix" describes the model succession in more detail. We interpret and present the results of the final and most parsimonious models.

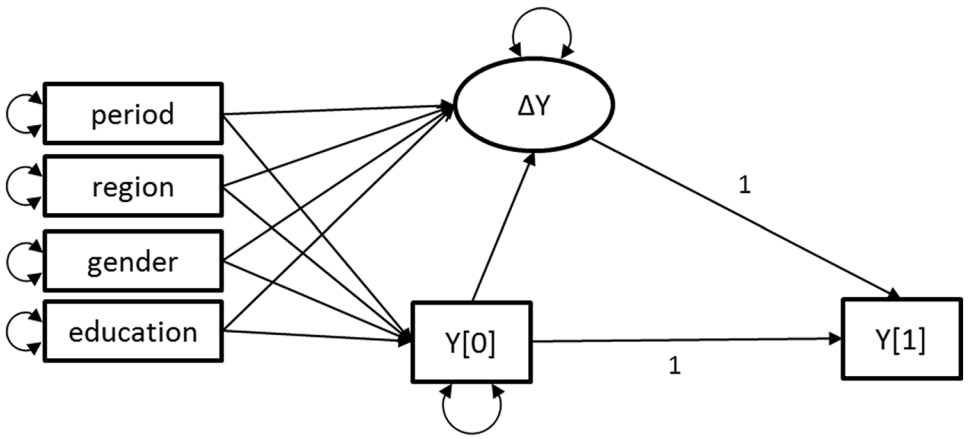

Fig. 1 Path diagram of the latent change score model. The latent variable ΔY is predicted by observation $Y[0]$ at baseline. Both variables fully predict $Y[1]$. In addition to period, region, gender, and education, level and change were also controlled for age at retirement and time since retirement. All control variables were permitted to covariate. The applied multi-group approach is not depicted

Compared with methods applied in previous studies dealing with pre- and post-retirement well-being (e.g. Kim and Moen 2002; Hyde et al. 2004; De Vaus et al. 2007), our procedure has two major advantages. First, we were able to examine the extent to which resources change with retirement and whether the degree and direction of change depended on participants' last labour market status. Second, we were also able to statistically control for the relationships between the level and change in resources on the one hand, and a number of sociodemographic characteristics (age, gender, region, education) as well as time since retirement and historical period on the other hand. Importantly, including age in the model allowed us to disentangle the effects of retirement from the effects of age. Moreover, the model allowed us to control for autoregression which is important because how a variable changes over time is typically related to its absolute level, a phenomenon often referred to as "regression to the mean". The advantage of controlling for autoregression is that the other change parameter captures the change in resources unrelated to this statistical artefact.

Results

Table 2 displays the results of the final and most parsimonious models. The parameters represent average effects adjusted for autoregression, age, gender, region, education, time since retirement and period. The consistently negative autoregression coefficients indicated that retirees with higher levels of a specific resource pre-retirement also experienced greater declines in that resource. Negative autoregression coefficients are, however, common in this type of model and are often driven by regression to the mean. Hence, the autoregression coefficients should not be over-interpreted. Figure 2 graphically displays the resource trajectories of people retiring from work ($n = 384$; 65.5%) and for people retiring from non-working statuses ($n = 202$; 34.5%).

Economic resources

Pre-retirement income was higher for people retiring from work than from other statuses. Both groups experienced an income decrease in similar magnitude. Accordingly, post-retirement income remained lower for people retiring from non-work.

Personal resources

There were no pre-retirement differences in physical health between people retiring from work and people retiring from other labour market statuses, nor was retirement associated with changes in physical health for either group. There were also no differences with regard to pre-retirement leisure activities. For people retiring from paid work, leisure activities increased ($b = 0.32$, or an increase of 1/3 SD). In contrast, leisure activities did not change for people retiring from other statuses.

Social-relational resources

Pre-retirement family network size did not differ between people retiring from work and people retiring from other statuses. Family network size increased to a similar, small degree for both groups. Pre-retirement non-family network size was significantly larger for people retiring from paid work. No changes in non-family network size were observed for either group of retirees. Hence, the difference in non-family network size remained stable with retirement. Social support did not differ pre-retirement and declined to a similar degree for both groups of retirees.

Sociodemographic characteristics

We observed two general patterns regarding the relationships between sociodemographic characteristics and resource changes during retirement. First, retirement increased all pre-existing differences between sociodemographic groups. For instance, differences in income between educational groups and between people living in former East and West Germany were larger post-retirement. Differences in non-family network size between men and women were likewise larger post-retirement. Second, the retirement-related increase in inequality between sociodemographic groups was particularly pronounced among those retiring from paid work. Most notably, among those retiring from paid work, more highly educated people experienced smaller decreases in income and social support as well as higher increases in leisure activities than their less-educated peers. Furthermore, among those retiring from paid work, regional differences in income and social support along with gender differences in income, non-family network size, and social support all became greater after retirement. There was less stratification by education, region, or gender among people retiring from other labour market status.

Discussion

The current study is one of the first empirical examinations of resource trajectories during retirement. We examined level and change in important economic, personal, and social-relational resources for people retiring from paid work and for people retiring from other, non-working statuses. Our results indicate that, overall, retirement per se appears to affect resources only modestly. Importantly, however, we found that resource trajectories during retirement depend on

Table 2 Level and change in resources for people retiring from paid work and for people retiring from other labour market statuses

Resources	Economic		Personal				Social-relational					
	Income		Physical health		Leisure activities		Family network		Non-family network		Social support	
Last labour market status	Work	Other	Work	Other	Work	Other	Work	Other	Work	Other	Work	Other
Pre-retirement level	**0.13**	**−0.30**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**−0.13**	**0**	**0**
Controls												
Period				0.18	0.21	0.17				0.16		
Region	−0.56	−0.75				−0.33						
Gender									0.28		0.36	
Education	0.68	0.54			0.32	0.44						
Change	**−0.10**	**−0.10**	**0**	**0**	**0.32**	**0**	**0**	**0.10**	**0**	**0**	**−0.14**	**−0.14**
Controls												
Autoregression	−0.51	−0.44	−0.49	−0.39	−0.51	−0.39	−0.76	−0.68	−0.74	−0.55	−0.82	−0.63
Period					0.12					0.15		0.27
Region	−0.21							−0.28			−0.24	
Gender	0.16			0.30					0.24		0.41	
Education	0.31	0.21		0.48	0.46	0.35					0.21	
χ^2 (*df*)	52.49 (13)		53.36 (16)		53.10 (15)		54.20 (15)		54.01 (15)		50.54 (15)	
RMSEA	0.10		0.09		0.09		0.09		0.09		0.09	
CFI	0.91		0.74		0.88		0.17		0.54		0.53	

All displayed parameters are significant at $p \leq 0.05$. Zero ("0") values indicate that the parameter did not statistically differ from 0. The models were additionally controlled for age at retirement and time since retirement (results not shown)

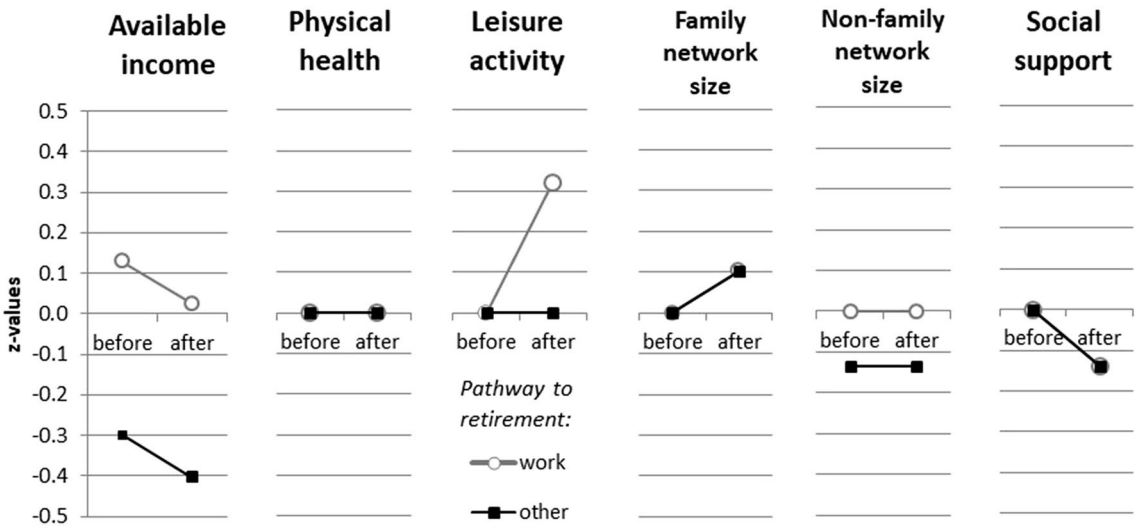

Fig. 2 Resource trajectories before and after retirement for people retiring from paid work and other labour market statuses

the type of resource, pathways to retirement, and sociodemographic characteristics.

Main findings

Our results partially confirmed our hypotheses. As expected, people retiring from paid work had more income (economic resources) pre-retirement than people retiring from non-working statuses, while there were no pre-retirement differences with regard to either family network size or social support (social-relational resources). Unexpectedly, however, people retiring from paid work had larger non-family networks pre-retirement, and there were no pre-retirement differences in either health or leisure activities (personal resources). Our results therefore suggest that retirees' last labour market status is more strongly related to their pre-retirement economic resources and less strongly related to their pre-retirement personal and social-relational resources. The lack of pre-retirement health differences may be associated with the specific indicator used in the current study, since measures of health based on lists of chronic conditions tend to be less related to labour market status than other, more subjective indicators of health (Baker et al. 2004).The larger pre-retirement non-family networks of people retiring from paid work may be due to their daily contact with work colleagues.

Concerning retirement-related *changes* in economic resources, we expected that income would decrease for people retiring from paid employment but remain stable for people retiring from other labour market statues. In contrast to our hypotheses as well as previous research (Motel-Klingebiel and Engstler 2008), we found a general decline in economic resources for both groups. Potentially, the unexpected average income decline for those retiring from non-working statuses may be due to the heterogenous composition of this group, which includes not only previously unemployed people but also homemakers and people retiring from disability pensions. Because pension payments depend on the number of years spent in the labour market, people retiring from non-work statuses likely experienced very diverse income changes. Relative to personal income, the net equivalized household income indicator is less sensitive to changes in individual labour market status. We would thus expect greater declines in personal income during retirement.

We expected that the personal resources physical health and leisure activities would remain stable during retirement for both groups of retirees. Consistent with our hypotheses, we observed no changes in physical health. However, leisure activities increased for people retiring from paid work. Similarly, based on longitudinal data, Van Den Bogaard et al. (2014) recently found that volunteering activities increased with retirement. Potentially, people who retire from paid work experience a reduction in (time) constraints which might increase their opportunity to engage in leisure and volunteer activities.

Furthermore, we expected that retirement would be associated with a decrease in non-family network size and an increase in family network size for people retiring from paid work (based on changing social network composition). Partially consistent with our expectations, we found that family network size increased but that non-family network size remained stable among those previously working, which might indicate that former colleagues become friends and stay in the network (van Tilburg 2009). Surprisingly, we found that family network size also increased for those previously not working. The increase in family network

size among those retiring from non-work statuses may be because previously unemployed people transition from a stigmatized to a normative status. As a result, they might experience an increase in well-being and hence activate their family networks.

Finally, although we expected that social support would remain stable, we found that social support in fact declined for both groups of retirees. One explanation for this puzzling result might be that, for people retiring from paid work, being released from work-role constraints and stresses may reduce their need for social support (e.g. less need to speak about work-related problems or receive help with housework). People retiring from other labour market statuses may need less social support after retirement because they feel more like part of society (Wetzel and Mahne 2016) and happier (Wetzel et al. 2016).

Retirement increases differences between sociodemographic groups, especially among those retiring from paid work

The results also point to some interesting patterns regarding how sociodemographic characteristics are related to resource level and change. Namely, we found that retirement *increased* pre-existing differences between sociodemographic groups, particularly among those retiring from paid work. In particular, resource differences between less and more highly educated people became larger after retirement among those retiring from paid work, while differences between educational groups remained stable among those retiring from other labour market statuses. All in all, we interpret the results as an indication that retirement increases intra-cohort social inequality among those retiring from paid work (Wetzel and Huxhold 2016). The observed increase in differences between sociodemographic groups indicate that retirement is a critical life event during which privileged groups become even more so. In other words, retirement appears to be relevant for CAD processes. Future research should investigate how and why retirement affects inequality between sociodemographic groups in more detail.

Bringing adjustment back in: do resource level and change explain patterns of retirement adjustment?

Resources are assumed to be important drivers of well-being in general (Hobfoll 1989) and adjustment to retired life in particular (Szinovacz 2003; Wang et al. 2011). Although we did not test whether resource trajectories were associated with well-being, our results nevertheless bear some relevance for the "resources-as-drivers" hypothesis. The result that resource trajectories were highly autoregressive corresponds with the resource explanation of why well-being post-retirement would be highly related to well-being before retirement (Hansson et al. 2018). Furthermore, our finding that retirement was, on the whole, only modestly associated with resource changes is also consistent with the resource explanation of why well-being would generally be stable during retirement, at least for people retiring from paid work (Henning et al. 2016; Wetzel et al. 2016). However, we also observed little resource change for people retiring from non-working statuses. Although the resource hypothesis would therefore expect stability in well-being for people retiring from non-working statuses, a number of recent studies have in fact suggested that well-being strongly *increases* for this group (De Vaus et al. 2007; Halleröd et al. 2012; Schmälzle et al. 2019; Wetzel et al. 2016).

In the light of our results, we suggest that other factors besides economic, personal, and social-relational resources (at least those investigated in the present study) may be driving the observed increases in well-being for people retiring from non-working labour market statuses. Specifically, we suggest that not only individual factors but also social factors (e.g. social norms about work and retirement, the social hierarchy) may explain why people retiring from non-working statuses experience an increase in well-being (see Wetzel et al. 2016; Wetzel and Mahne 2016). Future longitudinal studies which examine how level *and* change in resources predict level *and* change in well-being would shed more light on the extent to which resources drive processes of retirement adjustment (Segel-Karpas et al. 2013; Yeung and Zhou 2017; Yeung 2018).

Strengths and limitations

A major strength of the current study is that we considered multiple resource dimensions and different pathways to retirement. Our results confirm that how retirement affects resources is complex and depends not only on the type of resource (economic, personal, social-relational), but also on individuals' last labour market status and sociodemographic characteristics.

By using representative data, considering sociodemographic characteristics, and by using an inclusive operationalization of retirement, our results provide a broad indication of how retirement affects resources on the population level. Previous research on the effects of retirement has typically focused on people who follow traditional work-to-retirement transitions (e.g. Kim and Moen 2002; Hyde et al. 2004; Westerlund et al. 2009; Hansson et al. 2018). However, more than one third of the retirees in the current sample followed a "non-traditional" pathway to retirement (see also Schmälzle et al. 2019). This particular result underlines that analyses based only on people retiring from paid work provide an incomplete picture of how retirement affects the full population. Furthermore, in the light of our results

regarding strong relationships between sociodemographic characteristics and resources, studies based on selective, non-representative samples might lead to biased conclusions. For instance, studies based on samples with an overrepresentation of highly educated retirees might erroneously lead to the conclusion that retirement is generally associated with resource increases.

Alongside these strengths, the current study also has a number of limitations. Our analysis was based on just two measurements of resources (before/after retirement), which did not allow us to identify nonlinear changes. We were also unable to examine psychological resources (e.g. mastery). Another limitation is that the measurements were 6 years apart. We included *time since retirement* in the model to control for potential differences in how resource level and change may be related to retirement timing. However, our results do not provide insight about *how* retirement timing is related to resource trajectories. Future studies based on other data sets with more frequent, more closely spaced measurements are needed to investigate potential nonlinear patterns of changes and compare how resources change in the short and long terms.

Conclusion and outlook

To date, few studies have directly investigated resource trajectories during retirement. The current study demonstrates that the relationship between retirement and resources cannot be described by a single, average trend. We hope that the finding that retirement is neither strongly nor uniformly associated with (negative) resource changes finds resonance in the public, which often assumes that retirement goes along with substantial resource losses. We furthermore hope that our differentiated approach will inspire future empirical and theoretical work on the multidimensional and multidirectional relationship between retirement and resources.

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Appendix

We followed the same procedure for each resource variable. We started with the most flexible model in which all parameters were estimated freely. We then tested whether setting the intercepts of both groups as equal (*fix int*) decreased model fit. Next, we examined whether fixing the slope terms or allowing different slope terms for the two groups resulted in better model fit (*fix sl* or *free sl*). If fixing the intercepts to be equal and the slopes to be unequal resulted in better model fit, we retested whether allowing the intercepts to differ with fixed slopes improved model fit. In the last step, we examined whether each of the maximum of four level and change parameters significantly differed from zero. Table 3 displays the results of the model tests. All models with significantly better fit over the preceding model are in bold. The final, most parsimonious model is in italics.

For available income, model fit decreased significantly when the intercepts (A2, A3) were set to be equal across groups regardless of whether the slopes were estimated freely or fixed. Model fit increased when the intercepts were estimated freely and the slopes were fixed (A4:A1; $\Delta\chi^2 = -2.94$; $\Delta df = 1$; $p \geq 0.05$). Model fit decreased when each parameter was set to zero (A5, A6, A7). Accordingly, the most parsimonious model was characterized by two different intercept terms and a common slope term which were all unequal to zero, indicating that the two groups of retirees had different income pre-retirements but experienced the same rate of change during retirement.

For physical health, both the intercepts (C2:C1; $\Delta\chi^2 = -0.67$; $\Delta df = 1$; $p \geq 0.05$) and the slopes (C3:C2; $\Delta\chi^2 = -0.00$; $\Delta df = 1$; $p \geq 0.05$) could be set to be equal across the two groups, and the intercept parameter and slope parameter could be set to be zero without reducing model fit (C5:C3; $\Delta\chi^2 = -0.03$; $\Delta df = 1$; $p \geq 0.05$; C6:C5; $\Delta\chi^2 = -3.10$; $\Delta df = 1$; $p \geq 0.05$). The final model was thus characterized by no differences in level and no change for either group, indicating that there were neither pre-retirement differences nor changes in physical health for either group.

For leisure activities, the intercepts for the two groups could be set as equal without decreasing model fit (B2:B1; $\Delta\chi^2 = -3.15$; $\Delta df = 1$; $p \geq 0.05$). Setting the slopes to be equal reduced model fit (B3). Setting the intercept parameter to zero did not decrease model fit (B5:B2; $\Delta\chi^2 = -0.22$; $\Delta df = 1$; $p \geq 0.05$). The slope for people retiring from paid work was not equal to zero (B6), whereas the slope for those retiring from other, non-working statuses could be set to zero without affecting model fit (B7:B5; $\Delta\chi^2 = -0.19$; $\Delta df = 1$; $p \geq 0.05$). The final model was thus characterized by an intercept of 0 for both groups, with an increase for people retiring from paid work and no change for people retiring from other, non-working statuses.

For family network size, setting the intercepts to be equal decreased model fit (D2). Setting the slopes to be equal also decreased model fit (D3). Setting the intercepts as unequal and the slopes as equal affected model (D4:D1; $\Delta\chi^2 = -0.12$; $\Delta df = 1$; $p \geq 0.05$). Successively setting each intercept to zero did not affect model fit for either model (D5:D1; $\Delta\chi^2 = -2.80$; $\Delta df = 1$; $p \geq 0.05$; D6:D1; $\Delta\chi^2 = -1.73$; $\Delta df = 1$; $p \geq 0.05$). The equal slope parameters could not, however, be set to zero (D6). The final model thus indicated that both groups of retirees began with the same family

Table 3 Results of successive model testing

	Model	Intercept work	Intercept other	Slope work	Slope other	χ^2	*df*	$\Delta\chi^2$	*p*
Available income	**A1—all free**	i1	i2	s1	s2	49.55	12		
	A2—fix int, free sl	i	i	s1	s2	81.44	13	−31.89	0.00
	A3—fix int, fix sl	i	i	s	s	83.66	14	−34.11	0.00
	A4—free int, fix sl	***i1***	***i2***	***s***	***s***	*52.49*	*13*	*−2.94*	***0.09***
	A5—free	0	i2	s	s	59.11	14	−6.62	0.01
	A6—free	i1	0	s	s	78.83	14	−26.34	0.00
	A7—free	i1	i2	0	0	65.12	14	−12.63	0.00
Physical health	C1—all free	i1	i2	s1	s2	49.55	12		
	C2—fix int, free sl	i	i	s1	s2	50.22	13	−0.67	**0.41**
	C3—fix int, fix sl	i	i	s	s	50.22	14	0.00	**1.00**
	C4—free int, fix sl	i1	i2	s	s	49.55	13	0.67	**0.41**
	C5—fix int, fix sl	0	0	x	x	50.25	15	−0.03	**0.86**
	C6—fix int, fix sl	***0***	***0***	***0***	***0***	*53.36*	*16*	*−3.10*	***0.08***
Leisure activities	B1—all free	i1	i2	s1	s2	49.55	12		
	B2—fix int, free sl	i	i	s1	s2	52.70	13	−3.15	**0.08**
	B3—fix int, fix sl	i	i	s	s	74.88	14	−22.18	0.00
	B4—free int, fix sl	i1	i2	s	s	71.73	13	−19.03	0.00
	B5—fix int, free sl	0	0	s1	s2	52.92	14	−0.22	**0.64**
	B6—fix int, free sl	0	0	0	s2	101.85	15	−48.93	0.00
	B7—fix int, free sl	***0***	***0***	***s1***	***0***	*53.11*	*15*	*−0.19*	***0.67***
Family network size	D1—all free	i1	i2	s1	s2	49.55	12		
	D2—fix int, free sl	i	i	s1	s2	53.58	13	−4.03	0.04
	D3—fix int, fix sl	i	i	s	s	53.70	14	−4.15	0.04
	D4—free int, fix sl	i1	i2	s	s	49.67	13	−0.12	**0.73**
	D5—free int, fix sl	0	i2	s	s	52.47	14	−2.80	**0.09**
	D6—free int, fix sl	***i1***	***0***	***s***	***s***	*54.20*	*15*	*−1.73*	***0.19***
	D7—free int, fix sl	i1	i2	0	0	60.46	16	−6.26	0.01
Non-family network size	E1—all free	i1	i2	s1	s2	49.55	12		
	E2—fix int, free sl	i	i	s1	s2	55.66	13	−6.11	0.01
	E3—fix int, fix sl	i	i	s	s	55.74	14	−6.18	**0.05**
	E4—free int, fix sl	i1	i2	s	s	49.63	13	−0.08	**0.78**
	E5—free int, fix sl	0	i2	s	s	51.72	14	−2.09	**0.15**
	E6—fix int, free sl	0	0	s	s	55.75	15	−4.03	0.04
	E7—free int, fix sl	***0***	***i2***	***0***	***0***	*54.01*	*15*	*−2.30*	***0.13***
Social support	F1—all free	i1	i2	s1	s2	53.35	12		
	F2—fix int, free sl	i	i	s1	s2	49.78	13	3.57	**0.06**
	F3—fix int, fix sl	i	i	s	s	50.54	14	−0.76	**0.38**
	F4—free int, fix sl	i1	i2	s	s	50.30	13	3.05	**0.08**
	F5—fix int, fix sl	***0***	***0***	***s***	***s***	*50.54*	*15*	*0.00*	***1.00***
	F6—fix int, fix sl	0	0	0	0	60.45	16	−9.91	0.00

Starting with freely estimated intercepts (i1, i2) and slopes (s1, s2), the models were successively restricted to equal intercepts (i) and equal slopes (s) between the two groups, then we tested whether each of the parameters differed significantly from zero. Chi-square tests were used to test whether the successive model decreased model fit. Models with significantly better fit than the preceding model are in bold. The final, most parsimonious model is in italics

network size (0) and experienced the same slight increase in family network size during retirement.

For non-family network size, intercepts were unequal and the slopes were equal (E4:E1; $\Delta\chi^2 = 0.08$; $\Delta df = 1$; $p \geq 0.05$). The intercept for those retiring from paid work could be set to zero (E5:E4; $\Delta\chi^2 = -2.09$; $\Delta df = 1$; $p \geq 0.05$), but not the intercept for people retiring from other non-working statuses. Setting the slope parameters to zero did not decrease

model fit (E7:E5; $\Delta\chi^2 = -2.30$; $\Delta df = 1$; $p \geq 0.05$). The final model thus indicated different intercepts for the two groups (lower intercept for people retiring from non-work statuses) and no change for either group.

Finally, for social support, neither the intercepts (F2:F1; $\Delta\chi^2 = -3.57$; $\Delta df = 1$; $p \geq 0.05$) nor the slopes were statistically different (F3:F2; $\Delta\chi^2 = -0.76$; $\Delta df = 1$; $p \geq 0.05$) between the two groups. The intercept did not significantly differ from zero (F5:F3; $\Delta\chi^2 = -0.01$; $\Delta df = 1$; $p \geq 0.05$), but the slopes did. Thus, the final model suggests that the intercept of both groups was 0 (i.e. there were no pre-retirement differences in social support) and that social support decreased for both groups.

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