Retirement as a Lens for Socioeconomic Differences in Cognition and Well-being[1]

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ABSTRACT

This study conceptualizes retirement as a lens with regard to patterns of social inequality across the life course. It investigates if socioeconomic differences in well-being and cognitive performance differ between older workers and retirees, using data from the HEARTS (Health, Aging and Retirement Transitions in Sweden) study. The results provide evidence for retirement as a positive lens with regard to cognition, following the 'use it or lose it' hypothesis. We also find evidence for retirement as a negative lens with regard to well-being, supporting the cumulative (dis-)advantages theory. We test different aspects of socioeconomic status, that is, education, income, occupational group, and subjective work aspects and find the strongest effects for education. Hence, this study contributes with an understanding of mechanisms behind social inequalities over the life-course by using retirement and the loss of the work role as a marker for potential change.

KEYWORDS

Retirement / social inequalities / cognition / well-being / cumulative advantages / work demands / education

Introduction

The question whether social inequalities with regard to different health outcomes decrease or increase with age is controversially discussed (Fisher et al. 2014; Mein et al. 2003; Rohwedder & Willis 2010; Schöllgen et al. 2010; Schuring et al. 2015; Wetzel et al. 2015). Even when only one outcome is investigated, contrasting theoretical approaches and contradictive empirical results can be found in the literature. So far, there is limited research, which systematically investigates various theories on social inequalities on different outcome variables.

In this study, we are investigating socioeconomic differences in cognition and well-being, comparing workers to retirees. Retirement is an important event in older

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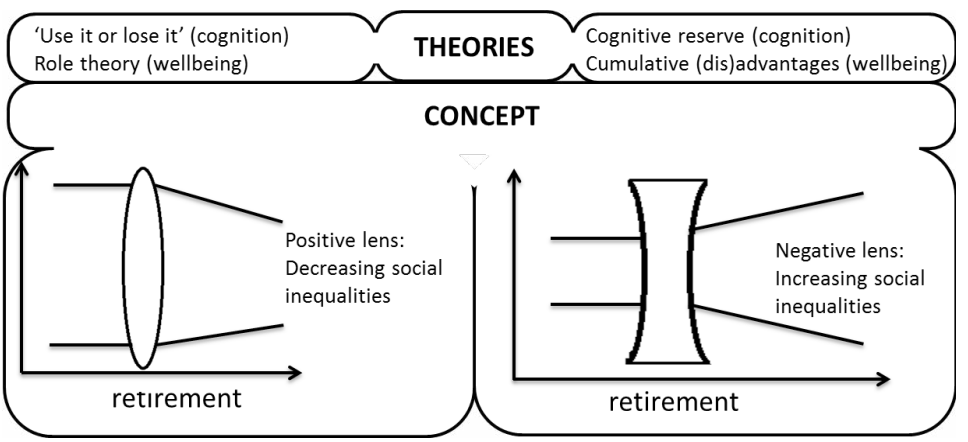
adulthood, as it marks a transition to a different phase of life without the work role. Some groups are more strongly affected (positively or negatively) by retirement in terms of health and well-being than others (Henning et al. 2016). Previous research found social inequalities in the transition to retirement, related to work aspects and environment (Berglund et al. 2017; Kadefors et al. 2016; Nilsson 2012). Thereby, retirement may also lead to different social strata following the transition.

We argue that the retirement transition serves as a 'lens' for either amplifying or mitigating social differences in health and well-being, because retirement might have different effects for different social groups. By using the 'HEalth, Ageing and Retirement Transitions in Sweden' (HEARTS) study (Lindwall et al., 2017) linked to income register data (LISA), we can contribute to previous research by looking at different indicators for socioeconomic status and work characteristics. It has been previously established that different measures of socioeconomic status may have separate effects on various health outcomes and should therefore be investigated separately (Darin-Mattsson et al. 2017; Fuchs 2004; Geyer et al. 2006).

This may be particularly important in a country like Sweden, where education is not closely linked to occupational tracks (Andersen & Van De Werfhorst 2010). From a life course perspective, it can be argued that the link between education and occupation or income should be less pronounced in older ages. HEARTS offers the opportunity to compare two specific aspects of health and well-being, that is, cognitive functioning and life satisfaction. We argue that previous contradictive results about the effect of retirement on social inequalities may be related to the outcome measure. While for some measures, social inequalities may increase after retirement, they may decrease for others (Figure 1).

This paper follows the conceptual framework for retirement transitions as a lens for social inequalities in health, functioning, and well-being and tests the idea empirically by looking at different outcome variables (i.e., cognition and well-being), providing a more refined picture of how retirement influences aspects of health for different groups. Theoretically, there are different approaches, suggesting either a negative lens with increasing social inequalities or a positive lens with decreasing social inequalities. The positive lens

Figure 1 Conceptual idea of retirement transitions as a lens for social inequalities.



(own illustration)

is suggested by the 'use it or lose it' hypothesis with regard to cognition and by role theory with regard to well-being. The negative lens is suggested by the cognitive reserve hypothesis with regard to cognition and by the cumulative disadvantages theorem with regard to well-being. There are also suggestions that retirement does not function as a lens, in particular for well-being. The underlying theory is the 'continuity theory' (Atchley 1976), which will be discussed in detail below.

The importance of addressing several aspects of socioeconomic status separately is proposed in several studies (Darin-Mattsson et al. 2017; Fuchs 2004; Geyer et al. 2006), since they capture different causal mechanisms. Previous studies often relate education or occupation to health differences, using them as a proxy for work aspects such as cognitive demands or work commitment. It can be argued that pre-retirement work factors influence health, well-being, and cognition and determine how these outcomes are affected by retirement. Leaving a job with poor working conditions can increase overall health (Schuring et al. 2015) and well-being (Wang 2007) while leaving a stimulating work environment can negatively affect well-being and cognition (Finkel et al. 2009; Mazzonna & Peracchi 2012; Rohwedder & Willis 2010). Differential availability of important resources may lead to differential opportunities to adapt to retirement (Wang 2007), which may amplify persisting inequalities.

As the lens effect could be driven by various dimensions related to socioeconomic differences, we will use different markers of socioeconomic status in the analyses. This study aims to disentangle the effects of different aspects of socioeconomic status by looking at

1. education
2. income
3. occupation (objective measure of work aspects)
4. subjective measures of work aspects

Thereby, the study can help to shed more light on the underlying mechanisms of increasing or decreasing social inequalities. It can be expected that subjective measures of work characteristics show similar effects across countries. However, with regard to education, occupation, and income, country-specific effect may occur. In countries where occupation is more closely linked to education, there may not be large differences between the two measures. In Sweden where this is not the case (Andersen & Van De Werfhorst 2010), occupation may be a better indicator to reflect the objective work role, while education may be a broader measure for different resources.

Following these ideas, we aim to answer the following research question:

Are socioeconomic differences among retirees larger or smaller compared to their pre-retirement working peers with regard to cognition and well-being?

Retirement and differences in psychological health

Retirement and cognition

Recent studies imply that retirement may affect cognitive performance negatively (Rohwedder & Willis 2010). According to the 'use it or lose it' hypothesis of cognitive aging (Katzman 1995), intellectual activity is needed to maintain cognitive abilities and

delay or attenuate age-related cognitive decline. The workplace is an important source of intellectual stimulation. Hence, giving up work may affect cognitive functioning and the rate of the age-related cognitive decline (Finkel et al. 2009). Furthermore, retirement might also lead to a decrease in health-promoting behavior and thus indirectly to changes in cognition, as work-related incentives for staying healthy disappear (Mazzonna & Peracchi 2012). Some studies report a significant association between individual age at the retirement transition and onset of cognitive decline (Mazzonna & Peracchi 2012) or a drop in performance around the actual retirement event (Bonsang et al. 2012). Interestingly, the latter study showed stabilization after the event. Others have found only domain-specific disadvantages, that is, problems regarding inductive reasoning (Roberts et al. 2011) and information processing (de Grip et al. 2015). Some studies even provide evidence of better performance among the retired regarding cognitive flexibility (de Grip et al. 2015). Coe and Zamarro (2011) do not find a significant effect at all.

The ambiguous results might result from mixing up different groups with various patterns of change, related to retirement. Little is known about which subgroups are more strongly affected by retirement in terms of cognition. Theoretically and empirically, research yields two opposing lines of argumentation for which groups retirement affects cognition negatively. Some researchers assume that cognitively high functioning individuals with complex work environment suffer more from retirement (Finkel et al. 2009); they relate to the 'use it or lose it' hypothesis of cognitive aging (Katzman 1995). Others argue that those with previously good cognitive performance and a complex work environment are to some extent guarded from the negative consequences of retirement (Fisher et al. 2014). This is in line with the 'cognitive reserve' hypothesis (Stern 2002).

Use it or lose it

Previous research finds a clear link between work complexity and cognition in old age (Andel et al. 2007). Some researchers assume that cognitively high functioning individuals with complex work environment suffer more from retirement, as they lose a more stimulating job (Finkel et al. 2009). This relates to the 'use it or lose it' hypothesis of cognitive aging (Katzman 1995), mentioned above: If a source of stimulation is lost, i.e. the brain is not used as in younger ages, cognitive aging should be stronger. This would be the case for people with more stimulating jobs, while people with monotonous jobs should experience weaker effects of retirement. Accordingly, people with less complex jobs have been found to show less decreases in cognitive health (Coe et al. 2012; Finkel et al. 2009). Coe et al. (2012) even find an increase in cognitive performance among blue-collar workers after retirement.

The 'use it or lose it' hypothesis therefore suggests that retirement functions as a positive lens (e.g. decreasing differences) with regard to cognitive abilities.

Hypothesis 1a (use it or lose it – positive lens): Cognitive differences across socioeconomic groups are smaller among retirees compared to working individuals.

Cognitive reserve

However, there are also studies suggesting the opposite. Fisher et al. (2014) relate cognitively less complex jobs to faster declines after retirement. Kok et al. (2016) find less

strong cognitive decline for individuals with higher socioeconomic position, suggesting increasing inequalities over time. This relates to the cognitive reserve approach on cognition (Stern 2002). This theory suggests that lifetime cognitive activity and stimulation might help to build a 'buffer' against cognitive decline. They should thus experience the negative effects of losing their job to a lower degree. Furthermore, people in complex work environments might have more resources (in terms of health, cognitively stimulating leisure activities, and finance) to establish a stimulating environment after retirement as well. Some studies support this view by showing that complex work environments are associated with more positive changes in cognition after retirement (Fisher et al. 2014).

Hence, the cognitive reserve approach rather suggests that retirement functions as a negative lens (e.g., increasing differences) with regard to cognitive abilities.

Hypothesis 1b (cognitive reserve – negative lens): Cognitive differences across socioeconomic groups are larger among retirees compared to working individuals.

Retirement and well-being

Theoretical arguments on the relationship between retirement and well-being are also not straight forward. Different theories provide insights in the potential dynamics of well-being around the retirement transition. Role theory implies that retirement might be more problematic life phase for those with higher status; the cumulative advantage/disadvantage theorem implies increased socioeconomic differences after retirement. The continuity theory, however, relates retirement to stability in well-being and would thus imply stable socioeconomic differences.

Role theory

According to role theory, the loss of the work role could decrease well-being (George & Maddox 1977). This should be especially important for individuals with strong work identity and prestigious jobs. However, also for other groups, the work role might provide a buffer in case of other nonwork roles are posing stress and pressure on the individual (Barnett & Hyde 2001; Kim & Moen 2002). In reverse, if the work role is a source for stress, retirement would then offer a relief from this strenuous role balance (Halleröd et al. 2012; Kim & Moen 2002). This could also be a rather short-term effect as suggested by Atchley (1976), who ascribes the loss of a stressful role to a 'honeymoon' phase.

Empirically, Mein et al. (2003) found an increase in depression only among individuals who continued to work but not among retirees. Charles (2002) accounted for endogeneity of retirement and well-being and found that retirement has a positive effect on well-being. Westerlund et al. (2010) found that retirement contributed to a decrease in mental and physical fatigue and depressive symptoms, especially among those with chronic disease.

Wang (2007) characterized those with physically demanding, stressful, or unsatisfying jobs as recovering retirees. Those groups benefited from retirement with regard to their well-being. In contrast, this means that no beneficial effect of retirement can be found for those in satisfying jobs. In his sample, Wang (2007) differentiated only between three distinct patterns. Potential long-term decrease of well-being after retirement was therefore not captured. Schuring (2015) found a decrease in health before

retirement for lower educated, leading to an increase afterwards. This was interpreted as possible relief from previous work stress.

A loss of this prestige might negatively affect well-being and in turn, retiring from a less accepted job might be beneficial (Clark & Fawaz 2009). In this case, social inequalities should be smaller after retirement.

Hypothesis 2a (role theory – positive lens): Socioeconomic differences in well-being are smaller among retirees compared to working individuals.

Cumulative advantage/disadvantage theorem

Social inequality in terms of socioeconomic status might determine if people have the resources to adapt to retirement. Previous studies found a benefit with regard to retirement adaptation for people with higher socioeconomic status (Pinquart & Schindler 2007) and with higher education (Wetzel et al. 2015). Wetzel et al. (2015) relate this to the 'cumulative advantage/disadvantage' theorem (DiPrete & Eirich 2006; Ross & Wu 1996), which assumes that people with more resources at earlier time points are also able to gather more resources over the life course. These type of studies find a more constant life satisfaction among higher educated, while they find a steeper decline for lower educated following retirement (after a short honeymoon phase of 1 year after retirement). Hence, this would imply that educational differences might be higher post-retirement.

The cumulative advantage/disadvantage theorem clearly follows the idea of a negative lens. Even though this approach does not suggest that a certain event leads to larger differences, an increase of inequalities over time is assumed.

Hypothesis 2b (cumulative advantage/disadvantage theorem – negative lens): Socioeconomic differences in well-being are larger among retirees compared to working individuals.

Continuity theory

In contrast to our assumption of retirement as a lens, continuity theory expects no clear change of well-being following retirement and suggests a life-course perspective (Atchley 1976; Coe & Zamarro 2011; Halleröd et al. 2012).

This was empirically supported by several studies that found no effects of retirement on different measures of well-being (Coe & Zamarro 2011; Halleröd et al. 2012; Hyde et al. 2004). Continuity theory assumes that people relate to their previous jobs even after retirement, so differences in societal acceptance, job prestige, and self-esteem might continue. This view is supported by studies showing the importance of pre-retirement identity for later life (Damman & Henkens 2016; Reitzes & Mutran 2006).

Following the continuity theory, the concept of a lens is not supported.

Hypothesis 2c (continuity theory): Previous social inequalities in well-being remain after retirement.

Method and data

The complexity and controversy of the discussed topic demands a rich data source that provides detailed information on (previous) working conditions. The 'HEalth, Ageing

and Retirement Transitions in Sweden' (HEARTS) study features all necessary aspects for investigating pre- and post-retirement differences in cognition and well-being.

HEARTS has a highly representative sample of 5913 individuals between the ages of 60 and 66 years in Sweden, recruited through the register *Statens personadressregister* (SPAR) in 2015. The sample for this article consists of working and retired individuals, which allows for group comparisons. Investigating a narrow age span has the advantage that age-related differences are less pronounced. Thus, group differences between workers and retirees can be more confidently linked to the transition to retirement and the loss of the work context. Information on current, respectively, previous working conditions is answered by workers and retirees.

Education is included as a dummy variable derived from the highest level of education with 'higher education' including those with some tertiary education.

In addition to the HEARTS data, we linked register data from the LISA (Swedish: Longitudinell integrationsdatabas för sjukförsäkrings- och arbetsmarknadsstudier) database, which provides data on income and occupation. These can be used as additional measures for socioeconomic status. Thereby, it allows us to separate the educational effect from purely income-related aspects. We include a measure for individual income (in 100 SEK), which is the sum of individual income from paid work and the total amount of old age pension income (private, state, and occupational pensions). Furthermore, we include a dummy variable for the occupational groups, which belong to professionals or managers according to the Swedish Standard Classification of Occupations grouping.

Cognitive work demands are measured with an additive index of four items, divided by the number of items: 'I have to keep my eyes on lots of things while I work', 'My work requires that I remember a lot of things', 'My work demands that I am good at coming up with new ideas', 'My work requires from me to make difficult decisions'. All items can be answered on a 5-point scale, with higher values describing higher agreement to the statement and therefore higher cognitive demands. For retirees, the same items are asked about the pre-retirement job.

The meaning of work is created as an additive index of three items, divided by the number of items: 'My work is meaningful', 'I feel that the work I do is important', 'I feel motivated and involved in my work'. All items can be answered on a 5-point scale, with higher values describing higher agreement to the statement and therefore a perception of a more meaningful work. For retirees, the same items are asked about the pre-retirement job.

We include age and sex as control variables and a measure for health: 'How do you rate your overall health condition?'. This can be ranked on a scale, ranging from very bad (1) to very good (6).

We conduct ordinary least square (OLS) regressions for cognition and well-being. Well-being is measured with the satisfaction with life scale (Diener et al. 1985). This scale is commonly used in studies on well-being and measures satisfaction with life with five items on a 7-point likert scale. We chose numeracy as cognitive outcome, which is assessed with six items based on Weller et al. (2013). First, we conduct the regression without any interaction effect to see the main effects of the socioeconomic measures. Then, we stepwise add interaction effects for each of the four socioeconomic measures with retirement status. Last, we illustrate the predictive margins within each socioeconomic group at the two different retirement states for the significant interactions. Predictive margins are frequently used to better understand, illustrate, and interpret regression results, in particular for complex models with interaction effects (Graubard & Korn 1999).

The analyses include 3175 individuals who answered at least three out of six items in the tests on cognition (numeracy) and 4496 who answered the questions on life satisfaction (Tables 1 and 2).

The descriptives show that retirees are on average somewhat older, more often female, and characterized by a lower socioeconomic status. This is in line with previous research. In our subsequent analyses, we therefore analyze socioeconomic groups separately to reduce the risk of misinterpretation of observable differences in well-being and cognition across the retirement states.

Results

The results suggest different dynamics for social inequalities in cognition and well-being. While differences are generally smaller among retirees when it comes to numeracy, they are larger with regard to life satisfaction compared to those in employment.

Table 1 Sample description (cognition) n = 3175

	Working (n = 2283)			Retired (n = 892)		
	Mean	**SD**	**%**	**Mean**	**SD**	**%**
Numeracy	2.76	1.29		2.77	1.24	
Income	4169.82	2657.76		3197.26	1969.39	
Cognitive demands	4.00	0.81		3.96	0.90	
Age	62.42	1.84		64.88	1.34	
Self-reported health	4.78	0.95		4.83	0.97	
Higher education			58.08			52.80
Manager			33.42			31.17
Women			50.55			53.59

Table 2 Sample description (life satisfaction) n = 4496

	Working (n = 3176)			Retired (n = 1320)		
	Mean	**SD**	**%**	**Mean**	**SD**	**%**
Life satisfaction	24.18	6.59		25.64	6.64	
Income	4011.85	2534.05		2991.50	1908.37	
Meaning of work	4.31	0.77		4.30	0.79	
Age	62.42	1.82		64.87	1.34	
Self-reported health	4.74	0.96		4.76	1.00	
Higher education			53.84			47.12
Manager			30.51			27.05
Women			52.11			56.52

Retirement and Cognition

Results from the OLS regressions on numeracy are presented in Table 3 and summarized in Table 5.

As described above, we use a stepwise approach. In the baseline model without interaction effects, education, occupational class, and income are all related to better numeracy. Retirement only influences the relationship of education and numeracy (model 2). In line with previous research (Coe et al. 2012), educational differences in numeracy are smaller after retirement. Adding further interaction terms does not meaningfully influence the interaction of education and retirement. Figure 2 shows the marginal effects (95% confidence intervals) of education on numeracy for workers and retirees, using connecting lines for illustrative purposes.

Our results for cognition suggests evidence for the 'use it or lose it' hypothesis and the idea of retirement as a positive lens. This provides evidence for hypothesis 1a and contradicts the hypothesis of a cognitive reserve (H1b).

Table 3 OLS regression on numeracy

	Model 1	Model 2	Model 3	Model 4	Model 5
Retired	0.11+	0.26***	0.20*	0.20*	0.27
	(0.06)	(0.00)	(0.04)	(0.05)	(0.21)
High education (dummy)	0.24***	0.32***	0.32***	0.31***	0.31***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Income	0.00***	0.00***	0.00***	0.00***	0.00***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Manager	0.32***	0.32***	0.32***	0.36***	0.36***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Cognitive demands	0.02	0.02	0.02	0.02	0.03
	(0.37)	(0.34)	(0.35)	(0.35)	(0.32)
Age	0.00	0.00	0.00	0.00	0.00
	(0.86)	(0.91)	(0.93)	(0.92)	(0.91)
Self-reported health	0.00	0.00	0.00	0.00	0.00
	(0.87)	(0.86)	(0.87)	(0.88)	(0.88)
Women	-0.57***	-0.57***	-0.57***	-0.57***	-0.57***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Retired # education		-0.28**	-0.29**	-0.25*	-0.24*
		(0.00)	(0.00)	(0.01)	(0.02)
Retired # income			0.00	0.00	0.00
			(0.37)	(0.20)	(0.18)
Retired # manager				-0.14	-0.14
				(0.20)	(0.22)
Retired # cognitive demands					-0.02
					(0.68)

(*Continued*)

Table 3 (*Continued*)

	Model 1	Model 2	Model 3	Model 4	Model 5
Constant	2.28**	2.28**	2.31**	2.31**	2.27**
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Observations	3175	3175	3175	3175	3175
R^2	0.122	0.124	0.124	0.125	0.125

p values in parentheses.
+ p < 0.10, * p < 0.05, ** p < 0.01, *** p < 0.001.
Robust inference
describes an interaction effect.

Retirement and well-being

Results from the OLS regressions on life satisfaction are presented in Table 4 and summarized in Table 5.

In a first model without interaction effects, we find positive effects of income and meaning of work on life satisfaction, as well as a marginal significant positive effect of occupational class. Adding interaction effects, we can see that retirement influences the effect of education, but not the effects of the other measures. Adding further interaction terms does not meaningfully influence the interaction of education and retirement.

Table 4 OLS regression on life satisfaction

	Model 1	Model 2	Model 3	Model 4	Model 5
Retired	1.46***	1.07***	1.07**	1.04**	1.37
	(0.00)	(0.00)	(0.01)	(0.01)	(0.25)
High education (dummy)	-0.24	-0.48*	-0.48*	-0.52*	-0.52*
	(0.22)	(0.04)	(0.04)	(0.03)	(0.03)
Income	0.00**	0.00**	0.00**	0.00**	0.00**
	(0.00)	(0.00)	(0.00)	(0.01)	(0.01)
Manager	0.38+	0.37+	0.37+	0.52*	0.52*
	(0.07)	(0.07)	(0.07)	(0.04)	(0.04)
Meaning of work	1.70***	1.70***	1.70***	1.70***	1.72***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Age	0.03	0.03	0.03	0.03	0.03
	(0.54)	(0.50)	(0.50)	(0.50)	(0.50)
Self-reported health	2.54***	2.54***	2.54***	2.54***	2.53***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Women	0.09	0.10	0.10	0.10	0.10
	(0.61)	(0.60)	(0.60)	(0.59)	(0.59)
Retired# high education		0.79*	0.79*	0.94*	0.95*
		(0.04)	(0.04)	(0.02)	(0.02)
Retired # income			-0.00	0.00	0.00
			(0.98)	(0.74)	(0.72)

Table 4 (*Continued*)

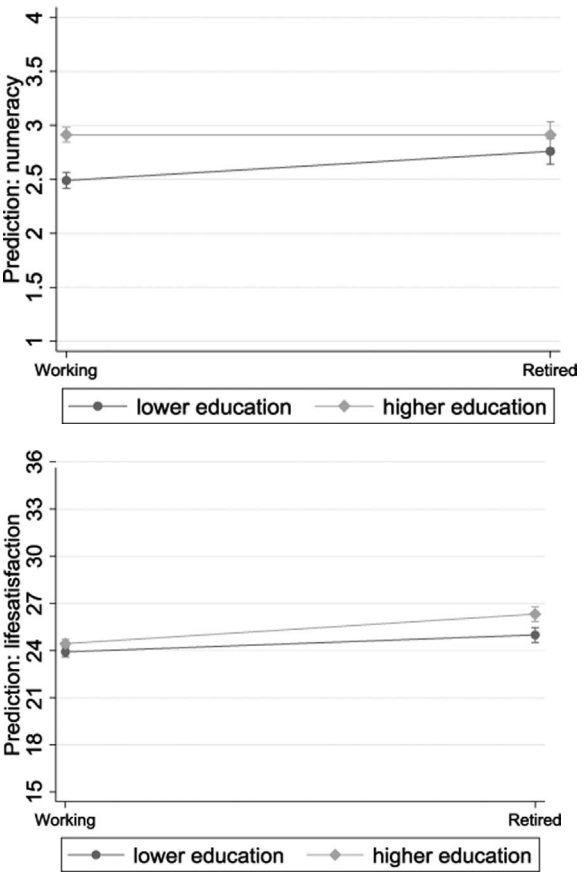
	Model 1	Model 2	Model 3	Model 4	Model 5
Retired # manager				-0.51 (0.26)	-0.51 (0.26)
Retired # meaning of work					-0.08 (0.77)
Constant	2.38 (0.46)	2.30 (0.48)	2.29 (0.48)	2.30 (0.48)	2.21 (0.50)
Observations	4496	4496	4496	4496	4496
R^2	0.225	0.225	0.225	0.226	0.226

p values in parentheses.
+ p < 0.10, * p < 0.05, ** p < 0.01, *** p < 0.001.
Robust inference.
describes an interaction effect.

Table 5 Summary of hypothesis and results

Hypothesis	Theoreticalargument	Lens	Measure	Rejected/supported
1a	Use it or lose it	Positive	Education	✓
			Income	×
			Occupation	×
			Cognitive demands	×
1b	Cognitive reserve	Negative	Education	×
			Income	×
			Occupation	×
			Cognitive demands	×
2a	Role theory	Positive	Education	×
			Income	×
			Occupation	×
			Meaning of work	×
2b	Cumulative disadvantage	Negative	Education	✓
			Income	×
			Occupation	×
			Meaning of work	×
2c	Continuity theory	No	Education	×
			Income	✓
			Occupation	✓
			Meaning of work	✓

Figure 2 Predictive margins of education and retirement on numeracy (positive lens) and on life satisfaction (negative lens).



Note: The results picture group comparisons.

Figure 2 shows the predictive margins (95% confidence intervals) of education on life satisfaction for workers and retirees, using connecting lines for illustrative purposes. The figure shows that educational differences with regard to life-satisfaction are larger after retirement than before retirement.

Our findings support the cumulative advantage hypothesis (H2b) and the idea of retirement as a negative lens for educational differences: Educational differences in life satisfaction are more pronounced among retirees.

These results are in contrast to the role theory approach, where higher educated individuals are expected to have lower satisfaction after retirement if they left their fulfilling work role. Hence, the findings are in contrast to hypothesis 2a.

Individuals in higher occupational groups and those who consider their work as meaningful have a higher life satisfaction in general, but there is no interaction effect with retirement. Hence, those who left their job role in a meaningful job do not differ with regard to life satisfaction compared to those who still work in a meaningful job

(Table 4: Model 5). This gives some support to the continuity theory (H2c) with regard to work aspects and rejects the role theory hypothesis (H2a).

Concluding, our results suggest that higher educational inequalities after retirement are related to other factors than what can be explained by role theory. There is a tendency for the continuing accumulation of advantages among highly educated. Despite potentially losing an important work role, higher educated may have better means to enjoy their retirement compared to their lower educated peers. These means go beyond financial aspects (Model 3).

Conclusions and limitations

Limitations

Due to the cross-sectional design of this study, our results are impaired by some limitations and may reflect selection biases. Haard (2008) and Bonsang et al. (2012), however, do not find that changes in cognition affect the expectation or probability to retire. Hence, with regard to cognition, it can be assumed that our results are not strongly impaired by a selection of individuals with lower cognitive functioning into retirement. Nevertheless, there could be group-specific selection effects. For example, lower cognitive performance might affect the likelihood for retirement in more complex jobs, held by people with higher socioeconomic status, while people with lower socioeconomic status might either have less cognitively demanding jobs, or might not be able to afford retirement. Longitudinal data is needed to further explore this issue. Also in terms of well-being, there may be a selection effect. This is suggested by the study by Bonsang and Klein (2012) which compared OLS results to fixed effects. In their study, lower satisfaction is related to a higher likelihood of being retired. Hence, our finding of a generally higher well-being after retirement might even be underestimated.

Contributions

This study shed more light on the contradictive picture of the effect of retirement on social inequalities. While empirical results and theoretical considerations led to inconsistent conclusions, our article could contribute in several ways.

First, this study contributes to research on life-course developments of social inequalities by its focus on the retirement transition. While previous studies also found support for the cumulative advantage theory with regard to some features of physical health (e.g., limitations of physical functioning and grip strength), they additionally found support for the continuity theory for subjective / self-reported health and chronic diseases (Leopold & Engelhardt 2012; Schöllgen et al. 2010). Those studies focused on life course differences rather than the retirement event. Our article highlights that accumulated (dis-)advantages may become even more pronounced by the retirement event and not solely occur due to age-related developments. Thus, it suggests a mechanism for increasing inequalities related to a change in resources due to job loss. Future research should test the lens concept by paying attention to social differences across retirement with other outcome measures.

Second, this study contributes to ongoing research on possible effects of retirement because we examined different outcome variables and differentiate between social groups.

The main finding is that retirement can have an amplifying *and* mitigating effect on social inequalities, depending on the outcome variable. In terms of cognition, educational differences are smaller in retirement while they are larger when looking at life satisfaction. Thus, this paper provides a conceptual contribution to retirement research: the retirement event serves as a lens for social inequalities with an amplifying function for life satisfaction and a mitigating function for cognition. Third, the dataset allowed us to disentangle the effect of social differences and different measures of socioeconomic factors and work characteristics. Thereby, we can highlight several theoretical implications. Going through all five theoretical arguments step by step, our results do not find evidence for the *cognitive reserve theory* for cognitive functioning in older ages. Future research should investigate this hypothesis by taking time in retirement into account. In our study, retirees had been retired between 1 and 6 years. The potential cognitive reserve might be more important over an extended time period.

In terms of the 'use it or lose it' hypothesis, we initially used this theoretical argument to prove a positive lens for cognition. While we find a positive lens with smaller differences among retirees, it is not suggested to follow the underlying argument of the 'use it or lose it' hypothesis. While the 'use it or lose it' hypothesis suggests that social inequalities in cognition are lower after retirement due to the loss of a stimulating work environment, we found an effect of education beyond this loss. The findings from this article clarify that the loss of a cognitive demanding job is not related to lower numeracy which is in contrast to previous results (Finkel et al. 2009; Mazzonna & Peracchi 2012; Rohwedder & Willis 2010). A possible explanation might be the subjectivity of our cognitive demand measure. It rather captures how the individual perceive the demands instead of providing an objective measure. However, in this case, the objective variable for occupational group should show some results, which is not the case. In line with previous results (Coe et al. 2012), our study finds additional evidence that lower educated have higher numeracy performance when they are retired compared to the working group. This suggests that this group enters a more active lifestyle after retirement but needs to be further investigated with longitudinal data to capture intra-individual change. This aspect is not covered by the 'use it or lose it' hypothesis. The potential opportunities in retirement for individuals with lower education have been broadly neglected in previous research.

Turning to the theories for well-being, our study finds some support for a negative lens and provides evidence for the *cumulative (dis)advantage theory*. Higher educated individuals have an even higher life satisfaction after retirement. This is in line with previous finding (Pinquart & Schindler 2007; Wetzel et al. 2015) for the advantage of higher educated individuals in the adaptation to retirement. The fact that we only find this effect for education but not for the other indicators of socioeconomic status highlights that the adaptation to retirement may rely on resources that go beyond income. Higher education is often related to higher self-efficacy (Bandura 1997), which can help coping with the new life challenges accompanying the retirement transition.

According to *role theory*, previous research argued that the loss of the job role leads to a lower satisfaction after retirement. This was linked to expectations on social inequalities. Using occupation and the meaning of work as a measure for high work

identification, our results suggest that the effect of meaningful work does not differ between workers and retirees.

Hence, this rather follows the *continuity theory* where it is argued that the loss of the job due to retirement does not affect the job identification. Individuals can still be satisfied by identifying with the previous work role even after retirement. The perception of a meaningful work is related to higher life satisfaction, independent of the work/retirement status.

Future research should account for retirement circumstances, include an indicator of voluntariness of retirement transitions, and use longitudinal data to investigate individual change to avoid misinterpretation due to group-specific selection into retirement.

Our results can be expected to be applicable beyond the Swedish context. In particular, the subjective perception of work characteristics should have a universal relevance. We find that occupation and education show very different results, hinting toward different mechanisms between the two measures of socioeconomic status. While occupation may be more directly related to a specific work role and an objective measure of work demands, education may be more related to other social and individual resources, such as self-efficacy. However, these findings may be specific for Sweden and other countries where occupations are not closely linked to education. In countries where occupation and education are higher correlated and closer linked due to specific educational systems, the different mechanisms of these two measures may become blurry. In terms of income and retirement, the Swedish pension system can be seen as rather protective, providing minimum pensions to low socioeconomic groups. While retirees have lower income on average compared to the working counterparts, this does not affect their satisfaction with life and their cognition differently. Hence, the level of income does not become more or less important after retirement. In countries with higher old age poverty, income disparities may play a more important role after retirement.

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