Change in Health Complaints When Transitioning to Retirement: A Stress-Theoretical Perspective on the Role of Working Time

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Abstract

Employing a stress theoretical perspective, we investigate the role of working time for the trajectory of health complaints at the transition from employment to retirement. Drawing on job demands-resources theory, we argue that individuals with longer weekly working hours experience greater health improvements when retiring. Additionally, we assume that work time control buffers the relationship between weekly working hours and changes in health complaints. We used a subsample of a representative panel survey conducted in Germany. This comprised 876 employees who transitioned from employment to retirement. The results of the discontinuous multilevel growth model indicated that longer weekly working hours and lower work time control lead to stronger decreases in health complaints from employment to retirement. We found no evidence of a buffering effect of work time control.

Keywords: Health, working time, retirement, growth model, panel study

Introduction

As statistics show, the German pension insurance recorded 165.803 new entrants to disability pensions in 2021 (Deutsche Rentenversicherung 2023). Disability retirement or health declines at the transition from employment to retirement might pose a strong risk in the increasingly ageing workforce as they might contribute to an overburdening of pension and health care systems in the future (Deller/Wöhrmann 2013; Virtanen et al. 2014).

Therefore, identifying risk factors from work that might be stressful and exhausting for older employees is of particular importance to prevent health declines. Otherwise, already existing health complaints might intensify, or new ones might emerge and eventually contribute

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to an increase in disability pensions. When demanding working conditions are removed with the transition from employment to retirement, it might come to an improvement of the health status. Indeed, the transition from employment to retirement has been found to reflect itself in individuals' health changes (e.g., Eibich 2015; Kim/Moen 2002). Whether it comes to an improvement or a deterioration in health, might vary greatly from individual to individual. Multiple studies found evidence for health improvements (e.g., Filomena/Picchio 2022; Fleischmann/Xue/Head 2020; Westerlund et al. 2010). Nonetheless, others also found a deterioration in health status (e.g., Jokela et al. 2010; Li et al. 2021). The extent to which the duration of weekly working hours might be a stressful working condition has been subject of much debate recently. Among other points, shortening weekly working hours, for example, by reducing the number of working days to four days per week, has become a socio-political debate (Böhle/Stöger 2022). In many European countries, specific models of working time organization were designed in order to ease and prolong the transition to retirement, such as partial retirement. These models give employees approaching retirement age in the near future the option to reduce their working time. The purpose of this working time reduction opportunity is to allow older people to participate in the workforce longer while providing some form of wage compensation.

Empirical research on the relationship between weekly working hours and health shows that longer weekly working hours are negatively related to health, while a reduction of weekly working hours was found to be beneficial (e.g., Baumann et al. 2022; Chu 2021; Voglino et al. 2022). These studies have considered the health status during employment, while to the best of our knowledge the aftermath of weekly working hours on health after transitioning to retirement has not been examined. Thus, little is known about the role of working time for health changes that might occur at the transition from employment to retirement. However, this is pivotal as it allows for a comparison of an individual's health status during employment and during retirement. Finding differences in the health trajectory could bring insights into how working conditions might be better designed to prevent health declines when transitioning to retirement.

Against the background of the current debate on the reduction of working time, we intend to answer the question of how working time during employment is related to intraindividual health changes that occur when employees transition from employment to retirement. In doing so, we aim to shed light on how to design decent working time conditions to prevent health declines in older working age and during retirement.

Job demands-resources theory (Demerouti et al. 2001) postulates that job demands, and job resources are predictors for employees' perceived stress and work engagement: job demands can promote stress and reduce work engagement whereas job resources can reduce stress and promote work engagement. In line with these assumptions, it can be argued that with an increasing amount of weekly working hours defined as job demands, older employees are longer exposed to stressful job conditions which may lead to a health deterioration during employment. Thinking this further, we argue that employees experiencing health impairments while still working may benefit from a greater health improvement after retiring due to the cessation of weekly working hours as a job demand. Based on job demands-resources theory it can further be assumed that work time control as a job resource compensates for stress during employment. Thus, we assume that the effect of long working hours on health improvement after retirement may be weaker in employees with high work time control.

Our study makes several important contributions to the literature. First, it considers different types of older employees' self-rated health complaints. Second, this study chooses a multilevel approach to model the trajectory of health complaints from employment to retirement intraindividually (Kahn/Schneider 2013). It thereby builds upon and extends previous nationally representative studies which have revealed intraindividual differences in the trajectories of life satisfaction (Heybroek/Haynes/Baxter 2015; Pinquart/Schindler 2007) and well-being (Wang 2007) from employment to retirement but no intraindividual differences. Linked to this is the call for more longitudinal studies including factors that potentially relate to how individuals embark on retirement (van der Heide et al. 2013). The present study responds to this call by considering individuals' working time conditions as one of such factors. Third, there are only few longitudinal studies in German representative samples explicitly focusing on individuals' health during retirement (e.g., Eibich 2015). The present study uses nationally representative data from the BAuA working time survey (Wöhrmann/Brauner/Michel 2021) and includes employees from various occupational sectors in different positions and income groups. This helps to improve the generalizability of the results. Fourth and from a more applied perspective, the present study may call practitioners' attention to reconsider working time organization for older employees as an opportunity to promote their health at the transition from employment to retirement.

Working Time and Health Changes at the Transition from Employment to Retirement

The World Health Organization (2021: 3) defines health as the "state of complete physical, mental and social well-being and not merely the absence of disease or infirmity". According to this definition, individuals who suffer from health complaints (e.g., physical pain or mental illness) would not be considered as being of good health. In our study, we mainly focus on the second part of the definition and conceptualize health as the absence of health complaints.

We base our conceptualization of working time on the definition of the European Working Time Directive (Directive 2003/88/EC), which considers working time as "the period during which the worker is working, at the employer's disposal and carrying out his activity or duties, in accordance with national laws and/or practice". The period or duration of working time might be longer or shorter depending on how many hours employees work per week. Therefore, we refer to it as weekly working hours.

The duration of weekly working hours can be considered a job demand (Bakker/Demerouti 2007). According to job demands-resources theory, job demands are defined as conditions at work that require physical or psychological effort. Job demands might not always be detrimental, but if employees do not sufficiently recover from the effort they invest to perform well in their jobs, they might trigger a health impairment process (Meijman/Mulder 1998; Bakker/Demerouti 2014). In this case they are referred to as stressors. The health-impairing effect might be explained in this way: Employees are confronted with a wide variety of different demands at work; in order to meet these demands, they have to exert themselves. Increased effort might be accompanied by the loss of energy (Demerouti et al. 2001; Demerouti/Bakker 2011). Based on these theoretical considerations, longer weekly working hours might become a potential stressor for employees for two reasons: First, they determine how long employees are exposed to stressful conditions or job demands at work regardless of the nature of the demands.

Second, the longer the workdays, the shorter the recovery periods from one workday to the next (Caruso et al. 2006; Hobfoll et al. 2018). This leaves fewer possibilities to recover from work and might thereby foster health impairment during employment (Meijman/Mulder 1998; Bakker/Demerouti 2014). Indeed, longer weekly working hours have been found to contribute to psychovegetative health impairments (Wirtz/Nachreiner 2010; Kivimäki et al. 2015; Virtanen et al. 2011; Virtanen et al. 2018). With a longer duration of weekly working hours, older employees might be at a particularly high risk, because with age physical capacities and processing speed decline (Eckert et al. 2010; Ilmarinen 1992; Salthouse 2012). This is why they might have to invest extra effort to perform well in their job and might have an increased need for recreation.

With the transition from employment to retirement, individuals are no longer exposed to job stressors and can thus recover from the effort they invested during employment. Retirement usually comes along with more time available for leisure activities, for example, enjoyment, relaxation, or novelty (Nimrod/Janke/Kleiber 2008; Wang/Shi 2016). The longer weekly working hours during employment, the greater the time that is freed up by the transition from employment to retirement. This newly freed up time offers enormous potential in terms of health and regeneration. Employees can now invest the time they sacrificed for work during employment, not only to recover from the stresses and strains of work, but also to engage among others in physical fitness or pursue other meaningful activities. We thus expect that with the elimination of job demands perceived as stressors, the health impairment process is less likely to progress when transitioning from employment to retirement. This will reflect itself in a decline in health complaints, respectively a health improvement during retirement compared to health status during employment.

Empirical results underline our theoretical assumptions. Among others, study results indicate that health often improves when transitioning from employment to retirement (e.g., Filomena/Picchio 2022; Westerlund et al. 2010). The importance of the design of working time in this context has been shown in studies on shift work: Shift workers reported longer sleep duration and a greater improvement in sleep quality when entering retirement than day workers (Monk et al. 2012; Myllyntausta/Stenholm 2018). Based on the theoretical and empirical considerations we hypothesize:

H1: The longer the duration of weekly working hours during employment, the greater the reduction in health complaints from employment to retirement.

While a longer duration of weekly working hours costs effort, other working time conditions might constitute resources for employees. According to job demands-resources theory, resources are beneficial for health and motivation as they reduce the physical and psychological effort invested to meet job demands and fulfill important basic psychological needs, for instance the need for autonomy (e.g., Ryan/Deci 2000). It is supposed that they are not only individually beneficial, but that they interact with job demands and buffer the negative relationship between job demands and strain (Bakker/Demerouti/Euwema 2005; Bakker/Demerouti 2007; Bakker/Demerouti 2014). These considerations are also supported by the job demand-control model (Karasek 1979), which assumes that jobs with high demands, for example high workload, are less demanding, if individuals have control over task execution at work (Bakker/Demerouti 2007; Karasek 1998).

A working time condition that is related to the need for autonomy is work time control. Work time control refers to individuals' control over the duration, position, and distribution of their working time (Karhula et al. 2020). Employees have work time control, for example if they can decide for themselves at what time they start or end their working day or when they take time off (Thomas/Ganster 1995; Valcour 2007; Vieten/Wöhrmann/Michel 2022). A sense of control is deemed to serve as a resource for individuals (e.g., Kim/Moen 2002; Lachman/Burack 1993) as it fulfills the need for autonomy (Bakker 2011; Ryan/Deci 2000; Nahrgang/Morgeson/Hofmann 2011). Thereby, work time control is not only motivationally beneficial, but it may also help employees to better regenerate from work time-related job stressors. This is in line with Spector (2002: 135) proposing that "the control must be over the stressful situation itself and not some other aspect of work". This proposition applies to our study, because we focus on work-time control in relation to work time demands. More precisely, work time control should give employees the possibility to adapt their weekly working hours in relation to their personal needs. For instance, they can end their work day earlier, if they have a great need for recovery. Drawing on job demands-resources theory, we argue that work time control helps employees to better allocate their resources throughout the week or the work day. They might profit from the resource of work time control in a way that it might enhance their ability to cope with the stress induced by longer weekly working hours during employment (Hoogendoorn et al. 2000). This assumption is in line with empirical findings that consider work time control as an important resource for reducing stress and enhancing the balance between work and non-work life in older individuals during employment (Dropkin et al. 2016). Other empirical studies have also pointed out that work time control becomes more important to individuals with increasing age (Stengård et al. 2022) and accommodates older individuals' needs (Dropkin et al. 2016; Virtanen et al. 2022).

Based on the proposed stress-compensating effect of work time control and its positive effect especially for older employees, it can be assumed that work time control buffers the detrimental effect of weekly working hours on health. In Hypothesis 1 we proposed that health complaints decrease when transitioning to retirement, especially when having longer weekly working hours. Based on the assumptions on the buffering role of work time control, this decrease might be less pronounced in individuals who had high work time control during employment than in individuals with low work time control. Hence, we state the following hypothesis:

H2: Work time control during employment moderates the relationship between weekly working hours and the change in health complaints from employment to retirement in such a way that health complaints decrease less when work time control is high than when work time control is low.

Method

Sample and Procedure

For our study, we used a longitudinal subsample of the 2015, 2017, 2019, and 2021 panel waves of the BAuA-Working Time Survey conducted by the Federal Institute for Occupational Safety and Health (BAuA) (Wöhrmann et al. 2021; see Häring et al. 2016, 2018; 2020; 2022; for the

methodological reports and see Brauner et al. 2019a; 2019b; Pattloch et al. 2021 for the scientific use files). The data was collected through computer-assisted telephone interviews (CATI) with an average duration of 35 minutes. German employees working at least 10 hours per week were included (Häring et al. 2016; 2018; 2020; 2022). The BAuA-Working Time Survey mainly focusses on working time and further covers different types of working conditions, socio-demographics, characteristics of the organization and the employment situation, as well as health characteristics. For the purpose of the present study, we used a subsample of n = 876 individuals who participated at least twice and who retired between survey waves. We included those who terminated employment due to partial retirement, early or regular retirement, not those who reported disability retirement. Slightly more than half of the participants were men (54 %) and based on the International Standard Classification of Education (ISCED), a large share was highly educated (58 %). The average age in the subsample was 62 years. Most of the respondents were employees (61 %), while only a small share was self-employed (4 %). The largest share of participants worked in the public service sector (43 %), followed by the service sector (27 %), while 18 % worked in industry and 6 % in the crafts sector. Six percent worked in other, non-specified sectors. The respondents worked on average 39 hours per week, most of them full-time (76 %).

Measures

Longitudinal data in any form represent nested data (Kahn/Schneider 2013). In the present study, measurement occasions (level 1) were nested within individuals (level 2), that is, measurement occasions could be subdivided into a smaller number of groups (i.e., individuals).

Level 1 Variables

Health Complaints: The measure of individuals' health comprised the following 11 health complaints: (a) back pain, low back pain; (b) pain in the neck and shoulder region; (c) headaches; (d) night-time sleeping disorders; (e) general tiredness, faintness, or fatigue; (f) stomach and digestion complaints; (g) hearing deterioration, ear noises; (h) nervousness or irritability; (i) depression; (j) physical exhaustion; and (k) emotional exhaustion. Participants indicated which complaints they had experienced often within the last 12 months and such complaints were coded 1. We used a similar approach as Franke (2015) by aggregating all answers into a count variable. The resulting variable constitutes this study's outcome variable, and it ranged from 0 (none of the health complaints) to 11 (all of the health complaints) so that lower counts indicated fewer complaints (i.e., better health). While Franke (2015) assessed health with 8 items, we additionally added the complaints (a), (b) and (g) which had been assessed in the dataset we used.

Level 2 Variables: Predictors

Weekly Working Hours: Respondents' weekly working hours were assessed with the item „How many hours do you actually work per week, on average in this occupational activity, including regular overtime work, extra work, emergency service, etc.?" on a metric scale.

Work Time Control: Individuals' work time control was measured with four items (e.g., "How much control do you have over when you begin and end each workday?") using the German version of a psychometric scale developed by Valcour (2007). The scale ranged from 1 (very little control) to 5 (very much control). Internal consistency in the present sample was

good (Cronbach's $\alpha = .82$). Responses were averaged across all items to form a mean score with higher values indicating higher work time control.

Level 2 Variables: Control Variables

The control variables comprised individuals' sex, age, education level, work intensity, and physical demands. The variables were included as reported at the last available measurement occasion of employment.

Sex: (0 = male; 1 = female) was controlled for to account for differences in how retirement is experienced by males and females (e.g., females are typically more involved in non-work life already during employment and tend to report more health complaints; Kim/Moen 2002).

Age: (in years) was added to account for age-related physical and psychological health changes (e.g., reduction in speed of perceptual processes or muscle strength; Bohle/Pitts/Quinlan 2010).

Education: (0 = medium/low; 1 = high) was controlled for because it has been suggested that individuals in higher positions typically have higher work time control than those in lower positions (e.g., Virtanen et al. 2017).

Work Intensity and Physical Demands were added as control variables as they are proved job demands which are likely to contribute to health impairment. Especially with age, information processing speed and physical capacities decline (Ilmarinen 1992; Salthouse 2012) which may lead to even more detrimental effects of work intensity and physical demands on older employees' health. This allowed us to analyze the effect of working time over and above the effects of work intensity and physical demands. To measure these job demands, we used psychometric rating scales originating from the BIBB/BAuA Employment Survey (Hall/Siefer 2011; Wittig/Nöllenheidt/Brenscheidt 2013). Each of the two scales consisted of three items. Participants responded on a four-point scale from 1 (often) to 4 (never). For statistical analyses, we recoded the items on both scales so that higher scale values corresponded to high physical demands, and thus high work intensity. An example item for work intensity is "How often do you have to work under high deadline or performance pressure?", and for physical demands is "working in a standing position".

Analytical Strategy

Descriptive analyses (i.e., frequencies, means, and standard deviations) were calculated for the main study variables and were performed within R (Version 4.2.2). The research question and both hypotheses were analyzed by calculating discontinuous growth curve models with R's lme4 package (Bates et al. 2015). A Poisson distribution with a logarithmic link (typical for discrete count data such as health complaints; Bolker et al. 2009) was selected. This approach allows for analyzing count data involving random effects without violating statistical assumptions and limiting the scope of inference, two common failures when trying to analyze not normally distributed data with classical statistical frameworks (Bolker et al. 2009). We specified two-level models in which the measurement occasions falling in employment and in retirement comprised level 1 data nested in individuals at level 2. For all participants included in our analyses, health complaints had been assessed on one to three measurement occasions during employment and on one occasion during retirement. In addition, working time conditions had been reported on at least one measurement occasion during employment.

Before proceeding to test the hypotheses, a transition variable was computed and scaled according to the time of interest (Ployhart/Vandenberg 2010). This variable (i.e., Retiree) was coded 0 for all measurement occasions falling in employment and coded 1 for the measurement occasion falling in retirement (see Debus/Fritz/Philipp 2019, for a similar approach). For example, if an individual had retired from work in 2018 and had participated in the 2015, 2017, and 2019 waves, Retiree was coded 0, 0, 1. The Retiree variable was left uncentered, as the raw metric had a meaningful zero point. Testing our hypotheses further required person-level measures of working time conditions. Hence, for each individual all available measurements during employment were averaged in order to have level 2 measures of these variables (see Debus et al. 2019, for a similar strategy). The variables were then grand mean centered (Enders/Tofighi 2007). This provides for interpretability, because the centered variables have a meaningful zero point, that is, the grand mean. Change in health complaints is specified as the outcome.

Before testing our hypotheses, we explored the data by calculating a random intercept fixed slope model with Retiree as a level 1 predictor. The resulting model allows model intercepts (i.e., health complaints during employment) to vary across individuals whereas the trajectory of health complaints from employment to retirement is assumed to be the same for all individuals. A significant coefficient of Retiree would denote a statistically meaningful change in health complaints from employment to retirement. The respective model equation from which we built all subsequent models is $Y_{it} = \beta_0 + \beta_1 Retiree_{it} + \varepsilon_{it}$, where Y_{it} represents the reported health complaints of employee i at measurement occasion t, β_0 is the intercept (i.e., the baseline level of health complaints during the employment phase), β_1 denotes the slope for the transition variable (i.e., the Retiree predictor) and thus the difference in health complaints between the employment phase and retirement, and ε_{it} is the error term. Next, we calculated the same model with a random slope added for Retiree to evaluate whether the trajectory of health complaints from employment to retirement differed across individuals (i.e., whether there was slope variance in the trajectory across individuals).

For testing H1 and H2, best-practice recommendations for estimating cross-level interactions using multilevel modeling were followed (see Aguinis/Gottfredson/Culpepper 2013). Because models specified for estimating cross-level interactions should always include a random slope for the lower-level variable involved in the interaction (Heisig/Schaeffer 2019), a random slope for Retiree was added from the first. To test H1 and H2, the cross-level interactions between Retiree as a level 1 predictor and working time conditions as level 2 predictors were added to the random-intercept and random slope model already specified before. To the same model we added a triple interaction term for Retiree as a level 1 predictor interacting with weekly working hours and work time control as level 2 predictors.

Due to missing values on the control variables (e.g., education or work intensity), n = 784 participants were included in our analyses. All models described included control variables as level 2 predictors. The models were estimated, using full information maximum likelihood estimation. The likelihood ratio test with a significance criterion of $\alpha = .05$ was performed to determine model fit statistically. In addition, the Akaike and Bayesian information criteria were calculated for a descriptive evaluation of model fit.

Results

Descriptive Results

Apart from hearing deterioration ear noises, the mean values of all health complaints reported decreased upon the transition from employment to retirement (Table 1).

Table 1: Health Complaints During Employment and in Retirement in the Study Sample

Health complaint	During employment[a]			In retirement		
	M	*n*	%	*M*	*n*	%
Nervousness or irritability	0.28	292	33	0.18	161	18
Depression	0.19	216	25	0.16	137	16
Emotional exhaustion	0.26	275	31	0.20	174	20
Back pain, low back pain	0.47	471	54	0.45	388	44
Pain in the neck and shoulder region	0.53	526	60	0.40	352	40
Headaches	0.22	228	26	0.16	137	16
Night-time sleeping disorders	0.36	360	41	0.35	301	34
General tiredness, faintness, or fatigue	0.46	457	52	0.33	287	33
Stomach and digestion complaints	0.16	179	20	0.14	123	14
Hearing deterioration, ear noises	0.23	236	27	0.27	226	26
Physical exhaustion	0.35	358	41	0.27	232	27

Note. N = 876. M = Mean; count and percentage for a given health complaint reflect individuals reporting the complaint.
[a]For each individual all available measurement occasions during employment were taken into account. The use of all available measurement points during employment explains the differences between mean values and percentages.

The total mean count of health complaints during employment was 3.5 (SD = 2.7) and during retirement it was 2.9 (SD = 2.6). Pain in the back, as well as in the neck and shoulder region and tiredness, faintness or fatigue were among the most frequently reported health complaints during employment as well as during retirement.

The mean values, standard deviations, and correlations of all study variables assessed during employment with health during employment as well as with health during retirement are depicted in Table 2.

Table 2: Means, Standard Deviations and Correlations between Study Variables

Variable	*M*	*SD*	1	2	3	4	5	6	7	8
1. Sex[a]	0.48	0.50	-							
2. Educational level[b]	0.56	0.50	-.09	-						
3. Age	62.36	2.46	.00	.09*	-					
4. Work intensity	3.36	0.61	.12***	.10**	-.09	-				
5. Physical demands	2.19	0.83	.02	-.15***	-.05	.08*	-			
6. Weekly working hours	38.62	9.71	-.35***	.13**	-.11*	.19***	-.01	-		
7. Work time control	3.29	1.17	-.21***	.01	-.00	-.12**	-.42***	.08		
8. Health complaints (employment)	3.54	2.74	.19***	.01	-.12*	.31***	.16***	.05	-.25***	-
9. Health complaints (retirement)	2.90	2.60	.23***	-.03	-.09	.21***	.11**	-.03	-.15***	.64***

*Note: N = 784. [a]Sex: 0 = male, 1 = female; [b]Educational level: 0 = low/medium level, 1 = high level; [b]***p < .001. ** p < .01. *p < .05*

Female participants had higher counts of (i.e., more) health complaints during employment than men. During employment health complaints were negatively related to age which we will elaborate in the context of the healthy worker effect in the discussion. They were however unrelated to participants' educational level. Health complaints during employment positively correlated with work intensity and physical demands. They were unrelated to weekly working hours but negatively correlated with work time control. During retirement we found the same correlations of health complaints with all variables, apart from the correlation between physical demands and health complaints during retirement which was non-significant.

Exploratory Analyses

Direct Effect of Retirement on Change in Health Complaints

A model including Retiree as a level 1 predictor and all control variables mentioned above improved model fit compared to a model with control variables only. The model with the Retiree predictor explored the trajectory of health complaints from employment to retirement. It showed that Retiree was negatively related to change in health complaints ($b = -0.20$, $SE = 0.03$, $p < .001$). This result indicates a decrease in health complaints from employment to retirement. The random slope for Retiree did not improve model fit, $\chi2(2) = 0.02$, $p = .989$, which shows that there are no statistically meaningful differences in the trajectory of health complaints from employment to retirement across individuals in our sample.

Hypotheses Testing

Cross-Level Interaction Effects of Weekly Working Hours

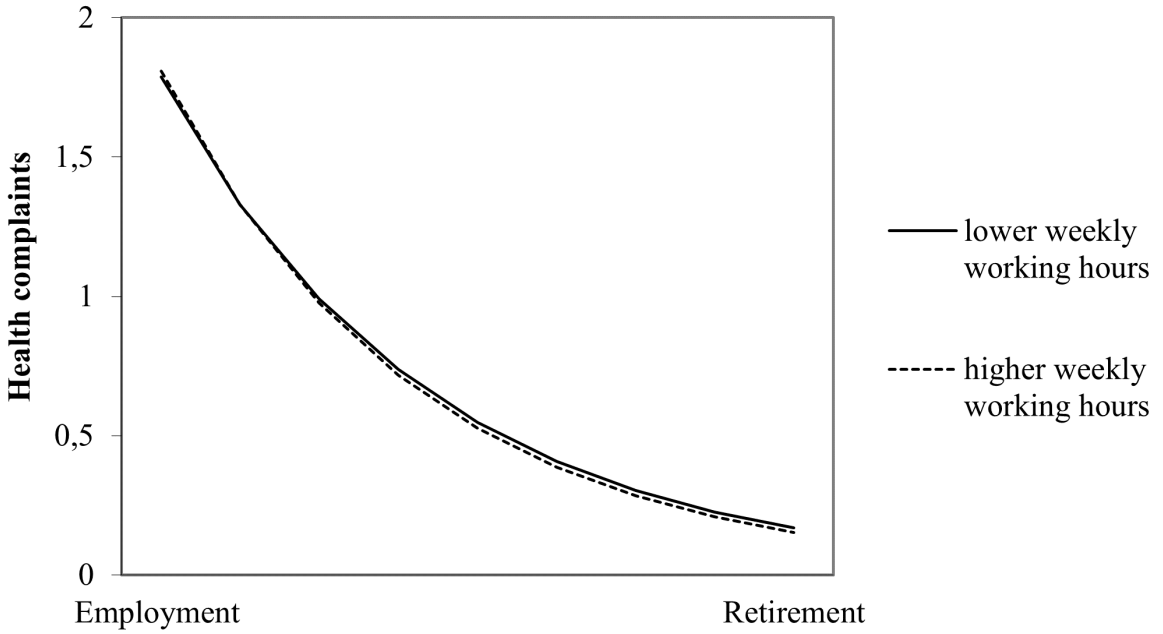
H1 stated that health complaints decrease stronger in the transition from employment to retirement in individuals with longer weekly working hours compared to individuals with shorter weekly working hours. The cross-level interaction between Retiree and weekly working hours stated in H1 was negative and significant (Table 3), indicating that longer weekly working hours were related to a higher decrease in health complaints from employment to retirement (Figure 1), thus, H1 was supported.

Table 3: Multilevel Modeling Analysis With Transition to Retirement, Weekly Working Hours and Work Time Control as Predictors for Health Complaints

	"Null"			Cross-level interaction		
	Est.	*SE*	*p*	Est.	*SE*	*p*
Fixed effects						
Intercept	0.39	0.07	< .001	0.51	0.07	< .001
Sex	0.30	0.06	< .001	0.26	0.06	< .001
Age	-0.09	0.04	.009	-0.10	0.04	.006
Educational level	0.05	0.06	.432	0.03	0.06	0.562
Work intensity	0.45	0.07	< .001	0.42	0.07	<. 001
Physical demands	0.21	0.08	< .001	0.12	0.08	.127
Retiree				-0.19	0.03	< .001
Weekly working hours				0.06	0.04	.091
Work time control				-0.13	0.03	< .001
Retiree x Weekly working hours *(H1)*				-0.06	0.03	.048
Retiree x Work time control				0.05	0.02	.035
Retiree x Work time control x Weekly working hours *(H2)*				0.00	0.02	.886
Random effects						
Intercept	0.50	0.71		0.48	0.70	
Retiree				0.00	0.01	
Intercept-slope c variance				1.00		
Additional information						
AIC	9000.9			8926.7		
BIC	9040.5			9017.3		

Note. N = 784, number of observations = 2122. The estimate (Est.) represents the values of the estimated coefficients when it corresponds to a variable's fixed effect, the variance of the estimated coefficients when it corresponds to a variable's random effect, and the values of the information criteria when it corresponds to the additional information provided. Retiree indicates transition to retirement. Work time control was grand-mean centered; age and weekly working hours were z-standardized. AIC = Akaike information criterion; BIC = Bayesian information criterion.

Figure 1: Cross-Level Interaction Plot for Health Complaints in the Transition to Retirement for Low and High Levels of Weekly Working Hours



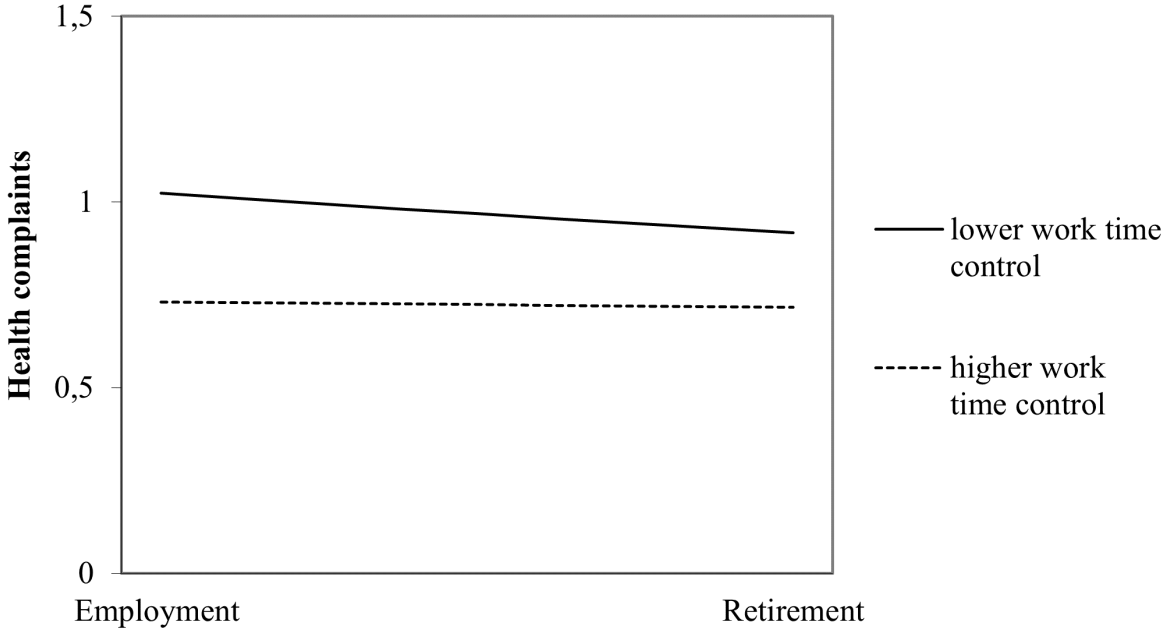
Note. Counts of health complaints during employment and during retirement are shown for low (i.e., 1 SD below M) and high (i.e., 1 SD above M) levels of weekly working hours. The values for the interaction variables Retiree and weekly working hours are from a random intercept and random slope model including Retiree as the level 1 predictor, weekly working hours as the level 2 predictor, and the cross-level interaction between the two variables.

The decrease in health complaints becomes more illustrative by comparing the mean values: Individuals having overlong working hours (>48 hours per week) had a mean value of M = 3.74 health complaints during employment and M = 2.92 complaints during retirement. Those working less than 38 hours per week showed mean values of M = 3.57 health complaints during employment and M = 3.02 during retirement.

Triple Interaction Effect of Retiree, Weekly Working Hours and Work Time Control

To test H2, we interpreted the triple interaction effect between Retiree, weekly working hours and work time control which was non-significant (Table 3), indicating that higher work time control did neither strengthen nor buffer the decrease in health complaints attributable to longer weekly working hours.

Figure 2: Cross-Level Interaction Plot for Health Complaints in the Transition to Retirement for Low and High Levels of Work Time Control



Note. Counts of health complaints during employment and during retirement are shown for low (i.e., 1 SD below M) and high (i.e., 1 SD above M) levels of work time control. The values for the interaction variables Retiree and work time control are from a random intercept and random slope model including Retiree as the level 1 predictor, work time control as the level 2 predictor, and the cross-level interaction between the two variables.

We did not hypothesize on that; however, the cross-level interaction term of work time control and Retiree is significant (Table 3). Higher work time control was related to a lower decrease in health complaints from employment to retirement (Figure 2). Those individuals who had values below the mean in work time control, had M = 3.97 health complaints during employment and M = 3.26 complaints during retirement, while those with values above the mean in work time control had M = 3.08 health complaints during employment and M = 2.54 health complaints during retirement.

Discussion

With our study we intended to shed light on the role of working time as an antecedent of changes in employees' health from employment to retirement. Based on job demands-resources theory (Demerouti et al. 2001), we hypothesized that longer weekly working hours are followed by a stronger decrease in health complaints when transitioning from employment to retirement. Second, we assumed weekly working hours to be stronger related to health complaints decreases from employment to retirement when work time control is low during employment.

Our findings yielded mixed results. Our first key finding was that health complaints generally decreased when employees transitioned from employment to retirement. This pattern seemed to be similar for all employees as the trajectory of health complaints showed small variation across individuals. We found that, although this variation was small - an instance that

should be kept in mind for all interpretations -, there was still some variation which could be explained by differences in the level of weekly working hours. Individuals with longer weekly working hours experienced a greater decrease in health complaints from employment to retirement than individuals with shorter weekly working hours. Contrary to our second hypothesis, work time control did not buffer the decrease in health complaints, attributable to longer weekly working hours. However, we additionally found the decrease in health complaints from employment to retirement to be more pronounced in individuals with lower work time control than in individuals with higher work time control. This suggests that longer weekly working hours and less work time control are independently related to a stronger decrease in health complaints upon the transition to retirement.

Empirical and Theoretical Implications

Drawing on job demands-resources theory (Demerouti et al. 2001) and applying it to the field of retirement research and working time design, we showed that working time conditions might explain health changes at the transition from employment to retirement.

Although we did not propose a hypothesis about the general health changes occurring from employment to retirement, the finding of a general decrease in health complaints seems to be worthy of discussion. Our finding is consistent with the theoretical considerations underlying job demands-resources theory (Demerouti et al. 2001). More precisely, the decrease indicates that the absence of job stressors is a welcome relief for many individuals. This is in line with similar observations of researchers who found out that retirement can be followed by health improvements (e.g., Nishimura/Oikawa/Motegi 2018; Odone et al. 2021; van Ours 2022). However, the empirical evidence on this is controversial as some studies have shown that retirement can also be detrimental to physical and mental health (e.g., Jokela et al. 2010; Li et al. 2021). The studies included in the meta-analysis of Li et al. (2021) differed from the present study in that they compared employees to retirees instead of attending to the same individuals both before and during retirement. Furthermore, studies might generate different results when employing different health measures (Filomena/Picchio 2022).

Moreover, the present study findings suggest a uniform trajectory of health complaints from employment to retirement across individuals. It thus contrasts studies that have identified rather differently pronounced trajectories with greater variation across individuals' life satisfaction and well-being from employment to retirement (Heybroek et al. 2015; Pinquart/Schindler 2007; Wang 2007). For instance, Heybroek et al. (2015) revealed that life satisfaction increases for some while it decreases for other individuals. Yet, one should note that the present study merely showed better fit of a model not allowing (vs. allowing) the trajectory of health complains to vary across individuals.

In line with job demands-resources theory (Demerouti et al. 2001) we identified longer weekly working hours as a potential stressor coming along with a greater decrease in health complaints when transitioning to retirement. Despite the health improvement during retirement, the comparison between the mean values in health complaints during employment indicate that the health of individuals with longer weekly working hours was worse than that of individuals who had shorter weekly working hours. This suggests that the strain resulting from job stressors must have been quite strong and highlights the potential relief of retiring from job

stressors. Our results are in line with other empirical studies on working time which identified longer weekly working hours as a risk factor for health (e.g., Bannai/Tamakoshi 2014; Berniell/Bietenbeck 2020) and studies that identified working time features (e.g. shift work) as being related to retirement sleep quality and cardiometabolic functions (Chin et al. 2023; Guo et al. 2013).

As we found no support for the buffering role of work time control on the relationship between weekly working hours and health when transitioning from employment to retirement, our results did not meet the assumptions of job demands-resources theory in this case. Although many other studies also did not find empirical evidence for the buffering effect of job resources on the relationship of job demands with health outcomes (e.g., Carr et al. 2016; McGonagle et al. 2015; Taris 2006; van der Doef/Maes 1999), this finding is interesting because work time control corresponds to the stressful situation marked by (the duration of) working hours.

Nevertheless, we can conclude from the significant cross-level interaction we found that work time control explains differences in health trajectories across individuals. More precisely, individuals with lower work time control showed stronger decreases in health complaints when transitioning from employment to retirement than those with higher work time control. However, as can be concluded from the mean values and the significant correlations between study variables with health during retirement, the health complaints of retirees who had low work time control during employment were on average still higher than those of retirees who had high work time control during employment. We see from these results that those with higher work time control during employment were better off in terms of health, while those with low work time control could possibly not compensate for stressful working conditions and were only able to regenerate when they retired, respectively when they were no longer exposed to these conditions. Conservation of resources theory offers a theoretical explanation: Individuals might recover from the stress caused by resource investment by building new resources (Hobfoll 1989). Work time control might provide employees with better opportunities for building new resources. For instance, if employees are granted control over taking several hours off, they can better adjust the duration of their work days to their personal needs. In the case of recovery deficits, for instance, after work-intensive periods, employees are able to extend the periods from one working day to the next to better recover from work. As our findings show, individuals with lower work time control gained more resources through retirement compared to individuals with higher work time control. It thus seems reasonable to argue that work time control as a source of autonomy (Ryan/Deci 2000) is a particularly valuable resource in later work life. The finding thereby underlines the meaningfulness of control as a resource for employees' health (e.g., Kim/Moen 2002; Lachman/Burack 1993). Our finding is in line with other studies that found a more pronounced improvement in health upon retirement in individuals exiting from lower work time control compared to individuals exiting from higher work time control (Peristera et al. 2022; van de Straat et al. 2019).

Limitations and Avenues for future research

With the BAuA Working Time Survey (Wöhrmann et al. 2021), there was exceptionally rich and repeatedly assessed data available on individuals' working time conditions and their health,

including data from various occupational sectors and different positions. This allowed for selecting a large set of potentially confounding characteristics and controlling for it in all models analyzed. Despite its contributions, this study is, however, not without limitations.

One such limitation is the healthy worker effect, which is often observed in older samples (Chowdhury/Shah/Payal 2017; Shah 2009). That higher age was related to fewer health complaints during employment in our present sample can be seen as an indicator for the presence of a healthy worker effect. This effect might have contributed to an underestimation of the effects we found, as these were rather small. Many workers with greater health complaints might have left their jobs earlier and were therefore not included in our study sample. However, the effects could also have been overestimated. There are indications that the health of workers who left the working conditions that negatively affected their health (e.g., shift work) may not recover due to a chronification of complaints (e.g., Frese/Semmer 1986). Thus, workers who left the workforce early due to adverse working conditions might continue to suffer from complaints which do not reverse. Thus again, in the light of the possibility that reversibility of complaints could be reduced (e.g., Igic et al. 2017), and these workers likely being not part of the study may have led to less participants whose health might not have recovered after retirement entry.

Although the applied analytical strategy allowed for the analysis of a large amount of measurement occasions falling into employment and retirement, a causal interpretation of this study's findings is not feasible.

Furthermore, other demands than the ones taken into account in this study, such as role ambiguity or work-family conflicts, may play a role for health trajectories upon retirement. In addition, when transitioning to retirement employees may not only experience the shortfall of job demands but also the disappearance of job resources. If these resources such as social support and recognition are not provided in the private life of the retiree, this may produce strain and consequently suppress potential health improvements. In our study we have not focused on this but recommend future research to go this avenue. Seiferling & Michel (2017, 2024) point out the importance of resource building during retirement.

A further constraint is that the present study employed self-report measures only. In fact, the measurement of health complaints relied on subjectively experienced, not on objectively determined complaints. It has been shown that with increasing age, subjective measures of health less accurately mirror objective measures of health (Wettstein/Schilling/Wahl 2016). The present study might further be limited because it could not take into account the reasons individuals had for retirement. Yet, these reasons have been shown to relate to how well individuals embark on retirement (e.g., Reitzes/Mutran 2004; van Solinge/Henkens 2007; Wang/Henkens/van Solinge 2011). Involuntary retirement has been associated with lower health and well-being during retirement (Stiemke/Heß 2022). Future studies could parallelly employ subjective and objective measures of health, refer explicitly to health during retirement, and consider the voluntariness of retirement as a potentially confounding variable.

Another limitation is that the present study was unable to provide more than one measurement occasion during retirement and hence can only inform about how individuals embarked on retirement, not how their health developed on longer-terms throughout it. Admittedly, retirement is a process that unfolds over time rather than as a single event (Reitzes/Mutran 2006):

Individuals continuously adapt to changes and while the first period of retirement may be associated with an improvement in health due to newly gained freedom, there likely follows a period where retirement becomes everyday reality and the initial improvement vanishes (Atchley 1989; Henning/Lindwall/Johansson 2016). Still, the present study primarily aimed to respond to the importance of how individuals embark on retirement, and it was able to do so with only one measurement occasion during retirement. Future studies could take it as a starting point for conducting long-term studies.

It appears reasonable to use the present study as a starting point for disentangling and determining which working time conditions are relevant for health at the transition from employment to retirement. Future studies might use different methodological approaches to examine how many hours of work are compatible with employees' health. Furthermore, it might be of particular interest to investigate the role of other types of working time conditions (e.g., distribution of working time, shift work, overtime work). Future researchers should also examine which resources might compensate for demanding working time conditions (e.g., the possibility to work from home) or from the work environment (e.g., social support). It could also be of great interest to investigate whether certain occupational groups recover better or worse during retirement than others.

Practical Implications

Several implications for practice can be derived from our study, as the results provide information about possibilities to intervene on both the organizational and the societal level. Our study highlights that working time organization might play a role for individuals' health beyond their exit from work.

In particular, our findings reveal that individuals with longer weekly working hours suffered of more health complaints during employment than during retirement. Although they benefitted from retirement with regard to their health, they could not fully regenerate from working longer hours, at least they did not reach the same level of health as those who had shorter working hours during employment. The mean values indicate that most of the employees in our sample worked on average less than 48 hours per week. Nevertheless, the regulations of the Working Time Directive (e.g., working time not to exceed 48 hours per week; minimum rest of 11 hours between working days following in a 24-hour period) seem necessary as our findings indicate that one should think about a more significant reduction of weekly working hours for older employees in order to prevent early retirement due to health reasons. Partial retirement arrangements in which regular weekly working hours are reduced therefore appear sensible from a health perspective, also on the basis of the findings of our study.

Because work time control did not play a buffering role in the relationship between weekly working hours and health when transitioning from employment to retirement, the reduction of working time seems appropriate, even if employees can exert control over their working hours. To promote individuals' health during employment, work time control generally appears to be an important resource as in the present study individuals with lower work time control transitioned from employment to retirement with a worse state of health. Even after retiring they were worse off than individuals with higher work time control. Practitioners could seek ways to enhance the control individuals have over their working time before they retire.

Conclusion

In conclusion, this study reports on the role of working time for the trajectory of health complaints from employment to retirement in a German representative sample. Health complaints generally decreased upon retirement and this trajectory was more pronounced in individuals retiring from longer weekly working hours and lower work time control. Work time control did not buffer the relationship between weekly working hours and health changes at the transition from employment to retirement. By drawing on job demands-resources theory, the present study offers a stress theoretical perspective on the role of working time at the transition from employment to retirement future, studies could build on. Practitioners may consider individuals' working time conditions in the discourse on retirement and might support individuals' health during employment by reducing weekly working hours and by enhancing employees' control over their work time.

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