Received: 28 June 2021 | Accepted: 5 October 2022

DOI: 10.1111/joop.12406

the british psychological society
promoting excellence in psychology

ARTICLE

Levels and change in autonomous and controlled work motivation in older workers—The role of proximity to retirement and sense of community at work

Georg Henning[1] | **Andreas Stenling**[2,3] | **Susanne Tafvelin**[2] | **Melanie Ebener**[4] | **Magnus Lindwall**[5,6]

[1]German Centre of Gerontology, Berlin, Germany

[2]Umeå University, Umeå, Sweden

[3]University of Agder, Kristiansand, Norway

[4]University of Wuppertal, Wuppertal, Germany

[5]University of Gothenburg, Gothenburg, Sweden

[6]The Swedish School of Sport and Health Sciences, Stockholm, Sweden

Correspondence

Georg Henning, German Centre of Gerontology, Manfred-von-Richthofen-Straße 2, 12101 Berlin, Germany.
Email: georg.henning@dza.de

Funding information

German Research Foundation, Grant/Award Number: 441444293; Swedish Research Council for Health, Working Life and Welfare, Grant/Award Numbers: 2013-2300, 2013-2291; Swedish Research Council, Grant/Award Number: 2017-00273

Abstract

Previous studies suggest a preretirement disengagement process from work, which includes reduced work motivation. In this study, we investigated changes in autonomous and controlled work motivation over two years among participants of the Health, Aging and Retirement Transition in Sweden (HEARTS) study. We found stability in both types of motivation; however, those who retired after the study period showed more distinct declines in autonomous motivation. A stronger sense of community at work was related to level, but not change in autonomous motivation. Intra-individual fluctuations in the expected retirement age did not predict work motivation or vice versa. Future studies are needed to better understand the antecedents and consequences of preretirement declines in autonomous work motivation.

KEYWORDS

retirement, self-determination theory, work motivation

Practitioner Points

- Autonomous and controlled work motivation are comparably stable in late work life.
- There seem to be declines in autonomous motivation in the last two years before retirement.
- Declines in autonomous work motivation may either lead to retirement plans or retirement plans may lead to a disengagement process.

INTRODUCTION

Do older workers lose their motivation and simply wait for retirement to come, or do they remain engaged and motivated? A widespread stereotype pictures older workers as unmotivated (cf. Posthuma & Campion, 2009). However, research does not support this idea (Ng & Feldman, 2012). As the population is ageing, the workforce is ageing too (Zacher, 2015). For researchers and practitioners alike, it is important to investigate how work motivation develops in later work life, because work motivation has important consequences for well-being and performance at the workplace (Deci et al., 2017). As a first step, it is important to understand the average trajectories of work motivation among older workers (cf. Zacher, 2015).

Most studies on work motivation and age have been cross-sectional comparisons of different age groups, and it is unclear whether their results mirror changes over the lifespan or, for example, cohort differences (cf. Bohlmann et al., 2018). Moreover, whereas some studies on motivational ageing at work have been conducted on workers in their 50s (Beier et al., 2018), little is known about work motivation in the last years of work life before retirement. Because workers anticipate and plan for their retirement (Ekerdt et al., 2000), it has been argued that in the years before retirement, people reprioritize and focus on other life areas to account for their future retirement. This is supposed to result in a preretirement work disengagement process, with negative consequences for work motivation (Damman et al., 2013). However, the literature on preretirement work disengagement is limited and partly contradictory, showing either disengagement (Damman et al., 2013) or no disengagement before retirement (De Wind et al., 2017). Moreover, no established scales of work motivation were used.

The aim of this study was to examine the level and change in work motivation in a sample of older Swedish workers around retirement age (aged 60–66 at baseline) drawn from three annual waves of the HEalth, Aging and Retirement Transitions in Sweden (HEARTS) study (Lindwall et al., 2017). In line with self-determination theory (SDT), we distinguished autonomous and controlled work motivation, which are known to have differential predictors and consequences for worker's well-being and performance (Deci et al., 2017). Autonomous motivation means that workers are 'engaged in an activity with a full sense of willingness, volition, and choice' (Deci et al., 2017, p. 20), whereas controlled motivation refers to motivation by external forces (Deci et al., 2017). Furthermore, we were interested in interindividual differences in change in work motivation and the role of a person's proximity to retirement. The flexible retirement age in Sweden allowed us to compare those who retired within a year after the study period with those who continued working. In addition, we included sense of community at work, which may influence work motivation when approaching retirement. Finally, we examine the interplay of work motivation and expected retirement age, which helps us to understand if decreases in work motivation are the antecedent or the consequence of an approaching retirement.

We have three main contributions to the field of research on ageing at work. First, we contribute by investigating multidimensional work motivation, instead of overall disengagement or engagement. This offers a more theoretically informed and nuanced approach to the topic and allows us to study the motivational underpinnings of behaviour and attitudes at work. Although our hypotheses focus on autonomous motivation, the inclusion of both types of motivation is important, given their well-documented differential consequences (Deci et al., 2017). Our findings may guide hypotheses in future studies on

work motivation in late working life. Second, our sample is distinct from previous studies as we focus on Swedish workers aged 60–66 in the last three years before retirement, whereas previous studies have been conducted with younger samples in the Netherlands. The last years before retirement are an understudied life phase in research on ageing at work. In Sweden, for the older adults in the birth cohorts investigated, retirement is possible from the age of 61 onwards, but workers are legally protected from age-based firing until the age of 67. A later retirement has financial advantages (König & Lindquist, 2016). Compared with other European countries, old age work participation is comparably high in Sweden with over 60% of people aged 60–64 working (Hofäcker et al., 2019). Due to this, motivation trajectories may also differ from other countries, assuming that these factors are related to motivation. The flexible retirement age makes Sweden an interesting country to study retirement-related developments and individual agency in retirement decision-making in a welfare state. Third, there is also a research gap in the SDT literature concerning work motivation of older workers (Henning, Stenling, et al., 2019). Hence, it is important to understand whether previous results on motivation and work outcomes in younger samples are also true for older workers.

Multidimensional work motivation

In SDT, work motivation is not viewed as a unidimensional construct. Instead of only considering the quantity of motivation, research based on SDT also focuses on the quality of motivation. Work motivation is often divided into two distinct types: autonomous and controlled, with subdimensions for each factor. Autonomous work motivation is developed if workers experience satisfaction of the basic psychological needs autonomy, relatedness and competence in job tasks or through need support by leaders or co-workers (Deci et al., 2017; Gagné & Deci, 2005). There are two subdimensions of autonomous motivation: Intrinsic motivation appears when workers enjoy the tasks themselves, identified regulation means that they identify with and value the tasks. Controlled motivation refers to motivation in response to external factors, such as pleasing others, external rewards, or avoiding punishment (external regulation), or to avoid bad conscience, guilt, or ego-enhancement (introjected regulation).

In the context of this study, it is important to distinguish how autonomous and controlled motivation change in older age, because depending on the type of work motivation, increases or decreases before retirement may have different consequences for the individual and the employer. For example, higher autonomous work motivation is associated with lower turnover intentions, because it seems to increase commitment to the work place (Galletta et al., 2011; Gillet et al., 2013; Richer et al., 2002), whereas higher levels of controlled motivation are associated with higher turnover intentions (Gillet et al., 2013). Autonomous work motivation is usually more strongly associated with better performance than controlled motivation (Kuvaas et al., 2017), assumedly partly because autonomous motivation is associated with higher efforts over time in pursuing one's work tasks (Meyer et al., 2004). Furthermore, because of higher need satisfaction at work, higher autonomous motivation is also associated with better well-being (Nie et al., 2015), and less exhaustion (Fernet et al., 2012).

Age and work motivation

In this study, we examined how multidimensional work motivation develops in the last years of the working life. The distinction of the two motivation types is valuable in research on work in older age as well because of the aforementioned differential antecedents and consequences. Socio-emotional selectivity theory postulates that with older age, individuals experience that their time is limited, which leads to an age-related shift from strategies of knowledge acquisition towards emotion regulation (Carstensen, 1991, 2006), which means that with ageing, individuals increasingly focus on positive social and emotional experiences. Ng and Feldman (2010) argue that this strategy leads to a self-selection of workers into more rewarding jobs over time, which should relate to higher need satisfaction at work among older workers.

A basic assumption of SDT is that need satisfaction at work leads to higher autonomous work motivation (Gagné & Deci, 2005). Consequently, older age should be associated with higher autonomous work motivation.

Unfortunately, there is little research available on lifespan change or age differences in autonomous and controlled motivation. However, scholars have investigated age differences in intrinsic and extrinsic motivation, which are similar, but not identical, to autonomous and controlled motivation.[1] Empirical findings are mixed, with some studies finding stronger intrinsic motivation among older workers compared with younger workers (Kordbacheh et al., 2014) and others finding small or no differences (Akkermans et al., 2016; Boumans et al., 2011).

Furthermore, older adults are assumed to be more motivated by intrinsic than external benefits of the workplace—either because, following socio-emotional selectivity theory, their shorter time perspective leads them to favour present work characteristics instead of long-term external rewards (Akkermans et al., 2016), or because, following the lifespan theory of control (Heckhausen & Schulz, 1995), extrinsic characteristics of the job such as increased payment or promotion are harder to control in older age (e.g., in Kooij et al., 2011). This idea has been confirmed in a number of studies (Inceoglu et al., 2009, 2012; Kooij et al., 2011).

A limitation in previous empirical studies, however, is that they are based on cross-sectional age differences instead of longitudinal studies. There are two main problems with cross-sectional age differences: First, age differences may show either cohort differences or changes (Schaie & Strother, 1968). Hence, longitudinal research is required to understand true within-person changes in work motivation. Second, there may be differential selection to the effect such that older workers may choose to retire when they are not (autonomously) motivated, whereas younger workers with low autonomous motivation are forced to continue working. At any given time point, a sample of older workers may be more autonomously motivated than a younger comparison group, but this would not mean that autonomous motivation changed across the lifespan. Considering within-person change, and in particular, change in the last work years, may show a more nuanced picture.

Work motivation and retirement

As mentioned before, in the SDT framework, changes in (autonomous) work motivation are likely to occur when need satisfaction at work changes (Gagné & Deci, 2005). SDT does not propose in which life phases such changes typically occur. However, in various lifespan or life course theories, for example the lifespan life-space theory (Super, 1990), which defines different developmental stages over the career span, the last years before retirement are seen as a time when individuals disengage from their work and increasingly invest in other roles, such as family relationships (Atchley, 1976; Damman et al., 2013). Such a disengagement process is likely to be associated with changes in need satisfaction at work, and therefore also work motivation.

Damman et al. (2013) described that this process consists of no longer keeping up with new developments in the field, reducing one's work hours, and trying to hand over responsibilities to younger employees. Such actions may go hand in hand with declines in both facets of autonomous motivation: First, workers may deliberately weaken their identification with their job, which may lead to decreased identified regulation. Second, a general disengagement from work tasks bears the risk of frustrating the basic psychological needs. For example, if people do not keep up with new developments and hand responsibilities to younger employees, the job may feel less fun, which would lead to declines in intrinsic motivation.

There are two main explanations for a disengagement process before retirement. First, it could be a way to prepare for retirement (Evans et al., 1985; Ryser & Wernli, 2017) and a transformational process

[1]Autonomous motivation includes motivation from 'types of extrinsic motivation in which people have identified with an activity's value and ideally will have integrated it into their sense of self' (Deci & Ryan, 2008, p. 182).

into life as a retiree (Wanka, 2019). Second, a preretirement disengagement process could be caused by typical negative experiences at the work place when retirement is close. Supervisors and colleagues may begin to care less about integrating the soon-to-be retiree in the team, give them less interesting tasks, and less training to keep up with one's work tasks (Canduela et al., 2012; Karpinska et al., 2015; Lazazzara et al., 2013). Furthermore, age discrimination may be prominent in the preretirement years (Bayl-Smith & Griffin, 2014).

Despite these theoretical assumptions, little is known about the typical preretirement change of work motivation, or interindividual differences in change. Damman et al. (2013) used two waves of panel data in a Dutch sample and found that individuals increased their scores on a disengagement scale, which also included an item on maintained/reduced work motivation, over 5–6 years. The closer people were to their expected retirement age, the stronger was the disengagement. However, work motivation was only assessed with one item ('I am still as motivated for my work as two years ago'). De Wind et al. (2017) studied change in vigour and dedication at work in a sample of older adults, but did not examine work motivation specifically, either. The authors found that in a sample of Dutch older adults, the vast majority (89%) showed very little change in work engagement over four years, and only small subgroups showed decreases or increases. Those retiring over the study period seemed to differ in level of work engagement, but not so much in change, from those who continued working. A recent meta-analysis (Katz et al., 2019) showed an inverse u-shaped association of age and career commitment—people around mid-life seem to have the highest career commitment, whereas it seems to be weaker among people older than 60. However, work motivation was not explicitly included in this meta-analysis.

Taken together, to our knowledge, no study has yet investigated change in autonomous and controlled work motivation before retirement. Yet, the results from studies of related constructs imply that autonomous work motivation declines before retirement. Theoretically, this could be explained by a decline in basic psychological need satisfaction at work. This could either be because people disengage from work and focus on other life areas instead (Damman et al., 2013), or because of the behaviour of co-workers and leaders (Bayl-Smith & Griffin, 2014). Based on previous work, our first hypothesis is:

H1 *People who are about to retire will show larger decreases in autonomous work motivation than those who continue to work.*

The picture is less clear when it comes to controlled work motivation. Research based on SDT has usually found fewer relations between controlled work motivation and work-related outcomes such as retirement adjustment, compared with autonomous work motivation (Henning, Stenling, et al., 2019). We therefore assume that controlled motivation may not decrease to a comparable degree as autonomous motivation before retirement. When people approach retirement, they may withdraw from their identification with their job and focus on other areas in life. Conversely, one could expect older workers to perform well at work and extrinsic rewards and punishments may still be driving forces (external regulation). In addition, self-esteem may still be linked to their work performance (introjected regulation). We therefore do not assume particular changes in controlled motivation before retirement.

Can we predict work motivation?—The role of sense of community at work

Apart from mean-level trajectories, it is also important to examine interindividual differences in change and to identify modifiable factors at the work place that can explain these interindividual differences. Employers are interested to keep their employees motivated at the workplace, especially if there may be specific declines in the last years of work. Based on SDT (Ryan & Deci, 2017) and the community experience framework (Nowell & Boyd, 2010), we suggest that sense of community at work may be one such factor. Sense of community is defined as '…a feeling that members have of belonging, a feeling that members matter to one another and to the group, and a shared faith that members' needs will be met through their commitment to be together' (McMillan & Chavis, 1986, p. 9). Within the community

experience framework developed by Nowell and Boyd (2010), the community is perceived as a resource for meeting key physiological and psychological needs that positively affects work-related outcomes (Boyd & Nowell, 2017). Viewed from an SDT perspective, a positive sense of community at work will contribute to relatedness need satisfaction (cf. Scotto di Luzio et al., 2019), which in turn will influence positive work-related outcomes, such as autonomous work motivation. Although few empirical studies have examined the link between sense of community and relatedness needs satisfaction at work, a recent study in a sample of workers (mean age = 39 years) showed a positive relation, such that a positive sense of community at work was related to higher relatedness needs satisfaction two months later (Scotto di Luzio et al., 2019).

Within SDT, it is argued that the need for relatedness plays a central role in the internalization of values and regulations. Thus, work that allows for interdependence among employees, strengthens identification with work groups and is respectful and concerned about each employee, will have a positive effect on the internalization of autonomous motivation (Gagné & Deci, 2005). The proposed link between relatedness needs satisfaction and autonomous work motivation is broadly supported in several meta-analyses (Slemp et al., 2018; Van den Broeck et al., 2016).

Based on theory and these previous findings, we therefore argue that a positive sense of community at work is likely to be important for autonomous motivation via improved relatedness needs satisfaction that promotes internalization of values and regulations (Gagné & Deci, 2005). Individuals who have a stronger sense of community at work may show more positive trajectories of autonomous motivation in general, and also be less affected by the negative effect of an approaching retirement. This reasoning leads to the following hypothesis:

H2 *The association between approaching retirement and change in autonomous motivation is weaker among individuals with stronger sense of community.*

What comes first, motivation declines or retirement plans?

In psychological research, retirement is often conceptualized as a decision-making process (Wang & Shi, 2014). In the preceding paragraphs, we mostly suggested that an approaching retirement may lead to declines in motivation. However, although individual retirement timing is dependent on many different factors, including health, income and family life (Fisher et al., 2016), experiences at the workplace play an important role when choosing when to retire (Wang & Shi, 2014). Therefore, retirement may also be a consequence of declines in work motivation, as a dissatisfying job seems to lead to retirement intentions (Böckerman & Ilmakunnas, 2020; Zacher & Rudolph, 2017).

Given the scarce literature on multidimensional work motivation and retirement, it is unclear how different types of motivation are associated with retirement. However, previous studies suggest that higher autonomous, not controlled, work motivation is associated with lower turnover intentions—higher controlled motivation may even be associated with higher turnover intentions (Fernet et al., 2017; Gillet et al., 2013). Therefore, experiencing lower autonomous work motivation may also lead to retirement intentions. Given the increased importance of intrinsic motives in older age (Kooij et al., 2011), we expect that declines in autonomous work motivation, rather than controlled motivation, may increase the likelihood of retirement.

In the data set we used, there was no information on retirement intentions or decisions to retire. However, working participants were asked at every measurement point to report when they expected to stop working completely. In line with the theoretical background described above, a lower expected retirement age could be followed by decreases in work motivation (anticipatory disengagement), or lower work motivation may be followed by a lower expected retirement age (decision-making). Using a random-intercept cross-lagged panel model (Hamaker et al., 2015), we were able to test both hypotheses. As this is one of the first studies on this subject and potential confounders are not clear, we did not aim at establishing causal inference in this paper, but rather gather first descriptive evidence, showing if, within

persons, higher levels of autonomous motivation are followed by decreases in the expected retirement age, or vice versa. We expected a bidirectional relationship, which means that both variables predict each other over time.

Therefore, our hypotheses were as follows:

H3a *A lower autonomous work motivation is followed by a lower expected retirement age.*
H3b *A lower expected retirement age is followed by lower autonomous work motivation.*

For exploratory reasons, we also tested the longitudinal relation of expected retirement age and controlled work motivation. Our research question was, if a lower expected retirement age predicted decreased controlled work motivation, or vice versa. We had no hypothesis because of the lack of theory or previous research.

METHOD

Participants

All analyses were based on data from the Swedish HEARTS study. The HEARTS study is conducted mainly online, and it is focussed on adjustment processes and health trajectories in the last years of work life and the first years of retirement (Lindwall et al., 2017). A nationally representative sample of people aged 60–66 was drawn from the SPAR (Statens personadressregister) registry in 2015 (N = 14,990), and 5913 individuals participated in the first wave. Six annual follow-up surveys have been conducted so far. For the current analyses, we used data mainly from the first three annual waves (2015–2017), because work motivation was not assessed in later waves. We included work status in the fourth wave to distinguish those who did or did not retire after the third wave. In the second wave, n = 4651 participated again, n = 4320 participated in the third wave, and n = 4033 in the fourth.

The HEARTS study includes the following measure of retirement status: 'Are you retired (have you started to take out old age pension)?'. Options were as follows: (a) no; (b) yes, but working and consider myself a worker; (c) yes, and working, but consider myself a retiree; (d) yes, full-time retiree. The four options were included to account for the increasing complexity of retirement transitions and different definitions of retirement (Ekerdt & DeViney, 1990; Eyjólfsdóttir et al., 2021). For this study, however, we decided to reduce complexity by only considering those who reported either working or being retired full time. This was also necessary because people who considered themselves retired, even though they worked to some degree, were not asked about their current work motivation. We included participants who reported not being retired (category a) at all four waves (as the working control group, n = 647) and those who reported working at the first three waves but full retirement (category d) at the fourth wave (as the retiring group, n = 140). Figure 1 shows the sample selection process. We tested for longitudinal attrition and found only small effect sizes (Cohen, 1992; Ferguson, 2009), which lets us assume that sample selectivity was rather small. More information on the attrition analyses can be found in the Appendix A.

Measures

Work motivation

Work motivation was assessed with a subset of items from the Multidimensional Work Motivation Scale (Gagné et al., 2015). Psychometric analyses of this shorter measure can be found in Henning, Stenling, et al. (2019). We differentiated autonomous and controlled motivation. Participants were asked 'Why do you put efforts into your current job?' and responses were given on a 7-point Likert scale (completely false – completely true). Both factors were measured with four items. Items for autonomous motivation were

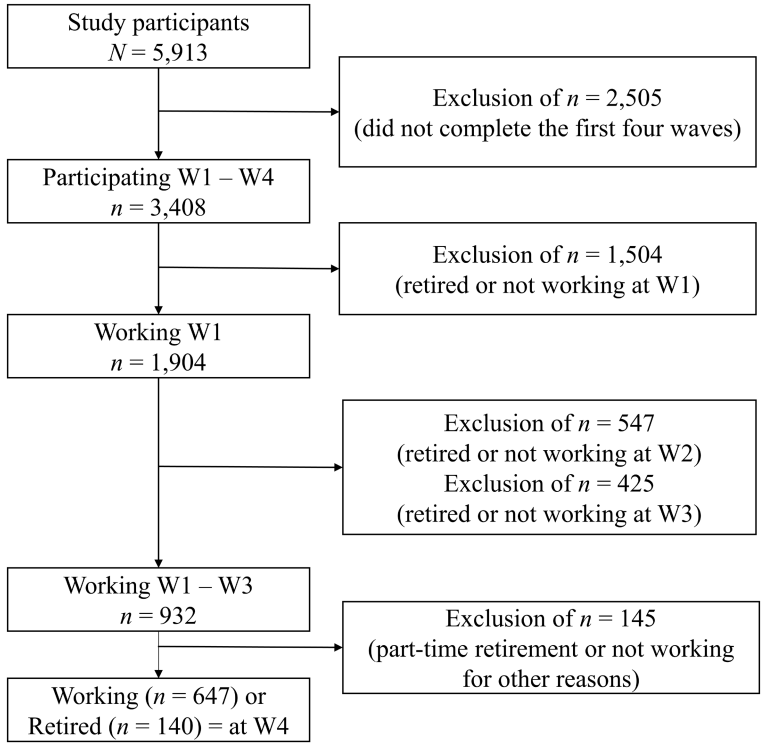

FIGURE 1 Sample selection

'Because I have fun doing my job', 'Because what I do in my work is exciting' (both intrinsic motivation), 'Because I personally consider it important to put efforts in this job', and 'Because putting efforts in this job aligns with my personal values' (both identified regulation).[2] Items for controlled motivation were 'Because I have to prove to myself that I can', 'Because it makes me feel proud of myself' (both introjected motivation), 'To get others' approval (e.g., supervisor, colleagues, family, clients…).', and 'because others will respect me more (e.g., supervisor, colleagues, family, clients…)'. (both external regulation). Amotivation was not included in the analysis as only two items were available in the data set, which showed poor reliability in a previous study (Henning, Stenling, et al., 2019). Cronbach's alpha ranged from .80 to .82 for autonomous motivation (a = .80 for T1, a = .83 for T2, a = .82 for T3) and ranged from .77 to .79 for controlled motivation (a = .77 for T1, a = .79 for T2, a = .78 for T3). Both types of motivation were measured as latent factors in the analyses.

Sense of community at work

Sense of community at work was included at baseline as a predictor of the level and change in work motivation. It was measured with a subscale of the COPSOQ-II questionnaire (Pejtersen et al., 2010) with a modified answer format: Whereas in the COPSOQ-II questionnaire a temporal frame is used (never/hardly ever to often), in the HEARTS questionnaire, people are asked to agree to an item (1—completely false, 5—completely true). Sense of community of work was measured with three items

[2]Integrated regulation, a further subdimension, is not included in the MWMS scale because of a lack of face validity and a conceptual overlap with other dimensions (Gagné et al., 2015).

(a = .89): 'There is a good atmosphere between me and my colleagues', 'There is a good cooperation between the colleagues at work', and 'I feel part of a community at my place of work'.

Expected age at retirement

Workers were asked at which age they expected to stop working completely. Answer alternatives were 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, or '71 or older'. We used this item as a continuous variable.

Covariates

We included age, gender, self-rated health, education and supervisory position reported at the first wave as covariates in the growth curve model with predictors. A higher age may be a reason why some people expect to retire within 4 years and may also influence work motivation. Gender is also associated with retirement behaviour and men and women show different work-retirement trajectories (König, 2017). Education was included as a proxy for socio-economic status. Poor health may lead to a decline in work motivation (Damman et al., 2013). Having a supervisory position has been related to less work disengagement in a previous study (Damman et al., 2013). We distinguished between higher educated participants (some tertiary education) and others. Participants rated their health on a scale ranging from 1 (very bad) to 6 (very good). Supervisory position was assessed with one item, asking if people had personnel responsibility. Response options ranged from 1 (personnel responsibility for more than 30 persons) to 4 (no responsibility). We coded this as a dichotomous item (no supervisory position = 0, supervisory position = 1). Table 1 shows baseline descriptive statistics.

Analysis

We conducted bivariate longitudinal latent growth curve models (Ram & Grimm, 2007) to study change in autonomous motivation and controlled motivation in Mplus (Muthén & Muthén, 2020). Figure 2 shows the path diagram for our model. We used the robust full information maximum likelihood estimator (MLR) to deal with potential non-normality and missing data.

Model fit evaluation was based on the comparative fit index (CFI), the Tucker–Lewis Index (TLI), the standardized root mean residual (SRMR), and the root mean square error of approximation (RMSEA).

TABLE 1 Descriptive statistics and cross-correlations between baseline variables

	M(*SD*)/%	1	2	3	4	5	6	7	8	9
1. Age	61.21 (1.24)	1								
2. Gender (Female)	55.04%	−.04	1							
3. Higher Education	60.00%	.06	.12**	1						
4. Self-Rated Health	4.86 (0.87)	.03	.02	.12**	1					
5. Supervisory Position	20.15%	−.06	.11**	.10**	.03	1				
6. Sense of Community at Work (T1)	4.29 (0.64)	.06	−.07	.07*	.17***	.08*	1			
7. Expected Retirement Age (T1)	66.13 (1.99)	.19***	−.08*	.14***	.13***	.15***	.07	1		
8. Autonomous Motivation (T1)	5.07 (1.31)	.05	.09*	.26***	.15***	.12**	.24***	.15***	1	
9. Controlled Motivation (T1)	4.32 (1.38)	−.09*	.07*	.17***	.06	.06	.04	.05	.53***	1

Note: N = 787. *p < .05, **p < .01, ***p < .001.

According to Marsh (2007), CFI and TLI values .90 or higher and SRMR and RMSEA values .08 or lower indicate acceptable model fit, CFI and TLI values .90 or higher and SRMR and RMSEA values .08 or lower indicate acceptable model fit.

As a first step, we tested for measurement invariance in a two factor model (autonomous and controlled motivation) with three measurement points. Our tests were based on recommendations by Chen (2007): To test for weak invariance (equal factor loadings), a change in CFI should be less than .010, change in RMSEA less than .015, and change in SRMR less than .030. Testing for strong invariance (equal item intercepts), CFI should change by less than .01, RMSEA should decrease less than .015 and SRMR should decrease less than .010. We allowed for residual correlations of the same items over time, as well as among items of the same subscales within time points (intrinsic, identified, introjected, external).

Next, we conducted bivariate latent growth curve analyses to model change in autonomous and controlled work motivation over time. Intercepts and slopes, as well as time specific residuals of autonomous and controlled work motivation were allowed to correlate.

To test hypothesis 1, we added retirement after the study period as a predictor of the level and slope in autonomous motivation. For exploratory reasons, we also predicted level and change in controlled motivation. We added sense of community at work, as well as the other covariates, as predictors of the levels and slope of autonomous motivation, and again, for exploratory reasons, of controlled motivation. We further tested for a moderation effect by including a retirement × sense of community at work interaction effect on the slope of autonomous motivation (hypothesis 2). Next, we added covariates as predictors as a robustness check. Sense of community, as well as health were mean centred.

Finally, to test hypotheses 3a and 3b, we computed random-intercept cross-lagged panel models (Hamaker et al., 2015) on the dynamic relationship of autonomous, respectively, controlled motivation and expected time to retirement. In this model, within-person cross-lagged effects between two variables are separated from stable between-person associations. Further parameters of the model include within-person correlations of the two variables as well as univariate auto-regression. Intercepts were regressed on covariates (age, gender, education, health and supervisory function). We compared models with only one path (i.e., expected retirement age → work motivation or vice versa) or no cross-lagged paths to a model with both cross-lagged paths, using $\Delta\chi^2$ model tests. Figure 3 shows the path diagram of such a model.

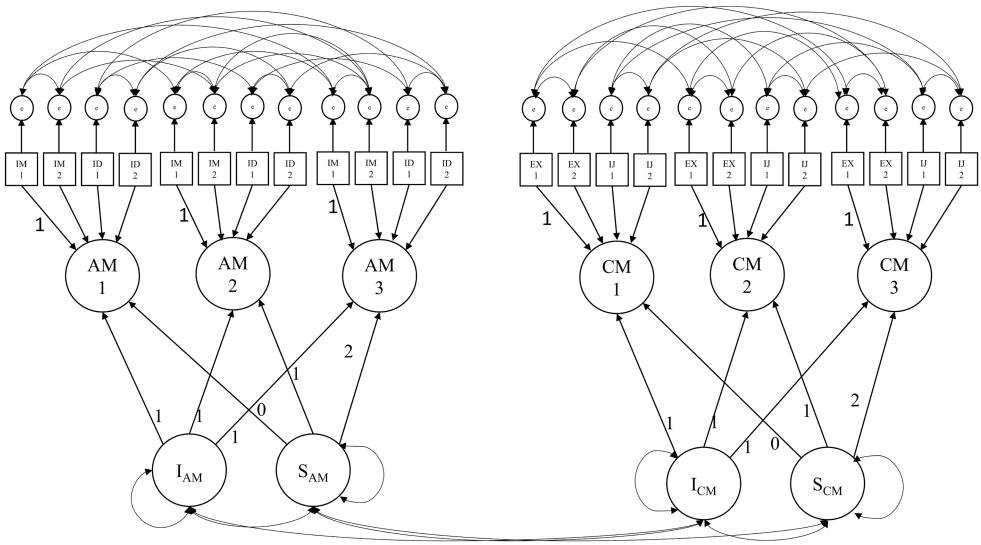

FIGURE 2 Bivariate latent growth curves. AM, Autonomous Work Motivation; CM, Controlled Motivation; EX, External Regulation; I, Intercept; ID, Identified Regulation; IJ, Introjected Regulation; IM, Intrinsic Motivation; S, Slope

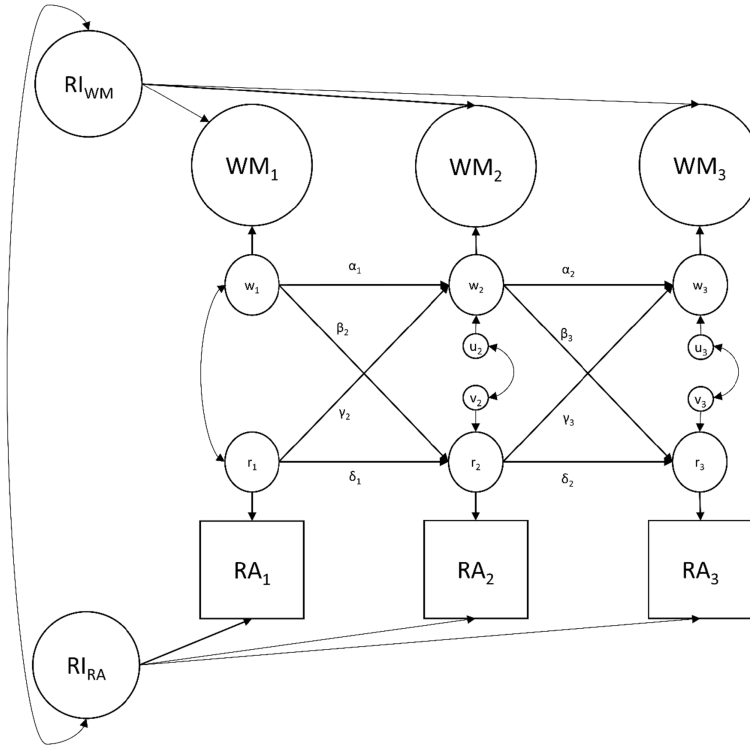

FIGURE 3 Random-intercept cross-lagged panel model. *Note*: Squares represent manifest variables and circles represent latent variables. Manifest indicators and covariates are not displayed. RA, Retirement Age; RI, Random Intercept; WM, Work Motivation

RESULTS

Bivariate correlations at baseline

Correlations between variables at baseline can be found in Table 1. Being a woman, having a higher education, better health, a supervisory position, a higher sense of community at work and a later expected retirement age were associated with higher levels of autonomous work motivation. Lower age, being a woman and higher education were associated with higher levels of controlled work motivation.

Measurement invariance

As a first step, we tested for configural invariance of a two factor model (autonomous and controlled motivation) with three measurement points by investigating global model fit. The fit was acceptable (CFI = .914, TLI = .882, SRMR = .061, RMSEA = .064, 95% CI [0.059, 0.068, $\chi^2(201) = 840.17$, $p < .001$]). We could further establish weak measurement invariance over time when setting factor loadings to equality over time (CFI = .914, TLI = .888, SRMR = .062, RMSEA = .062, 95% CI [0.057, 0.066], $\chi^2(213) = 851.51$, $p < .001$). Finally, we could establish strong measurement invariance by setting item intercepts to equality (CFI = .912, TLI = .892, SRMR = .062, RMSEA = .061, 95% CI [0.057, 0.065], $\chi^2(225) = 878.02$, $p < .001$).[3]

[3]Santorra-Bentler scaled X2 comparisons did not show significant differences (weak MI: X2(12) = 6.35, $p = .897$; strong MI: X2(12) = 19.87, $p = .070$).

TABLE 2 Bivariate latent growth curve

	Autonomous motivation	Controlled motivation
Intercept	5.22 (0.05)***	4.10 (0.06)***
Slope	−0.01 (0.02)	−0.03 (0.02)
Variance intercept	0.76 (0.11)***	1.00 (0.09)***
Variance slope	0.04 (0.02)	Set to 0
Univariate intercept-slope covariance	−0.03 (0.03)	Set to 0
Bivariate intercept-intercept covariance	0.60 (0.07)***	
Covariance intercept controlled motivation slope autonomous motivation	−0.01 (0.02)	
Bivariate time-specific residual correlation	0.30 (0.02)***	
Model fit	CFI = .911, TLI = .896, SRMR = .063, RMSEA = .060, 90% CI [0.055; 0.064]	

Note: $N = 787$.

*** $p < .001$.

Change in work motivation

A bivariate latent growth curve on controlled and autonomous work motivation converged but showed a non-positive definite latent covariance matrix and a non-significant negative variance of the slope for controlled motivation. Therefore, we set this variance to zero which led to convergence and an acceptable model fit (cf. Bühler et al., 2020). A likelihood ratio test showed no significant difference between models (TRd (4) = 3.63, $p = .458$), and the confidence interval (95% CI [−0.10, 0.06]) included zero as well (cf. Chen et al., 2001); therefore, we assume that the true variance was zero or close to zero in our sample. The resulting model showed stable levels of motivation, given the insignificant slopes of autonomous ($M_{Slope} = -0.03$, $SE = 0.02$, $p = .131$) and controlled work motivation ($M_{Slope} = -0.01$, $SE = 0.02$, $p = .653$). The slope variance of autonomous motivation was small and non-significant ($\sigma^2 = .04$, $SE = 0.02$, $p = .100$). Taken together, these findings show little evidence of declines in motivation among older workers. Table 2 shows all parameters of the model.

Retirement and work motivation (hypothesis 1)

In the next step, we included retirement after wave 3 as a predictor. As the slope variance for controlled motivation had been set to zero in the previous step, we kept this restriction in the following models and did not predict it, as the variance was seemingly too small to reliably predict interindividual differences.[4] The model showed that those about to retire reported lower autonomous work motivation ($B = -0.23$, $SE = 0.10$, $p = .023$) and controlled motivation ($B = -0.21$, $SE = 0.11$, $p = .047$) at baseline. In line with hypothesis 1, we found that those who retired after the three waves showed a larger decline in autonomous motivation ($B = -0.08$, $SE = 0.04$, $p = .030$). These effects are illustrated in Figure 4. All coefficients in this model can be found in Table 3 (model 1).

[4]Including predictors can increase the power to detect slope variance. However, including predictors of the slope variance for controlled motivation did not show any significant effects, and the residual variance of the slope of controlled motivation was estimated as negative and the models showed a non-positive definite latent covariance matrix.

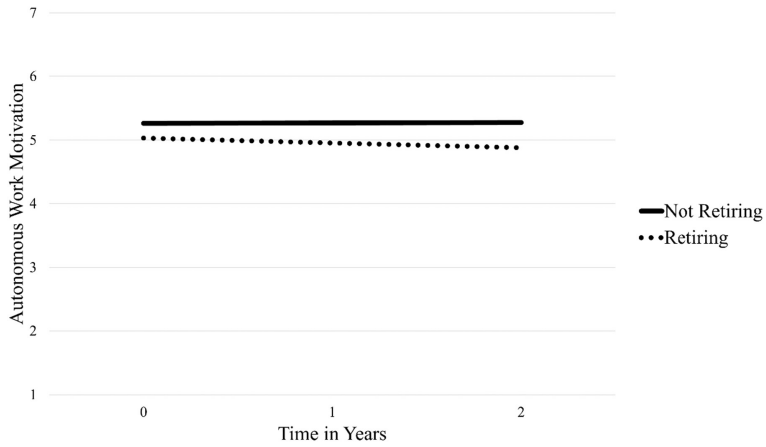

FIGURE 4 Change in autonomous work motivation. *Note*: Retiring and not-retiring participants differed significantly in level and change in autonomous motivation

Sense of community at work and work motivation (hypothesis 2)

Next, we added sense of community as a predictor (Table 3, model 2). Sense of community was significantly associated with higher autonomous work motivation ($B = 0.28$, $SE = 0.07$, $p < .001$), but not to changes in autonomous work motivation ($B = -0.02$, $SE = 0.02$, $p = .360$) or with levels of controlled motivation ($B = 0.06$, $SE = 0.06$, $p = .338$) at baseline. The association of retirement and the level and change in autonomous motivation remained significant, but the association of retirement with the level of controlled motivation ($B = -0.21$, $SE = 0.11$, $p = .050$) was not significant anymore. In the next step, we added sense of community x retirement interaction effects as predictors of the levels and slopes (Table 3, model 3), but none of the effects were significant. This is in contrast to hypothesis 2, which predicted a positive effect on change in autonomous motivation. Adding covariates (age, gender, education, self- rated health and supervisory function) did not affect these results (Table 3, model 4).

Expected retirement time and work motivation (hypotheses 3a and 3b)

Finally, we estimated random-intercept cross-lagged panel models on the relationship of expected retirement age and work motivation in two separate models.[5] In all models, we included age, gender, education, supervisory function and health as predictors of the random intercepts. A separate latent growth curve model on planned retirement age showed that the age at which individuals planned to retire increased slightly over time ($M_{\text{Intercept}} = 66.14$, $SE = 0.07$, $p < .001$, $M_{\text{Slope}} = 0.07$, $SE = 0.02$, $p < .001$, $\sigma^2_{\text{Intercept}} = 3.26$, $SE = 0.25$, $p < .001$, $\sigma^2_{\text{Slope}} = .07$, $SE = 0.09$, $p = .468$).

Autonomous motivation

Model fit of a model with full cross-lagged effects was good (CFI = .942, TLI = .931, RMSEA = .053, 90% CI [0.048, 0.058], SRMR = .060). We set residual correlations, autoregressive effects and cross-lagged effects to be equal over time without a significant loss in fit, $\Delta\chi^2(5) = 10.16$, $p = .071$. Both cross-lagged effects were estimated as non-significant (planned retirement age → work motivation: $B = 0.03$, $SE = 0.04$,

[5]Models with time to expected retirement (in years) instead of planned retirement age showed the same results.

TABLE 3 Predictors of level and change in work motivation

	Intercept autonomous motivation, *B* (*SE*)	Slope autonomous motivation, *B* (*SE*)	Intercept controlled motivation, *B* (*SE*)
Model 1 (only retirement)			
Intercept	5.26 (0.05)***	0.01 (0.02)	4.14 (0.06)***
Retirement	−0.23 (0.10)*	−0.09 (0.04)*	−0.21 (0.10)*
Residual variance	0.75 (0.11)***	0.04 (0.02)	0.98 (0.09)***
R^2	0.01 (0.01)	0.02 (0.03)	0.01 (0.01)
Model fit	CFI = .913, TLI = .898, SRMR = .061, RMSEA = .057, 90% CI [0.053; 0.061]		
Model 2 (with sense of community at work)			
Intercept	5.26 (0.05)***	0.01 (0.02)	4.14 (0.06)***
Retirement	−0.22 (0.10)*	−0.09 (0.04)*	−0.21 (0.11)
Sense of community at work	0.28 (0.07)***	−0.02 (0.02)	0.06 (0.06)
Residual variance	0.74 (0.11)***	0.04 (0.02)	0.98 (0.09)***
R^2	0.07 (0.03)*	0.03 (0.03)	0.01 (0.01)
Model fit	CFI = .909, TLI = .893, SRMR = .061, RMSEA = .057, 90% CI [0.053; 0.061]		
Model 3 (interaction effects)			
Intercept	5.26 (0.05)***	0.01 (0.02)	4.14 (0.06)***
Retirement	−0.22 (0.10)*	−0.09 (0.04)*	−0.20 (0.10)
Sense of community at work	0.28 (0.07)***	−0.01 (0.02)	0.01 (0.07)
Sense of community at work × retirement	0.03 (0.13)	0.19 (0.13)	−0.03 (0.06)
Residual variance	0.75 (0.11)***	0.04 (0.03)	0.98 (0.09)***
R^2	0.07 (0.03)	0.04 (0.04)	0.01 (0.01)
Model fit	CFI = .908, TLI = .893, SRMR = .059, RMSEA = .056, 90% CI [0.052; 0.059]		
Model 4 (with covariates)			
Intercept	4.80 (0.08)***	−0.02 (0.03)	3.78 (0.09)***
Age	0.05 (0.03)	−0.01 (0.01)	−0.05 (0.04)
Female gender	0.20 (0.08)**	0.06 (0.03)	0.15 (0.09)***
High education	0.47 (0.09)***	0.00 (0.02)	0.38 (0.09)***
Supervisory function	0.32 (0.09)***	−0.03 (0.04)	0.19 (0.10)
Self-rated health	0.08 (0.05)	0.00 (0.02)	0.06 (0.05)
Retirement	−0.21 (0.10)*	−0.08 (0.04)*	−0.12 (0.11)
Sense of community at work	0.24 (0.07)***	−0.01 (0.02)	0.00 (0.07)
Sense of community at work × retirement	0.04 (0.13)	−0.04 (0.06)	0.19 (0.13)
Residual variance	0.64 (0.09)***	0.03 (0.03)	0.92 (0.09)***
R^2	0.20 (0.04)***	0.08 (0.07)	0.07 (0.02)**
Model fit	CFI = .902, TLI = .886, SRMR = .055, RMSEA = .053, 90% CI [0.049; 0.056]		

Note: The slope variance for controlled motivation was set to zero. $N = 787$. *$p < .05$, **$p < .01$, ***$p < .001$.

$p = .476$; work motivation → planned retirement age: $B = 0.16$, $SE = 0.10$, $p = .116$), so H3a and H3b were not confirmed. Random intercepts were significantly associated, which means that those with higher autonomous motivation tended to plan to retire later ($B = 0.33$, $SE = 0.08$, $p < .001$). Table 4 shows all parameters from this model. Setting one of the paths or both paths to zero did not lead to a significantly worse model fit, planned retirement age → autonomous work motivation: $\Delta\chi^2(1) = 0.52$, $p = .472$; auton-

TABLE 4 Random intercept cross-lagged panel model of work motivation and planned retirement age

	Autonomous work motivation, *B* (*SE*)	Controlled work motivation, *B* (*SE*)
Autoregressive Effect Work Motivation	0.08 (0.10)	−0.01 (0.04)
Autoregressive Effect Planned Retirement Age	0.13 (0.11)	0.03 (0.09)
Work Motivation → Planned Retirement Age	0.16 (0.10)	0.02 (0.08)
Planned Retirement Age → Work Motivation	0.03 (0.04)	−0.01 (0.04)
Covariance Residuals Work Motivation and Planned Retirement Age T1	0.00 (0.04)	0.00 (0.04)
Covariance Residuals Work Motivation and Planned Retirement Age T2/T3	0.06 (0.04)	−0.01 (0.04)
Covariance Random Intercepts Work Motivation and Planned Retirement Age	0.33 (0.08)***	0.13 (0.07)
Correlation Random Intercepts Work Motivation and Planned Retirement Age	0.21 (0.05)***	0.09 (0.05)

Note: Effects of covariates not displayed. $N = 787$. *$p < .05$, **$p < .01$, ***$p < .001$.

omous work motivation → planned retirement age: $\Delta\chi^2(1) = 2.60$, $p = .107$; both paths: $\Delta\chi^2(2) = 3.42$, $p = .181$.

Controlled motivation

As to the exploratory analyses on controlled motivation, the model fit of a model with full cross-lagged effects was good (CFI = .950, TLI = .941, RMSEA = .045, 90% CI [0.040, 0.051], SRMR = .055). We set residual correlations, residual variances, autoregressive effects and cross-lagged effects to be equal over time without a significant loss in fit, $\Delta\chi^2(5) = 3.19$, $p = .671$. Both cross-lagged effects were estimated as non-significant (planned retirement age → work motivation: $B = -0.10$, $SE = 0.04$, $p = .881$; work motivation → planned retirement age: $B = 0.03$, $SE = 0.09$, $p = .730$). Random intercepts were not significantly associated ($B = 0.13$, $SE = 0.07$, $p = .061$). Parameters can be found in Table 4. Setting one of the paths or both paths to zero did not lead to a significantly worse model fit, planned retirement age → controlled work motivation: $\Delta\chi^2(1) = 0.06$, $p = .814$; controlled work motivation → planned retirement age: $\Delta\chi^2(1) = 0.14$, $p = .704$; both paths: $\Delta\chi^2(2) = 0.42$, $p = .812$.

DISCUSSION

In the current study, we examined the level and change in autonomous and controlled work motivation in the preretirement period among older workers as well as some of its precedents. We found relative stability rather than declines in autonomous and controlled work motivation, but slight decreases in autonomous work motivation among those who retired within a year after the study period. Controlled motivation showed mainly stability, even among those retiring. We could not identify significant predictors of change in motivation, apart from an approaching retirement.

Proximity to retirement as a central factor

Our findings imply that, in line with our H1, despite general stability in work motivation among older workers, autonomous work motivation declines slightly before retirement. This finding is in accordance with previous results showing a certain degree of disengagement before one's exit from the work force (Damman et al., 2013) and with findings of an inverse u-shaped relationship of career engagement and age in previous studies (Katz et al., 2019), but it is in contrast to findings from De Wind et al. (2017). The decline does not seem to be an effect of chronological age (cf. Akkermans et al., 2016; Kordbacheh

et al., 2014), but seems to be rather specific to the preretirement years. Already three years before retirement, retiring individuals reported lower autonomous work motivation than those who would continue to work. The difference in change in autonomous motivation between those about to retire and those continuing to work remained after controlling for sense of community and other covariates that are known to be related with retirement itself (gender, health and education), demonstrating the independent role of an approaching retirement in autonomous motivation.

Sense of community—no buffer for declining work motivation

Although sense of community at work was associated with higher autonomous work motivation at baseline, we did not find significant effects on change and it also did not buffer the effects of retirement, which we had expected (H2). One possible explanation is that the high level of sense of community in the sample could have led to a ceiling effect. This high level may be a sign of self-selection into rewarding jobs over the lifespan (Ng & Feldman, 2010), or that people with a lower sense of community may have already retired at the start of the study. Alternatively, as Beehr et al. (2010) pointed out, not all forms of well-meaning social interactions at work need to have positive effects on the individual attitudes towards the work place, but some can also lead to more negative attitudes. The three-item scale used in our study may be too global, and more fine-grained measures of the social environment at work may be needed (cf. Ebener, 2019). Nevertheless, as there was a significant cross-sectional association, both sense of community and autonomous work motivation may have the same antecedents, develop in parallel over time, sense of community at work may be influenced by autonomous motivation, or sense of community may influence the development of autonomous motivation earlier in the working lifespan. Further research is warranted to clarify these issues.

Interestingly, sense of community at work was not related to higher baseline levels of controlled motivation. Perceiving a sense of community at work may primarily lead to an increased identification with the workplace (Francioli et al., 2018), which in turn would lead to higher autonomous work motivation, but not controlled motivation. Future studies with larger samples are needed to identify predictors of change in autonomous work motivation among older workers. For example, previous studies showed the beneficial role of autonomy support at the work place for autonomous work motivation (Gillet et al., 2013; Nie et al., 2015). However, the role of autonomy support from peers and/or the leader when approaching retirement has not yet been explored but would be interesting to examine in future research.

Why does autonomous work motivation decline?

Mechanisms behind the decline in autonomous motivation are yet unknown. It may be a sign of an intentional disengagement from work to prepare for retirement and focus on other life areas (Damman et al., 2013), or it may be caused by changes at the workplace in the last years of working life, if colleagues or supervisors invest less time and energy in the integration and support of ageing workers (Lazazzara et al., 2013). Alternatively, it is possible that people retire once they experience losses in autonomous work motivation (cf. Zacher & Rudolph, 2017).

However, the results of a random-intercept cross-lagged panel model did not provide evidence for either retirement decision processes (i.e., decreased autonomous motivation being followed by decreases in the retirement age, H3a), or disengagement processes (i.e., decreased in the expected retirement age being followed by decreases in autonomous motivation, H3b). Most likely, people in that age group already know when they will retire and will not adjust that age anymore. Decisions for retirement or disengagement processes may both have started earlier, so that our study missed the relevant time window. Future studies should start earlier in the working life to understand long-term trajectories and potential 'terminal declines' (cf. Gerstorf et al., 2008) in work motivation before retirement (Zacher & Rudolph, 2017). It should also be noted that many of our participants continued to work beyond the study period; therefore,

it is possible that those retiring already after two years were a very special group of workers with atypical trajectories of motivation. Finally, time-to-retirement models similar to time-to-death models, including larger samples of retirees and centreing the change in work motivation before retirement, may offer important insights (cf. Gerstorf et al., 2008).

Theoretical implications

The current study makes several contributions to SDT and to our understanding motivational processes before retirement. First, our study is one of the first to examine multidimensional work motivation from an ageing perspective. Although factors that contribute to autonomous and controlled work motivation are well known, little is known about typical and atypical change in these different types of motivation over the lifespan. In general, few SDT-based studies have included older workers or retirees (Burmeister et al., 2020; Henning, Stenling, et al., 2019). While studies on the topic until today were often cross-sectional, we add evidence from longitudinal data and showed that at least in our sample autonomous motivation seems to remain high among Swedish workers in their 60s, but may change around retirement. Future research may proceed with this by investigating longer time frames in later working life. As has been noted previously (Henning, Bjälkebring, et al., 2019), combining SDT with lifespan psychological approaches can be of benefit for both research traditions.

Second, the current study contributes to research using a more differentiated concept of work motivation instead of the simpler indicators used before when it comes to disengagement. Considering autonomous and controlled work motivation instead of unidimensional engagement indices provides a more nuanced view, as we found them not changing in the same way. This is an important addition to previous approaches to work motivation in older age. For example, the lifespan model of successful ageing at work by Kooij et al. (2020) defines successful ageing as the maintenance of work ability and work motivation. SDT, and in particular the findings in our study, suggest that it may be autonomous motivation that is of specific importance to maintain. Relatedly, in another approach to motivational ageing at work, Kanfer et al. (2013) differentiate 'motivation at work', 'motivation to work' and 'motivation to retire' among older workers. Future studies could investigate how the three types of motivation develop longitudinally as people age and get closer to retirement, and how they are associated with each other, but further distinguish different types of motivation at work.

Third, the study profited from using not age, but proximity to retirement, as the process of retirement is correlated with, but not determined by age. Therefore, we suggest that future studies on ageing at work should consider (subjective or objective) proximity to retirement in addition to or even instead of chronological age. Lifespan psychologist have, for a long time, argued that age itself is not a meaningful variable, but it is always a proxy for some psychosocial or biological mechanism (Freund & Isaacowitz, 2013; Wohlwill, 1970). By contrast, using proximity to retirement allows for a more nuanced view on the possible mechanisms of disengagement and motivational decline. In this context, there is also potential for a further theoretical refinement of work disengagement approaches by considering the concept of occupational time perspective, which refers to the subjective time horizon at a specific job (Rudolph et al., 2018).

Practical implications

From a practitioner perspective, it is encouraging to see the relatively high level (around 5 on a 7-point scale) of autonomous work motivation among the older workers in this study, mirroring previous results by De Wind et al. (2017) and a meta-analysis by Ng and Feldman (2012). Stereotypes of older workers being less motivated than younger workers are thus clearly wrong. Thus, in case that autonomous motivation of an older worker is low, that does not seem to be inevitable but can potentially be addressed.

An important question is if it should be tried to raise, or at least maintain, autonomous work motivation in the last years before retirement, when declines seem to set in. From an employer's perspective, this

seems to be optimal as motivated worker will work more productively and healthily as described above, and motivation declines may lead to employer changes (Garthe & Hasselhorn, 2021; Gillet et al., 2013) or earlier retirement (cf., Zacher & Rudolph, 2017). Nevertheless, from an employee's perspective, it seems more ambivalent. Despite the positive consequences of autonomous motivation while the individual is working, a lowered motivation as part of a preretirement disengagement may be adaptive and help to manage the transition to retirement (Henning, Stenling, et al., 2019; Wang, 2007). There are a number of interventions to support need satisfaction (and thereby also autonomous motivation) at the workplace (Slemp et al., 2021). But before testing whether they are suitable for older workers, research should gain more knowledge about the role of (especially: autonomous) motivation in the preretirement years.

Strengths and limitations

A strength of the current study is the unique sample and design and the use of multidimensional work motivation to capture motivational processes before retirement. Furthermore, this is the first study to investigate preretirement disengagement processes in a Swedish sample. Finally, the use of longitudinal data helps to illustrate change, instead of level, in work motivation and to investigate the role of the approaching retirement events.

One limitation of the current study is the relatively short observation period (2 years). This does not allow one to test for non-linear trends, and more waves of data are needed to understand whether those retiring after three waves of the HEARTS study are representative for the usual processes before retirement in our sample, or whether they are a selective group, given that many workers continued to work. The preretirement motivational trajectories of later retirees in the HEARTS sample may look different. However, unfortunately, work motivation was only assessed at three waves in the study. Furthermore, those who still worked at baseline in the HEARTS sample may be a selective group with higher work motivation from the start. Because of the age range of the study, we were not able to look at retirees who left the labour market before the official retirement age, for example receiving disability pensions or unemployment benefits. However, it is very common in Sweden to work up to this age (Hofäcker et al., 2019; König & Lindquist, 2016). Our sample is also selective with regard to education (Lindwall et al., 2017). A further limitation is that very limited information on the participants' workplace is available in HEARTS, and all information is based on self-report data, with potential for problems linked to common method bias. Another important construct to explore in similar studies in the future, which was not part of the HEARTS questionnaire, is need satisfaction (and frustration) at the workplace. Need satisfaction is according to SDT the main driver of autonomous motivation. Finally, we only included those retiring full-time from work and excluded people working part time in retirement (Henning, Stenling, et al., 2019).

CONCLUSION

We found that autonomous work motivation was rather stable in our sample, but it declined among those who retired within one year after the study period. More research is needed to understand antecedents and consequences of such developments. It remains unclear whether motivational changes before retirement show a disengagement process or rather are a consequence of external factors and/or lead to the decision to retire. In general, researchers in the field should try to investigate more in detail how work motivation changes over the lifespan, making use of lifespan developmental theories.

AUTHOR CONTRIBUTIONS

Georg Henning: Conceptualization; formal analysis; methodology; visualization; writing – original draft. **Andreas Stenling:** Conceptualization; methodology; writing – review and editing. **Susanne Tafvelin:**

Conceptualization; writing – review and editing. **Melanie Ebener:** Conceptualization; writing – review and editing. **Magnus Lindwall:** Conceptualization; writing – review and editing.

ACKNOWLEDGEMENTS

The authors would like to thank Martin Hyde for very helpful comments on an earlier version of this manuscript.

FUNDING INFORMATION

Georg Henning was supported by a grant from the German Research Foundation (DFG, project number 441444293). The HEARTS study was supported by the grants Dnr 2013-2291 and Dnr 2013-2300 from the Swedish Research Council for Health, Working Life and Welfare (FORTE). Andreas Stenling was supported by an international postdoc grant from the Swedish Research Council (dnr: 2017-00273).

CONFLICT OF INTEREST

No potential conflict of interest was reported by the authors.

DATA AVAILABILITY STATEMENT

This data can be made available upon request and in accordance with applicable laws. For further information about accessibility of data, contact hearts@psy.gu.se.

ETHICAL APPROVAL

The HEARTS study was carried out in accordance with the recommendations of the regional ethical approval board of the University of Gothenburg with written informed consent from all subjects. All subjects gave written informed consent in accordance with the Declaration of Helsinki. Ethical approval was granted from the ethical approval board of the University of Gothenburg (Dnr: 970-14).

ORCID

Georg Henning https://orcid.org/0000-0003-2046-1624
Andreas Stenling https://orcid.org/0000-0002-0834-1040
Susanne Tafvelin https://orcid.org/0000-0003-4263-8080
Magnus Lindwall https://orcid.org/0000-0002-2066-6235

REFERENCES

Akkermans, J., de Lange, A., van der Heijden, B., Kooij, D., Jansen, P., & Dikkers, J. (2016). What about time? Examining chronological and subjective age and their relation to work motivation. *Career Development International*, *21*, 419–439. https://doi.org/10.1108/CDI-04-2016-0063

Atchley, R. C. (1976). *The sociology of retirement*. Halsted Press.

Bayl-Smith, P. H., & Griffin, B. (2014). Age discrimination in the workplace. Identifying as a late-career worker and its relationship with engagement and intended retirement age. *Journal of Applied Social Psychology*, *44*, 588–599. https://doi.org/10.1111/jasp.12251

Beehr, T. A., Bowling, N. A., & Bennett, M. M. (2010). Occupational stress and failures of social support: When helping hurts. *Journal of Occupational Health Psychology*, *15*(1), 45–59. https://doi.org/10.1037/a0018234

Beier, M. E., LoPilato, A. C., & Kanfer, R. (2018). Successful motivational aging at work: Antecedents and retirement-related outcomes. *Work, Aging and Retirement*, *4*(2), 213–224. https://doi.org/10.1093/workar/wax034

Bohlmann, C., Rudolph, C. W., & Zacher, H. (2018). Methodological recommendations to move research on work and aging forward. *Work, Aging and Retirement*, *4*(3), 225–237. https://doi.org/10.1093/workar/wax023

Boumans, N. P. G., de Jong, A. H. J., & Janssen, S. M. (2011). Age-differences in work motivation and job satisfaction. The influence of age on the relationships between work characteristics and workers' outcomes. *The International Journal of Aging and Human Development*, *73*, 331–350. https://doi.org/10.2190/AG.73.4.d

Boyd, N. M., & Nowell, B. (2017). Testing a theory of sense of community and community responsibility in organizations: An empirical assessment of predictive capacity on employee well-being and organizational citizenship. *Journal of Community Psychology*, *45*(2), 210–229. https://doi.org/10.1002/jcop.21843

Burmeister, A., Wang, M., & Hirschi, A. (2020). Understanding the motivational benefits of knowledge transfer for older and younger workers in age-diverse coworker dyads: An actor–partner interdependence model. *Journal of Applied Psychology*, *105*(7), 748–759. https://doi.org/10.1037/apl0000466

Böckerman, P., & Ilmakunnas, P. (2020). Do good working conditions make you work longer? Analyzing retirement decisions using linked survey and register data. *The Journal of the Economics of Ageing*, *17*, 100192. https://doi.org/10.1016/j.jeoa.2019.02.001

Bühler, J. L., Weidmann, R., Wünsche, J., Burriss, R. P., & Grob, A. (2020). Daily responsiveness, expectations, and self–disclosure: How the average levels and within–person variability of three relationship components mediate personality–relationship transactions in romantic couples. *European Journal of Personality*, *34*(3), 367–392. https://doi.org/10.1002/per.2255

Canduela, J., Dutton, M., Johnson, S., Lindsay, C., McQuaid, R. W., & Raeside, R. (2012). Ageing, skills and participation in work-related training in Britain: Assessing the position of older workers. *Work, Employment and Society*, *26*, 42–60. https://doi.org/10.1177/0950017011426303

Carstensen, L. L. (1991). Selectivity theory: Social activity in life-span context. *Annual Review of Gerontology and Geriatrics*, *11*, 195–217.

Carstensen, L. L. (2006). The influence of a sense of time on human development. *Science*, *312*(5782), 1913–1915. https://doi.org/10.1126/science.1127488

Chen, F. F. (2007). Sensitivity of goodness of fit indexes to lack of measurement invariance. *Structural Equation Modeling: A Multidisciplinary Journal*, *14*(3), 464–504. https://doi.org/10.1080/10705510701301834

Chen, F., Bollen, K. A., Paxton, P., Curran, P. J., & Kirby, J. B. (2001). Improper solutions in structural equation models: Causes, consequences, and strategies. *Sociological Methods & Research*, *29*(4), 468–508. https://doi.org/10.1177/0049124101029004003

Cohen, J. (1992). A power primer. *Psychological Bulletin*, *112*(1), 155–159. https://doi.org/10.1037/0033-2909.112.1.155

Damman, M., Henkens, K., & Kalmijn, M. (2013). Late-career work disengagement: The role of proximity to retirement and career experiences. *The Journals of Gerontology. Series B, Psychological Sciences and Social Sciences*, *68*(3), 455–463. https://doi.org/10.1093/geronb/gbt001

De Wind, A., Leijten, F. R., Hoekstra, T., Geuskens, G. A., Burdorf, A., & Van Der Beek, A. J. (2017). "Mental retirement?" Trajectories of work engagement preceding retirement among older workers. *Scandinavian Journal of Work, Environment & Health*, *43*(1), 34–41. https://doi.org/10.5271/sjweh.3604

Deci, E. L., Olafsen, A. H., & Ryan, R. M. (2017). Self-determination theory in work organizations: The state of a science. *Annual Review of Organizational Psychology and Organizational Behavior*, *4*, 19–43. https://doi.org/10.1146/annurev-orgpsych-032516-113108

Deci, E. L., & Ryan, R. M. (2008). Self-determination theory: A macrotheory of human motivation, development, and health. *Canadian Psychology/Psychologie Canadienne*, *49*(3), 182–185. https://doi.org/10.1037/a0012801

Ebener, M. (2019). Die Erfassung der Motivation, erwerbstätig zu sein, in arbeitswissenschaftlichen Studien [Doctoral Dissertation, Bergische Universität Wuppertal]. Deutsche Nationalbibliothek. https://d-nb.info/1182555349

Ekerdt, D. J., & DeViney, S. (1990). On defining persons as retired. *Journal of Aging Studies*, *4*, 211–229. https://doi.org/10.1016/0890-4065(90)90023-2

Ekerdt, D. J., Kosloski, K., & DeViney, S. (2000). The normative anticipation of retirement by older workers. *Research on Aging*, *22*(1), 3–22. https://doi.org/10.1177/0164027500221001

Evans, L., Ekerdt, D. J., & Bosse, R. (1985). Proximity to retirement and anticipatory involvement: Findings from the normative aging study. *Journal of Gerontology*, *40*, 368–374. https://doi.org/10.1093/geronj/40.3.368

Eyjólfsdóttir, H. S., Baumann, I., Agahi, N., & Lennartsson, C. (2021). How to measure retirement age? A comparison of survey and register data. *Journal of Population Ageing*, *14*, 143–161. https://doi.org/10.1007/s12062-019-09254-6

Ferguson, C. J. (2009). An effect size primer: A guide for clinicians and researchers. *Professional Psychology: Research and Practice*, *40*(5), 532–538. https://doi.org/10.1037/a0015808

Fernet, C., Austin, S., & Vallerand, R. J. (2012). The effects of work motivation on employee exhaustion and commitment: An extension of the JD-R model. *Work and Stress*, *26*(3), 213–229. https://doi.org/10.1080/02678373.2012.713202

Fernet, C., Trépanier, S. G., Demers, M., & Austin, S. (2017). Motivational pathways of occupational and organizational turnover intention among newly registered nurses in Canada. *Nursing Outlook*, *65*(4), 444–454. https://doi.org/10.1016/j.outlook.2017.05.008

Freund, A. M., & Isaacowitz, D. M. (2013). Beyond age comparisons: A plea for the use of a modified brunswikian approach to experimental designs in the study of adult development and aging. *Human Development*, *56*(6), 351–371. https://doi.org/10.1159/000357177

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

Francioli, L., Conway, P. M., Hansen, Å. M., Holten, A. L., Grynderup, M. B., Persson, R., Mikkelsen, E. G., Costa, G., & Høgh, A. (2018). Quality of leadership and workplace bullying: The mediating role of social community at work in a two-year follow-up study. *Journal of Business Ethics*, *147*, 889–899. https://doi.org/10.1007/s10551-015-2996-3

Gagné, M., & Deci, E. L. (2005). Self-determination theory and work motivation. *Journal of Organizational Behavior*, *26*(4), 331–362. https://doi.org/10.1002/job.322

Gagné, M., Forest, J., Vansteenkiste, M., Crevier-Braud, L., Van den Broeck, A., Aspeli, A. K., Bellerose, J., Benabou, C., Chemolli, E., Güntert, S. T., Halvari, H., Indiyastuti, D. L., Johnson, P. A., Molstad, M. H., Naudin, M., Ndao, A., Olafsen, A. H., Roussel,

P., Wang, Z., & Westbye, C. (2015). The multidimensional work motivation scale: Validation evidence in seven languages and nine countries. *Journal of Work and Organizational Psychology*, *24*(2), 178–196. https://doi.org/10.1080/1359432X.2013.877892

Galletta, M., Portoghese, I., & Battistelli, A. (2011). Intrinsic motivation, job autonomy and turnover intention in the Italian healthcare: The mediating role of affective commitment. *Journal of Management Research*, *3*(2), 1–19. https://doi.org/10.5296/jmr.v3i2.61

Garthe, N., & Hasselhorn, H. M. (2021). Leaving and staying with the employer—Changes in work, health, and work ability among older workers. *International Archives of Occupational and Environmental Health*, *94*, 85–93. https://doi.org/10.1007/s00420-020-01563-0

Gerstorf, D., Ram, N., Estabrook, R., Schupp, J., Wagner, G. G., & Lindenberger, U. (2008). Life satisfaction shows terminal decline in old age: Longitudinal evidence from the German Socio-Economic Panel Study (SOEP). *Developmental Psychology*, *44*(4), 1148–1159. https://doi.org/10.1037/0012-1649.44.4.1148

Gillet, N., Gagné, M., Sauvagère, S., & Fouquereau, E. (2013). The role of supervisor autonomy support, organizational support, and autonomous and controlled motivation in predicting employees' satisfaction and turnover intentions. *European Journal of Work and Organizational Psychology*, *22*(4), 450–460. https://doi.org/10.1080/1359432X.2012.665228

Hamaker, E. L., Kuiper, R. M., & Grasman, R. P. P. P. (2015). A critique of the cross-lagged panel model. *Psychological Methods*, *20*(1), 102–116. https://doi.org/10.1037/a0038889

Heckhausen, J., & Schulz, R. (1995). A life-span theory of control. *Psychological Review*, *102*, 284–304. https://doi.org/10.1037/0033-295x.102.2.284

Henning, G., Bjälkebring, P., Stenling, A., Thorvaldsson, V., Johansson, B., & Lindwall, M. (2019). Changes in within-and between-person associations between basic psychological need satisfaction and well-being after retirement. *Journal of Research in Personality*, *79*, 151–160. https://doi.org/10.1016/j.jrp.2019.03.008

Henning, G., Stenling, A., Tafvelin, S., Hansson, I., Kivi, M., Johansson, B., & Lindwall, M. (2019). Preretirement work motivation and subsequent retirement adjustment: A self-determination theory perspective. *Work, Aging and Retirement*, *5*(2), 189–203. https://doi.org/10.1093/workar/way017

Hofäcker, D., Hess, M., & König, S. (2019). Wandel von Ruhestandsübergängen im politischen Paradigmenwechsel Europas. *Zeitschrift für Gerontologie und Geriatrie*, *52*(1), 40–51. https://doi.org/10.1007/s00391-018-01476-1

Inceoglu, I., Segers, J., & Bartram, D. (2012). Age-related differences in work motivation. *Journal of Occupational and Organizational Psychology*, *85*(2), 300–329. https://doi.org/10.1111/j.2044-8325.2011.02035.x

Inceoglu, I., Segers, J., Bartram, D., & Vloeberghs, D. (2009). Age differences in work motivation in a sample from five northern European countries. *Zeitschrift für Personalpsychologie*, *8*(2), 59–70. https://doi.org/10.1026/1617-6391.8.2.59

Kanfer, R., Beier, M. E., & Ackerman, P. L. (2013). Goals and motivation related to work in later adulthood: An organizing framework. *European Journal of Work and Organizational Psychology*, *22*(3), 253–264. https://doi.org/10.1080/1359432X.2012.734298

Karpinska, K., Henkens, K., Schippers, J., & Wang, M. (2015). Training opportunities for older workers in the Netherlands: A Vignette study. *Research in Social Stratification and Mobility*, *41*, 105–114. https://doi.org/10.1016/j.rssm.2015.03.002

Katz, I. M., Rudolph, C. W., & Zacher, H. (2019). Age and career commitment: Meta-analytic tests of competing linear versus curvilinear relationships. *Journal of Vocational Behavior*, *112*, 396–416. https://doi.org/10.1016/j.jvb.2019.03.001

König, S. (2017). Career histories as determinants of gendered retirement timing in the Danish and Swedish pension systems. *European Journal of Ageing*, *14*(4), 397–406. https://doi.org/10.1007/s10433-017-0424-5

König, S., & Lindquist, G. S. (2016). Sweden: Steeply rising older workers' employment rates in a late-exit country. In D. Hofäcker, M. Hess, & S. König (Eds.), *Delaying retirement: Progress and challenges of active ageing in Europe, the United States and Japan* (pp. 315–335). Palgrave Macmillan UK.

Kooij, D., De Lange, A., Jansen, P., Kanfer, R., & Dikkers, J. (2011). Age and work-related motives: Results of a meta-analysis. *Journal of Organizational Behavior*, *32*, 197–225. https://doi.org/10.1002/job.665

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

Kordbacheh, N., Shultz, K. S., & Olson, D. A. (2014). Engaging mid and late career employees: The relationship between age and employee engagement, intrinsic motivation, and meaningfulness. *Journal of Organizational Psychology*, *14*, 11–25.

Kuvaas, B., Buch, R., Weibel, A., Dysvik, A., & Nerstad, C. (2017). Do intrinsic and extrinsic motivation relate differently to employee outcomes? *Journal of Economic Psychology*, *61*, 244–258. https://doi.org/10.1016/j.joep.2017.05.004

Lazazzara, A., Karpinska, K., & Henkens, K. (2013). What factors influence training opportunities for older workers? Three factorial surveys exploring the attitudes of HR professionals. *The International Journal of Human Resource Management*, *24*, 2154–2172. https://doi.org/10.1080/09585192.2012.725077

Lindwall, M., Berg, A. I., Bjälkebring, P., Buratti, S., Hansson, I., Hassing, L., Henning, G., Kivi, M., König, S., Thorvaldsson, V., & Johansson, B. (2017). Psychological health in the retirement transition: Rationale and first findings in the Health, Ageing and Retirement Transitions in Sweden (HEARTS) study. *Frontiers in Psychology*, *8*, 1634. https://doi.org/10.3389/fpsyg.2017.01634

McMillan, D. W., & Chavis, D. M. (1986). Sense of community: A definition and theory. *Journal of Community Psychology*, *14*(1), 6–23. https://doi.org/10.1002/1520-6629(198601)14:1<6::AID-JCOP2290140103>3.0.CO;2-I

Marsh, H. W. (2007). Application of confirmatory factor analysis and structural equation modeling in sport and exercise psychology. In G. Tenenbaum & R. C. Eklund (Eds.), *Handbook of sport psychology* (pp. 774–798). John Wiley & Sons, Inc.

Meyer, J. P., Becker, T. E., & Vandenberghe, C. (2004). Employee commitment and motivation: a conceptual analysis and integrative model. *Journal of Applied Psychology*, *89*, 991–1007. https://doi.org/10.1037/0021-9010.89.6.991

Muthén, L., & Muthén, B. (2020). Mplus. *The comprehensive modelling program for applied researchers: user's guide, 5*.
Ng, T. W. H., & Feldman, D. C. (2010). The relationship of age with job attitudes: A meta-analysis. *Personnel Psychology*, *63*, 677–718. https://doi.org/10.1111/j.1744-6570.2010.01184.x
Ng, T. W. H., & Feldman, D. C. (2012). Evaluating six common stereotypes about older workers with meta-analytical data. *Personnel Psychology*, *65*, 821–858. https://doi.org/10.1111/peps.12003
Nie, Y., Chua, B. L., Yeung, A. S., Ryan, R. M., & Chan, W. Y. (2015). The importance of autonomy support and the mediating role of work motivation for well-being: Testing self-determination theory in a Chinese work organisation. *International Journal of Psychology*, *50*(4), 245–255. https://doi.org/10.1002/ijop.12110
Nowell, B., & Boyd, N. (2010). Viewing community as responsibility versus resource: Deconstructing the theoretical roots of psychological sense of community. *Journal of Community Psychology*, *38*, 828–841. https://doi.org/10.1002/jcop.20398
Pejtersen, J. H., Kristensen, T. S., Borg, V., & Bjorner, J. B. (2010). The second version of the Copenhagen Psychosocial Questionnaire. *Scandinavian Journal of Public Health*, *38*(3_suppl), 8–24. https://doi.org/10.1177/1403494809349858
Posthuma, R. A., & Campion, M. A. (2009). Age stereotypes in the workplace: Common stereotypes, moderators, and future research directions. *Journal of Management*, *35*(1), 158–188. https://doi.org/10.1177/0149206308318617
Ram, N., & Grimm, K. (2007). Using simple and complex growth models to articulate developmental change: Matching theory to method. *International Journal of Behavioral Development*, *31*(4), 303–316. https://doi.org/10.1177/0165025407077751
Richer, S. F., Blanchard, C., & Vallerand, R. J. (2002). A motivational model of work turnover. *Journal of Applied Social Psychology*, *32*(10), 2089–2113. https://doi.org/10.1111/j.1559-1816.2002.tb02065.x
Rudolph, C. W., Kooij, D. T. A. M., Rauvola, R. S., & Zacher, H. (2018). Occupational future time perspective: A meta-analysis of antecedents and outcomes. *Journal of Organizational Behavior*, *39*, 229–248. https://doi.org/10.1002/job.2264
Ryser, V.-A., & Wernli, B. (2017). How does transitioning into retirement impact the individual emotional system? Evidence from the Swiss context. *Advances in Life Course Research*, *32*, 42–54. https://doi.org/10.1016/j.alcr.2016.08.001
Ryan, R. M., & Deci, E. L., (Eds.). (2017). *Self-determination theory: Basic psychological needs in motivation, development, and wellness*. The Guilford Press. https://doi.org/10.1521/978.14625/28806
Schaie, K. W., & Strother, C. R. (1968). The effect of time and cohort differences on the interpretation of age changes in cognitive behavior. *Multivariate Behavioral Research*, *3*(3), 259–293. https://doi.org/10.1207/s15327906mbr0303_1
Scotto di Luzio, S., Isoard-Gautheur, S., Ginoux, C., & Sarrazin, P. (2019). Exploring the relationship between sense of community and vigor in workplace community: The role of needs satisfaction and physical activity. *Journal of Community Psychology*, *47*(6), 1419–1432. https://doi.org/10.1002/jcop.22195
Slemp, G. R., Kern, M. L., Patrick, K. J., & Ryan, R. M. (2018). Leader autonomy support in the workplace: A meta-analytic review. *Motivation and Emotion*, *42*(5), 706–724. https://doi.org/10.1007/s11031-018-9698-y
Slemp, G., Lee, M. A., & Mossman, L. H. (2021). Interventions to support autonomy, competence, and relatedness needs in organizations: A systematic review with recommendations for research and practice. *Journal of Occupational and Organizational Psychology*, *94*(2), 427–457. https://doi.org/10.1111/joop.12338
Super, D. E. (1990). *A life-span, life-space approach to career development career choice and development: Applying contemporary theories to practice* (2nd ed., pp. 197–261). Jossey-Bass.
Van den Broeck, A., Ferris, D. L., Chang, C.-H., & Rosen, C. C. (2016). A review of self-determination theory's basic psychological needs at work. *Journal of Management*, *42*(5), 1195–1229. https://doi.org/10.1177/0149206316632058
Wang, M. (2007). Profiling retirees in the retirement transition and adjustment process: Examining the longitudinal change patterns of retirees' psychological well-being. *Journal of Applied Psychology*, *92*(2), 455–474. https://doi.org/10.1037/0021-9010.92.2.455
Wang, M., & Shi, J. (2014). Psychological research on retirement. *Annual Review of Psychology*, *65*, 209–233. https://doi.org/10.1146/annurev-psych-010213-115131
Wanka, A. (2019). Continuity and change in the transition to retirement – How time allocation, leisure practices and lifestyles evolve when work vanishes in later life. *European Journal of Ageing*, *17*, 81–93. Online first: https://doi.org/10.1007/s10433-019-00526-w
Wohlwill, J. F. (1970). The age variable in psychological research. *Psychological Review*, *77*(1), 49–64. https://doi.org/10.1037/h0028600
Zacher, H. (2015). Successful aging at work. *Work, Aging and Retirement*, *1*(1), 4–25. https://doi.org/10.1093/workar/wau006
Zacher, H., & Rudolph, C. W. (2017). Change in job satisfaction negatively predicts change in retirement intentions. *Work, Aging and Retirement*, *3*(3), 284–297. https://doi.org/10.1093/workar/wax009

How to cite this article: Henning, G., Stenling, A., Tafvelin, S., Ebener, M., & Lindwall, M. (2022). Levels and change in autonomous and controlled work motivation in older workers—The role of proximity to retirement and sense of community at work. *Journal of Occupational and Organizational Psychology*, *00*, 1–24. https://doi.org/10.1111/joop.12406

APPENDIX A

A.1

Attrition analyses

To test for longitudinal attrition, we constructed a control group by selecting participants who were working at all available time points and expected to retire after more than 2 years, but dropped out after wave 1, 2 or 3 (n = 670). We tested for statistically significant differences in the study variables, using t-tests and χ^2 tests. Expected retirement age was not included when testing for selectivity, because in the comparison group, we had only included those who expected to retire after at least 3 years, whereas in the study sample, some individuals expected to retire earlier (but this did not turn out to be true), so groups were bound to differ anyway, both in terms of means and variance. The only statistically significant differences observed were in health, $t(1352.70) = -2.49$, $p = .012$, $d = 0.12$, age, $t(1482.15) = 3.13$, $p = .002$, $d = -0.17$, and education, $\chi^2(1) = 14.16$, $p < .001$, OR = 1.23. The effect sizes for all three variables were small (Cohen, 1992; Ferguson, 2009). Therefore we conclude that the selectivity of our sample was rather small.