Being Active in Working Life at Age 60, 66, and 72[1]

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ABSTRACT

*This study examines associations between participation in working life and sociodemographic, health, and work environment factors among people aged 60, 66, and 72 years. The age-stratified logistic regression analysis used data from 2001–2003 (T1) and 2013–2015 (T2) derived from The Swedish National Study on Ageing and Care. Further, interaction variables with time*independent variables explored differences in those associations over time. We found positive associations between being active in working life and male gender (age 66 and 72), higher education (all age groups), higher professional level (age 60 and 66), better health (age 60 and 66), less negative work experiences (mainly age 60), light level of physical activity at work (age 60 and 66), higher work satisfaction (age 60 and 66), and time: that is, T2 vs. T1 (all age groups). Not only health status but also work environment factors were shown to play a significant role in being active in working life at older ages. Our findings verify that authorities need to develop reforms aiming at keeping older people active in working life from a heterogeneous perspective.*

KEYWORDS

Active in working life / aging workforce / health / life course perspective / work environment

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Introduction

In recent decades, the proportion of older people in the population has increased (United Nations 2019), resulting in strains on pension systems and reforms being pursued by the authorities to promote active aging with expectations of extending working life and postponing retirement (OECD 2021, 2023). For instance, globally, the proportion of the population aged ≥ 65 years is projected to rise to 16% by 2050 (United Nations 2019), and in Sweden, is expected to be around 23% by 2030 (OECD 2023). However, a criticism of reforms aiming to extend working life among older people is that it is mainly based on economic perspectives, rather than a matter of democracy and justice or a way of utilizing personal and social resources. This has led to an ongoing debate, regarding the complex circumstances surrounding the empirical landscape of extended working life, and the need to highlight an aging population from a heterogeneous perspective (Krekula & Vickerstaff 2017).

Further, from an organizational perspective, the societal ambition to increase the participation of senior workers in working life and delay retirement does not always harmony with the employer's needs. Retaining senior workers, may to a great deal, depend on the shortage of specific labor skills at the workplace (Arman et al. 2022). The expected age of retirement does not only depend on a country's statutory age, but also employer-specific pension rules or cultural and organizational norms (Fisher et al. 2016).

Life course theory recognizes the complex mechanisms involved in retirement timing and the diversity of older people's ability to remain active in working life (Wang et al. 2011). Elder et al. (2003) suggest that life course theory includes different central principles, for example, human agency, linked lives, lifespan development, time and place, and timing. These principles are embracing both individual differences within the same generation and differences between generations regarding aspects of retirement timing (Wang et al. 2011) making this interesting to study among different generations, in the present study 12 years apart.

Research has revealed that regarding individual differences, personal characteristics such as gender, that is, males compared to females, participate to a greater extent in working life at older ages (Fisher et al. 2016; OECD 2017; Pilipiec et al. 2022; Scharn et al. 2018; Staudinger et al. 2016). For instance, a review, including 183 countries, indicated that among people aged 65+ years worldwide, and at every income level, males had higher labor participation rates than females did (Staudinger et al. 2016). Further, The Organization for Economic Co-operation and Development (OECD) reported that, despite an overall increase in female participation in working life, in most countries, older women still participate less in paid labor than men (OECD 2017). Another well-documented, personal characteristic that has been found to influence participation in working life among older people is education level (Anxo et al. 2019; Fisher et al. 2016; Laun & Palme 2017; McAllister et al 2020; Pilipiec et al. 2022; Scharn et al. 2018). In Europe, one study showed that during the period 2003–2010, older people adapted their preferred retirement age to pension reforms aimed at postponing retirement; this increase was greater among higher-educated people than among lower-educated people (Hess 2017). However, participation in working life among low-educated workers has tended to increase. In Germany, the predicted probability of working beyond age 65 increased between 1980 and 2000, among lower-educated workers from 2.4% to 14.0% vs. among highly educated workers from 8.9% to 15.1% (Hofaecker & Naumann 2015). Health

is a crucial factor influencing older people's participation in working life and retirement patterns (Anxo et al. 2019; de Wind et al. 2016; de Breij et al. 2020; Nilsson et al. 2016; Nilsson 2018; Fisher et al. 2016; Pilipiec et al. 2022; Scharn et al. 2018; Sousa-Ribeiro 2021; Swedas et al. 2020; Virtanen et al. 2014). Research has shown that both having fewer diagnosed diseases (de Wind et al. 2018; Swedas et al. 2020) and better self-reported health (Nilsson et al. 2016; Sousa-Ribeiro 2021) increases the possibility of staying active in working life at older ages. Further, a Swedish cross-sectional study including healthcare workers (55–64 years of age) found that self-rated health was more strongly related to desired early retirement than to diagnosed diseases. Good self-rated health was associated with work until 65 years of age or beyond, regarding both whether they "wanted to work" and whether they thought, they "could work" (Nilsson et al. 2016).

Health and work can be interrelated, and research has revealed that strenuous working conditions were associated with poorer physical and mental health. Further, these associations were stronger among lower-educated workers aged around 58 years (de Breij et al. 2020). There are various aspects of the work environment associated with the participation of older people in working life (Anxo et al. 2019; Berglund et al. 2020; McAllister et al 2020; Nilsson 2018; Pilipiec et al. 2022; Scharn et al. 2018; Virtanen et al. 2017; Wargo-Sugleris et al. 2018). Having physical and mental demands in balance with job resources and having an organizational psychological climate that promotes successful aging seem to be positively associated with higher job satisfaction and older people's motivation to continue working after the official retirement age (Pilipiec et al. 2022; Wargo-Sugleris et al. 2018). Further, working in highly skilled jobs, within higher occupational classifications, increases the possibility to postpone retirement (Anxo et al. 2019; Virtanen et al. 2017). These differences are mainly explained by having a physically light job, flexible working hours, and better self-rated workability (Virtanen et al. 2017).

Differences between generations, that is, changes in age norms over time have also been shown to play a significant role in retirement timing. A systematic review of causes of the increased ages of exiting from working life in the OECD countries revealed that the most prominent cause was the changes in social security systems (Boissonneault 2020). Moreover, it has also been proposed that research on being active in working life among the aging population alongside the individual, health, and work-related factors should also emphasize social changes in society (Krekula & Vickerstaff 2017).

Sweden went through a major reform of its public old pension system in 1989, which was fully implemented in 2003. The new system for calculating pensions is based on contributions from lifetime earnings and makes it possible and financially advantageous to gradually leave the workforce after age 65. Thus, cohorts born before 1938 still receive pensions as to the old system. Each successive cohort up to 1953 receives an additional part from the old system as well as from the new system. The 1954 cohort receive pensions completely from the new system. In addition, alternative exit routes, for example, unemployment and disability pensions, have been progressively restricted. The Swedish pension system has a flexible age (at the time of our study, between 61 and 67 years) for starting to take part in public pension benefits. It is possible to extend the working life even further, with an agreement between the employer and the employee (OECD 2018). However, the most anticipated retirement age in Sweden has for a long time been considered 65 years (Fondberg et al. 2022).

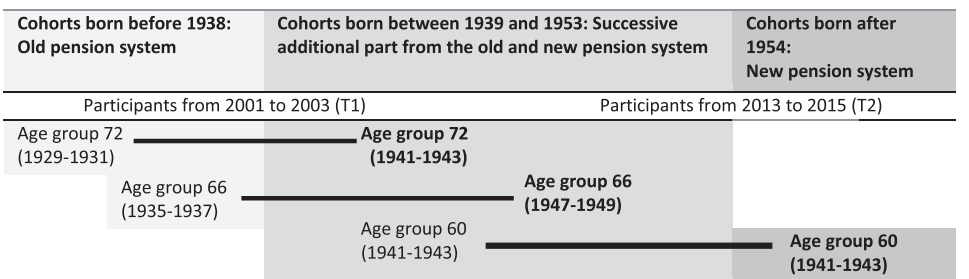
In research so far, leaving, or prolonging working life among older people has been found to be associated with several factors such as personal and work environment

characteristics, health status, and pension systems (Fisher et al. 2016; Nilsson 2018; Scharn et al. 2018). Whether these associations differ between different age groups is less studied as whether these associations might have changed over time, between different generations, and during significant changes in society, for example, in the pension system. The period of 12 years, from 2001–2003 (T1) to 2013–2015 (T2), is interesting, as, during this period, the statutory pension system in Sweden went through a major reform.

Referring to the life course theory, the overarching hypothesis in this study is that different birth cohorts, that is, generations also have different expectations and opportunities for being active in working life at older ages. Senior workers born in later birth cohorts probably have improved opportunities to be active in working life. Another hypothesis, based on the principle of human agency in the life course theory, is that in the same birth cohort, having better socioeconomic status and health increases the probability of senior workers continuing to be active in working life.

Thus, the aim of the present study was tripartite: (1) To examine participation in working life among people aged 60, 66, and 72 years in two cross-sectional groups sampled 12 years apart. (2) To examine associations (stratified by age group) between being active in working life and sociodemographic, health, and work environment factors and time, that is, 2001–2003 (T1) vs. 2013–2015 (T2). (3) To explore changes between T1 and T2 in those associations. Figure 1 presents an overview of the changed public pension system for this study's included birth cohorts.

Figure 1 Overview of the study's included cohorts and their different level of changes in the Swedish pension system.



Methods

Data source and participants

The present study compared two cross-sectional groups sampled at two time points, 12 years apart, using data derived from The Swedish National Study on Ageing and Care (SNAC-project). SNAC is a large national study commissioned in 1989 by the Swedish Ministry of Health and Social Affairs. Study participants in SNAC were randomly sampled from the National Population Registry and invited to participate. The registry covers both urban and rural areas within four geographical areas and is a representative sample of demographic variation in Sweden. A stratified sampling procedure was employed; at baseline (2001–2004) the population in each site was stratified by age

(60, 66, 72, 78, 81, 84, 87, 90, and ≥93 years), and then random samples were selected from each age group. Follow-up is performed every 6 years for younger cohorts (60–78 years) and every 3 years for older cohorts (78+ years). Using standardized protocols, professionals collected data through interviews and clinical examinations. A description of the national study has been published elsewhere (Lagergren et al. 2004). The protocols contain core questions for all areas and some optional questions. The present study uses data from three of the four geographical areas (because in one of the areas, some optional questions were missing) and participants in the age group 60, 66, and 72 years collected during the period 2001–2003 (T1), n = 2558, and participants in the age group 60, 66, and 72 years collected during the period 2013–2015 (T2), n = 2921.

Dependent variable

The International Labour Organization (2017) uses a broad definition of labor participation, which includes subsistence work for at least 1 hour a week; the present study uses the same definition. Further, being active in working life includes participating in the labor market to some extent, with possibilities to combine retirement and work, while not being active in working life is defined as being fully retired, fully on sick leave/disability pension, or unemployed. This grouping is like that made by Nilsson et al. (2016). Participation in working life among respondents 60 years of age was measured by posing one question regarding their current occupation, with 10 different response options and more than one option could be chosen (i.e., employed [number of hours a week] combined with early retirement or retirement pension). The responses were recoded into two options: (1) participating in working life, including employed and retirement pension/early retirement combined with employed, and (2) not participating in working life, including retirement pension, early retirement, registered unemployed, sick leave, and disability pension. Regarding respondents 66 and 72 years of age, participation in working life was measured by posing one yes-no question: Are you participating in working life to some extent? Thus, for all age groups, the participants were not asked whether they had reduced their working hours only if they worked or not. The Swedish pension system is structured to enable participation in working life combined with retirement.

Independent variables

Personal characteristics were age (60, 66, or 72 years of age), gender (female or male), and marital status (four different options: married, widowed, unmarried, or divorced). Education level was measured as elementary school, vocational/high school, or university. The professional level at which respondents worked the longest during their entire working life was classified using the Swedish Standard of Occupations (SSYK). This classification includes subgroups of professions classified with numbers down to a three-figure code. In the present study, professions are classified using the first figure in the code, which defines the professional field and is divided into four levels, based on the qualification level typical of that profession. It should be noted that this does not necessarily correspond to the qualifications of the worker carrying out the profession. The levels are as follows: Level 1: no or low formal educational requirements, for example,

restaurant and kitchen assistants or cleaning and home service staff. Level 2: upper secondary education and post-secondary education shorter than 2 years, for example, construction workers, mechanics, secretaries, or hairdressers. Level 3: practical or vocation-specific university or college education of at least 2–3 years, for example, bank officials, pharmacy dispensers, or IT technicians. Level 4: theoretical or research preparatory university education of at least 3 years, typically four or more, for example, registered nurses, civil engineers, or teachers (SSYK 2012).

Health was measured in two ways. The presence of disease was measured objectively by a physician, through clinical examination and the medical record, to determine whether the respondent had a diagnosis within one or more of 11 different disease groups: neurological disease (i.e., epilepsy and Parkinsonism); hypertension; cardiovascular disease (i.e., myocardial ischemia and myocardial infarction); cerebrovascular disease (i.e., stroke, both hemorrhagic and non-hemorrhagic and ischemic attack, transient); eye disease (i.e., cataract and glaucoma); musculoskeletal disease (i.e., osteoarthritis, osteoporosis, and inflammatory joint diseases); endocrine system disease (i.e., diabetes mellitus and thyroid diseases); lung disease, obstructive (i.e., asthma and pulmonary disease, chronic obstructive); cancer; depression and other psychiatric diseases (i.e., schizophrenia, bipolar disorder, anxiety disorders, or sleep disorders). The total number of diseases was calculated and recoded into a dichotomous variable (none to one disease or two or more diseases), based on the median value: one disease. Subjective self-reported health was measured using two items, like Statistics Sweden's (SCB) health index, and one single-item question with yes or no response alternatives: Do you have any long-term illness, impairment after injury, disability, or other debilities?

The work environment was measured using a total of five items. Three items measured whether the working environment may have affected one's health, using one single-item question with yes or no response alternatives. Have you been exposed to something in your physical work environment that you believe may have affected your life or your health? Has your work been organized in a way that entailed great mental or physical strain that you believe may have negatively affected your life or your health? Have you had any negative experiences in your relations with superiors or work colleagues that you believe may have affected your life or your health? Work satisfaction was measured with one single-item question (How satisfying do you feel your work has been?) with five response alternatives, from very unsatisfying to very satisfying. The responses were recalculated into two alternatives: Unsatisfying/neutral vs. satisfying. Further, the level of physical activity usually required in the main occupation during the entire working life was measured with one single-item question (What level of physical activity is/was typically required in your main work task?) with three response alternatives, from light to heavy.

Statistical analyses

Descriptive statistics with frequencies and percentages were used to describe participants' characteristics and being active in working life on both data collection occasions. To compare the cross-sectional samples, we used inferential statistics: Chi-square with a cell-by-cell comparison of observed and estimated expected frequencies. If the adjusted residual was greater than two, the significance derives from those cells (Fitzmaurice et al. 2011).

We used logistic regression models to examine associations between being active in working life and each of the independent variables: time, that is, 2001–2003 (T1) vs. 2013–2015 (T2), gender, education level, professional level, and health and work environment factors. These analyses were stratified by age group. To investigate changes over time, interaction variables with time and the different independent variables were computed. Interaction should be interpreted as the effect of one of the variables being modified by the level of the other. Although the design was not longitudinal, the same 60-year-old individuals at T1 were also included at T2 as 72 years of age. In the interaction analysis of the whole sample, we regarded these individuals, as they were sampled from two independent populations and the analyses were adjusted for the age group. The results are presented as odds ratios (ORs) and adjusted odds ratios (aORs) with 95% confidence intervals (95% CIs). The level of statistical significance was set at $p < 0.05$. Statistical analyses were performed using IBM SPSS, version 27.0.

Results

Description of the two samples

Table 1 presents the characteristics of the two cross-sectional samples. Significant differences in proportions were found for age groups ($p = 0.044$), higher proportions of being married at T2, having higher education level, and professional level at T2 (all p-values <0.001). For gender distribution between T1 and T2, the difference was nonsignificant ($p = 0.984$).

Proportions of being active in working life at T1 and T2

Table 2 presents a comparison of being active in working life between T1 and T2. A significant increase in the proportion of participants active in working life was found for all age groups at T2 vs. T1 (p-values <0.001). In the age group 60 years, participants active in working life increased from 59% to 77.3%, in the age group 66 years from 6.7% to 26.6%, and in the age group 72 years from 3.3% to 10.4%.

Associations between being active in working life and the independent variables, stratified by age group

Table 3 presents the associations between being active in working life, stratified by age group, and the independent variables time, gender, education level, occupational level, self-reported ill-health, number of diseases, exposure in the physical work environment, work entailed mental och physical strain, negative experiences in relation to superiors and/or work colleagues, work satisfaction, and physical activity required in work.

In the age group 60 years, all independent variables, except gender, were significantly associated with being active in working life.

In the age group 66 years, the significant results were the same as age group 60 except for the independent variables: physical or mental strain at work, negative experiences in

Table 1 A comparison of respondent's characteristics in the two cross-sectional samples, that is, those aged 60, 66, and 72 years at T1 (2001–2003) and those aged 60, 66, and 72 years at T2 (2013–2015)

Number of participants (n)	**T1: n = 2558**		**T2: n = 2921**		***p***
	Observed	**Estimated expected**	**Observed**	**Estimated expected**	
Age					
60 years	1022 (40.0)[a]	(994.9)[b] (1.5)[c]	1109 (38.0)	(1136)[b] (–1.5)[c]	**0.044**
66 years	974 (38.1)	(962.7)[b] (0.6)[c]	1088 (37.2)	(1099.3)[b] (–0.6)[c]	
72 years	562 (22.0)	(600.4)[b] **(–2.5)**[c]	724 (24.8)	(685.6)[b] **(2.5)**[c]	
Gender, female	1305 (51.0)		1491 (51.0)		0.984
Marital status[d]					
Married	1795 (71.3)	(1838.9)[b] **(–2.7)**[c]	2131 (74.6)	(2087.1)[b] **(2.7)**[c]	**<0.001**
Widowed	241 (9.6)	(181.7)[b] **(6.3)**[c]	147 (5.1)	(206.3)[b] **(–6.3)**[c]	
Unmarried	181 (7.2)	(200.0)[b] (–1.9)[c]	246 (8.6)	(227.7)[b] (1.9)[c]	
Divorced	301 (12.0)	(297.4)[b] (0.3)[c]	334 (11.7)	(337.6)[b] (–0.3)[c]	
Education[e]					
Elementary	972 (38.9)	(645.5)[b] **(20.6)**[c]	388 (14.0)	(714.5)[b] **(–20.6)**[c]	**<0.001**
High school or vocational	1238 (49.5)	(1420.7)[b] **(–10.2)**[c]	1755 (63.4)	(1572.3)[b] **(10.2)**[c]	
University	291 (11.6)	(434.8)[b] **(–10.5)**[c]	625 (22.6)	(481.2)[b] **(10.5)**[c]	
SSYK[f,g]					
Level 1	136 (5.5)	(117.7)[b] (**2.4**)[c]	114 (4.1)	(132.3)[b] **(–2.4**)[c]	**<0.001**
Level 2	1625 (65.6)	(1520.2)[b] **(5.9)**[c]	1605 (57.6)	(1709.8)[b] **(–5.9)**[c]	
Level 3	310 (12.5)	(340.8)[b] **(–2.5)**[c]	414 (14.9)	(383.2)[b] **(2.5)**[c]	
Level 4	407 (16.4)	(499.4)[b] **(–6.4)**[c]	654 (23.5)	(561.6)[b] **(6.4)**[c]	

Notes: [a]Number of participants (%).
[b](Expected count) and [c](Adjusted residual).
Missing values: [d]T1: n = 40, T2: n = 63.
[e]T1: n = 57, T2: n = 153.
[f]T1: n = 80, T2 n = 134.
[g]Swedish Standard of Occupations, Level 1, No or low formal education requirements to Level 4, theoretical or research preparatory university education at least 3 years.

Table 2 Frequencies of respondents active in working life and a comparison between the two samples, that is, T1 (2001–2003) and T2 (2013–2015)

Number of participants (n)	**T1 n = 2558**	**T2 n = 2921**	***p***
Age 60 = 2130[a]			
Active in working life	588 (59.0)*	802 (77.3)	**<0.001**
Age 66 = 2062[b]			
Active in working life	63 (6.7)	218 (26.6)	**<0.001**
Age 72 = 1286[c]			
Active in working life	18 (3.3)	56 (10.4)	**<0.001**

Notes: *Number of participants (%). Missing cases: [a]n = 97, [b]n = 305, [c]n = 202.

relations with superiors or colleagues, and work satisfaction. In addition, gender became significantly associated with being active in working life.

In the age group 72 years, the significant independent variables associated with being active in working life were time, gender, and educational level.

Table 3 Associations between being active in working life and time, sociodemographic health and work environment factors, stratified by age

Number (n) of participants = 5479	**Age 60 n = 2131**	**Age 66 n = 2062**	**Age 72 n = 1286**
	aOR[a] (95% CI[b])	**aOR (95% CI)**	**aOR (95% CI)**
Time[d] (Ref[c]. 2001–2003): 2013–2015	**2.07** (1.69–2.59)	**3.96** (2.89–5.43)	**2.77** (1.56–4.91)
Gender[d] (Ref. female): Male	1.06 (0.88–1.29)	**1.46** (1.10–1.92)	**1.84** (1.12–3.03)
Education level[d] (Ref. elementary): University High school	**2.65** (1.90–3.70) **1.49** (1.16–1.93)	**3.54** (2.22–5.64) **1.70** (1.11–2.59)	**2.76** (1.35–5.61) 1.31 (0.72–2.38)
SSYK[e,m] (Ref. level 1): Level 4 Level 3 Level 2 (not adjusted for education)	**5.35** (3.19–8.97) **3.45** (2.01–5.90) **2.54** (1.58–4.09)	**4.55** (1.88–10.94) **2.80** (1.12–6.97) 1.77 (0.74–4.23)	1.06 (0.33–3.37) 0.68 (0.20–2.34) 0.46 (0.33–3.37)
Self-reported ill health[f] (Ref. yes): No	**3.19** (2.59–3.93)	**1.53** (1.13–2.07)	1.79 (0.99–3.27)
Number of diseases[g] (Ref. 2 or more): 0–1	**2.16** (1.76–2.66)	**1.65** (1.24–2.17)	1.01 (0.62–1.67)
Exposed in physical work environment[h] (Ref. yes): No	**1.88** (1.53–2.31)	**1.41** (1.03–1.94)	1.30 (0.73–2.30)
Experience of work entailed mental or physical strain[i] (Ref. yes): No	**2.19** (1.78–2.69)	1.16 (0.85–1.59)	1.37 (0.76–2.48)
Negative experiences in relations with superiors/work colleagues[j] (Ref. yes): No	**1.68** (1.27–2.22)	1.36 (0.87–2.14)	1.06 (0.46–2.47)
Work satisfaction[k] (Ref. bad/neutral): Good	**1.80** (1.39–2.33)	1.57 (0.99–2.48)	1.26 (0.56–2.86)
Physical activity required in work[l] (Ref. heavy): Light Medium	**1.53** (1.20–1.96) 1.16 (0.89–1.51)	**1.59** (1.10–2.30) 1.24 (0.81–1.90)	1.54 (0.79–2.98) 1.35 (0.64–2.83)

Notes: [a]Odds ratio adjusted for time, gender, and education level.
[b]Confidence interval.
[c]Reference.
Missing cases: [d]age 60 n = 105, age 66 n = 359, age 72 n = 209.
[e]Age 60 n = 113, age 66 n = 338, age 72 n = 224.
[f]Age 60 n = 206, age 66 n = 446, age 72 n = 280.
[g]Age 60 n = 164, age 66 n = 388, age 72 n = 233.
[h]Age 60 n = 197, age 66 n = 423, age 72 n = 268.
[i]Age 60 n = 186, age 66 n = 415, age 72 n = 274.
[j]Age 60 n = 183, age 66 n = 413, age 72 n = 275.
[k]Age 60 n = 126, age 66 n = 389, age 72 n = 242.
[l]Age 60 n = 134, age 66 n = 379, age 72 n = 236.
[m]Swedish Standard of Occupations, Level 1, No or low formal education requirements to Level 4, theoretical or research preparatory university education for at least 3 years.

Associations between being active in working life and the interaction between time and the independent variables

Table 4 presents that significant interaction terms in the unadjusted logistic regression analyses in the whole sample were time*age, that is, T1*age group 66 years ($p < 0.001$), time*profession level, that is, T1*level 4 ($p = 0.018$), T1*level 3 ($p = 0.027$), and time*negative experiences in relations with superiors or colleagues ($p = 0.009$). When adjusting for sociodemographic variables, time*age group remained significant, that is, the odds of being active in working life decreased for the age group 60 vs. 66 and 72 years when modified by the level over time (T2 vs. T1).

Table 4 Associations between being active in working life and time, sociodemographic health and work environment factors, with significant interaction terms

Number of participants (n) = 5479	**OR (95% CI)[a]**	**Sig**	**aOR (95% CI)[b]**	**sig**
Time[c] (Ref. T1) T2	**2.21 (1.96–2.50)**	**<0.001**	**[1] 1.734 (1.53–1.97)**	**<0.001**
Age group[c] (Ref. 60 years):				
66 years	0.09 (0.08–0.10)	<0.001	[1] 0.09 (0.07–0.10)	<0.001
72 years	0.03 (0.03–0.04)	<0.001	0.04 (0.03–0.05)	<0.001
Time (Ref. T1): T2	2.37 (1.96–2.88)	<0.001	[1] 2.05 (1.682–2.51)	<0.001
Age group (Ref. 60 years):				
66 years	0.05 (0.04–0.07)	<0.001	0.05 (0.04–0.07)	<0.001
72 years	0.02 (0.01–0.04)	<0.001	0.03 (0.02–0.04)	<0.001
Interaction time*Age group T1*66 years	2.12 (1.48–3.02)	**<0.001**	1.99 (1.38–2.85)	**< 0.001**
T1*72 years	1.45 (0.81–2.58)	0.210	1.32 (0.74–2.37)	0.349
SSYK[d,f] (Ref. level 1): Level 4	3.93 (2.78–5.56)	<0.001	[2] 4.65 (3.08–7.02)	<0.001
Level 3	2.63 (1.83–3.76)	<0.001	2.83 (1.84–4.35)	<0.001
Level 2	1.98 (1.42–2.76)	<0.001	1.85 (1.25–2.73)	0.002
Time (Ref. T1): T2	4.01 (2.03–8.15)	<0.001	[2] 2.49 (1.12–5.56)	0.026
SSYK (Ref. level 1):				
Level 4	6.15 (3.42–11.07)	<0.001	4.12 (2.10–8.01)	<0.001
Level 3	4.11 (2.25–7.52)	<0.001	2.89 (1.44–5.80)	0.003
Level 2	2.74 (1.56–4.83)	<0.001	1.87 (0.99–3.56)	0.055
Interaction time*SSYK T1*level 4	0.41 (0.20–0.86)	**0.018**	1.29 (0.54–3.07)	0.564
T1* level 3	0.42 (0.20–0.91)	**0.027**	1.07 (0.43–2.62)	0.890
T1*level 2	0.57 (0.28–1.17)	0.127	1.29 (0.54–3.07)	0.686
Negative experiences in relation to superiors or work colleagues[e] (Ref. yes): No	0.95 (0.79–1.15)	0.586	[3] 1.56 (1.26–1.97)	<0.001
Time (Ref. T1): T2	1.40 (0.98–2.01)	0.064	[3] 1.81 (1.17–2.79)	0.008
Negative experiences in relation to superiors or work colleagues (Ref. yes): No	0.75 (0.56–1.04)	0.054	1.25 (0.89–1.76)	0.198
Interaction time*Negative experiences	1.66 (1.13–2.43)	**0.009**	1.50 (0.95–2.39)	0.084

Notes: [a]Odds ratio (95% confidence interval).

[b]Odds ratio, adjusted for (1) gender and education level, (2) gender and age, (3) gender, age, and education level (95% confidence interval).

Missing cases: [c]n = 604, [d]n = 675, [e]n = 842.

[f]Swedish Standard of Occupations, Level 1, No or low formal education requirements to Level 4, theoretical or research preparatory university education at least 3 years.

Discussion

Overall, as expected, all age groups significantly increased their participation in working life at T2 vs. T1, but this increase was most prominent in the age group 66 years. The results revealed differences among the included age groups in positive associations between being active in working life and the included personal, health, and work environment factors. The age-stratified analysis showed positive associations between being active in working life and male gender (age 66 and 72 years), higher education (all age groups), higher professional level (age 60 and 66 years), better health (age 60 and 66 years), less negative work experiences (mainly age 60 years), light level of physical activity required at work (age group 60 and 66 years), higher work satisfaction (age 60 and 66 years) and time: that is, T2 vs. T1(all age groups). Only the interaction variable age*time was significant after adjusting for gender and educational level.

The Life course theory's principle of human agency refers to the fact that people's planning and choices during their life course are based on their possibilities and limitations in a given situation (e.g., the transition from working life to retirement), which points out individual differences within the same generation (Elder et al. 2003). Our results confirmed earlier knowledge about the heterogeneous aspect of circumstances around a postponed working life among the aging population. Still, changed pension reforms often address general, public expectations concerning postponed retirement, that is, in Sweden; it is suggested that the statutory retirement age should follow estimated life expectancy after retirement (The Swedish Pension Agency 2022) and does not involve any consideration regarding a heterogeneous aging population. Our result showed that after adjusting for time, age, and educational level, males had higher odds of participating in working life than females did. However, gender differences were only significant within the age groups 66 and 72 years and not for the age group 60 years. The OECD reported in 2017 that males more often combined work and pensions than females (OECD 2017). From a subjective perspective, one study revealed that women experience that men vs. women are less discriminated on the grounds of age (Sigurðardóttir & Snorradóttir 2020). Gender aspects and being active in working life at older ages should also be reflected through the life course principle of linked lives, which, for example, focuses on people's different assets and obligations in their social contexts, for example, extensive care responsibilities for the family (Elder et al 2003). Research has shown that women with previous family responsibilities are more likely to be vulnerable to deterioration in late-career job quality (Madero-Cabib 2017). However, life course theory also emphasizes that welfare regimes may frame biographies (Mayer 2004). In Sweden, the state actively supports a dual-earner model and offers comprehensive public-funded caregiving services (Halldén et al. 2012). A study aimed to investigate older adults' labor market trajectories using a comparative gendered life course perspective showed that family ties matter more in regimes with a breadwinner caregiver structure than they do where a dual-earner model is promoted (Worts et al. 2016). For decades, the state in Sweden has actively supported women's employment throughout their life course (OECD 2018), which might mirror the results in the age group 60. However, on the other hand, research in a Swedish context has shown a higher proportion of women vs. men reported being informal caregivers (Elmståhl et al. 2018), which might be one reason why there is a gender difference in the age groups 66 and 72.

Despite equalized proportions between men and women in being active in working life, our results show that the odds of being active in working life after age 65 are still higher among men vs. women. Surprisingly, our interaction analyses regarding gender and time were also nonsignificant.

The life course theory principle of life-span development refers to aging as a lifelong process and inequalities tend to accumulate in old age, that is, the gap between those with better socioeconomic positions and those with worse socioeconomic positions at earlier stages of life increases (the cumulative advantage and disadvantages perspective) (Elder et al. 2003). Our result showed that a higher education level, working in a highly skilled profession, and better health increased the odds of being active in working life. We found that both university educational level (in all three age groups) and working in a high-skill professional occupation (age group 60 and 66 years) increased the odds of being active in working life. However, our interaction analyses (unadjusted) revealed that the gap between the different professional levels in the odds of being active in working life significantly decreased, which is in line with previous research (Hofaecker & Naumann 2015; Kadefors et al. 2017). We also found that better work environment aspects were positively associated with being active in working life (in the age group 60 years and partly in the age group 66). In addition, our interaction analyses (unadjusted), showed that, between 2001–2003 and 2013–2015, positive associations between being active in working life and not having negative experiences with superiors or colleagues that might have affected own life or health were strengthened. This can be interpreted as counterproductive in facilitating the circumstances of extended working life among an aging working force. Research has also demonstrated that psychological climate is related to promoting successful aging at work, and a motivation to continue being active in working life after the official retirement age (Zacher & Yang 2016). As expected, our results showed that better health status was positively associated with being active in working life (age group 60 and 66 years), and we could not find any changes over time, regarding health status as a prominent factor for postponing working life at older ages. Therefore, our result also supports (in line with the cumulative disadvantages perspective) that vulnerability in late careers is more likely among individuals with health problems during their life course (Madero-Cabib 2017). The nonsignificant results for this in the age group 72 are interesting and might be due to other interrelated circumstances for wanting to remain active in working life. In a qualitative study of those being still active in working life, those at this age mentioned that due to good working conditions, working was experienced as beneficial to physical and cognitive health and social well-being (Bjuhr et al. 2022).

The time and place principle within life course theory refers to the assumption that people born during the same period have certain social or historical life events in common. As well as the principle of timing refers to the changes in age norms over time. In each society, expectations and roles are associated with different age groups (Elder et al. 2003). We found potential changes in age norms over the period of our study regarding older people being active in working life. The results revealed an overall increase in being active in working life, but most in the age group of 66 years. This could be interpreted as both individual and society's expectations of participation in working life after age 65 are growing. Previous research has revealed that employers may also have positive attitudes regarding the retention of older workers in working life (Frøyland & Terjesen 2020; Jonsson et al. 2020). The OECD reported in 2017 that the share of

older people combining work and retirement was about 15% in Sweden compared with, for example, less than 3% in Belgium, Greece, and Spain (OECD 2017). One crucial structural change in Sweden during the period for our study was the introduction of the new pension system in 2003. Pension benefits became more closely linked to individuals' participation in working life over their entire working life and the right to remain employed increased from 65 to 67 years of age (OECD 2018). This could be viewed through life-course theory, highlighting that historical influences and cohort effects on being active in working life at older ages need to be considered as opportunity structures within historical settings (Elder et al. 2003). In 2013–2015, the participants in our study (in all three age groups, but especially the age group 66 years) had other opportunity structures, in being active in working life compared to participants in 2001–2003. Our interaction analyses also revealed that the gap regarding the odds of being active in working life between the age group 60 years and age group 66 years decreased between 2001–2003 and 2013–2015. In addition, the age groups 66 and 72 were fully attached to the old pension system at T1, while at T2, those age groups were only additionally attached to the new pension system (see Figure 1). This can be interpreted as not only changing the public pension system may contribute to an increased interest in continuing to be active in working life at older ages. For example, it has been suggested that continuing to be active in working life depends on a subjective assessment of one's health prospects in working life (Nilsson 2018). In a study investigating subject aspects of successful aging, 15.4% reported specific work/job-related activities as an important aspect of successful aging (Jopp et al. 2015). Previous research also showed that from a subjective perspective, still being active in working life after age 65 was described as beneficial to maintaining vitality, the innermost dimension of health (Bjuhr et al. 2022). However, interestingly, we found that neither health status nor work environment factors seemed to play a significant role in being active in working life at age 72. A plausible explanation for the age-related differences is that age-related physiological decline may render the oldest age group frailer and, consequently, less likely to participate in working life independent of diseases and work environment factors.

To conclude, our findings verify that the central principles within life-course theory and conditions regarding participation in working life at older ages cannot be understood without the understanding of individual differences within the same generation, as well as the temporary perspective and differences between generations regarding aspects of retirement timing (Wang et al. 2011).

Strengths and limitations

As mentioned above, data used in this study has been exported from a large, individualized population-based study, that is, SNAC, not only envisioned to examine participation in working life at ages 60, 66, and 72 years. This may be considered a limitation since we only used disposable data measurements that were included in the standardized study protocol used in SNAC. However, the overall aim of SNAC is to, through the construction of large national databases, cover broad aspects of aging among the population of 60 years and older, and create conditions for research and analysis of various issues of importance regarding aging after age 60. Since SNAC also includes issues about occupational status and working conditions, we were still able to cover many aspects

that are known to play a significant role regarding factors related to being active in working life at older ages.

Another limitation is that a complete analysis of the response rate cannot be provided in this study. To utilize SNAC data, we needed to apply for access to the relevant data (matching our study aim) from each of the four sites, and therefore do not have access to the aggregated data of SNAC.

One major strength is that the data from SNAC enable temporal perspectives via repeated cross-sectional analyses. Further, since we included both cohorts completely in the old Swedish pension system, cohorts with different mixtures of the systems, and cohorts who are completely in the new system, we were able to explore age-group differences with different structural opportunities. The two cross-sectional sample sizes enabled robust analysis procedures except for the age group 72 years. This could explain the lack of significant associations between being active in working life and the independent variables for this age group. Further, relatively few respondents also mean higher statistical uncertainty and the possibility of nonresponse bias. The present study consists of a normal population with respondents from both rural and urban settings and all socioeconomic groups. This may make the results generalizable, at least in Sweden. Factors that also should have been of interest for our purpose that have not been investigated in this study are family caregiving aspects, individual/household financial circumstances, and different working life courses and must therefore be seen as a limitation of the study.

Studying two different cross-sectional samples 12 years apart and examining the interaction terms of time*independent variable produces tendencies over time regarding changes in participation in working life and associations with sociodemographic characteristics, health status, and work environment factors. Since we did not find any differences over time (except age) in associations with continuing to be active in working life, the period of 12 years was probably too narrow. Another limitation may be that the results come from a cross-sectional analysis, making it more difficult to infer causality from the associations found than one could with a longitudinal design. However, our main interest was in studying temporal trends, that is, 'timing' from a life-course perspective, and comparing factors associated with older people's active labour market participation within different age groups, that is, 'time and place' from a life-course perspective.

Conclusion

We conclude that despite increased participation in working life (most prominent at age 66) during the first decade after the major Swedish pension reform, there were, surprisingly, still no distinct changes in factors associated with being active in working life. Not only health status but also work environment factors were shown to play a significant role in being active in working life at older ages. Further, factors associated with being active in working life at older ages seem to be age-specific. Finding factors associated with being active in working life among our oldest age group (72 years) also proved to be challenging, that is why we suggest future research to investigate working life in older age groups. Our findings also verify that authorities need to develop reforms aiming to motivate older people to remain active in working life from a heterogeneous perspective.

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