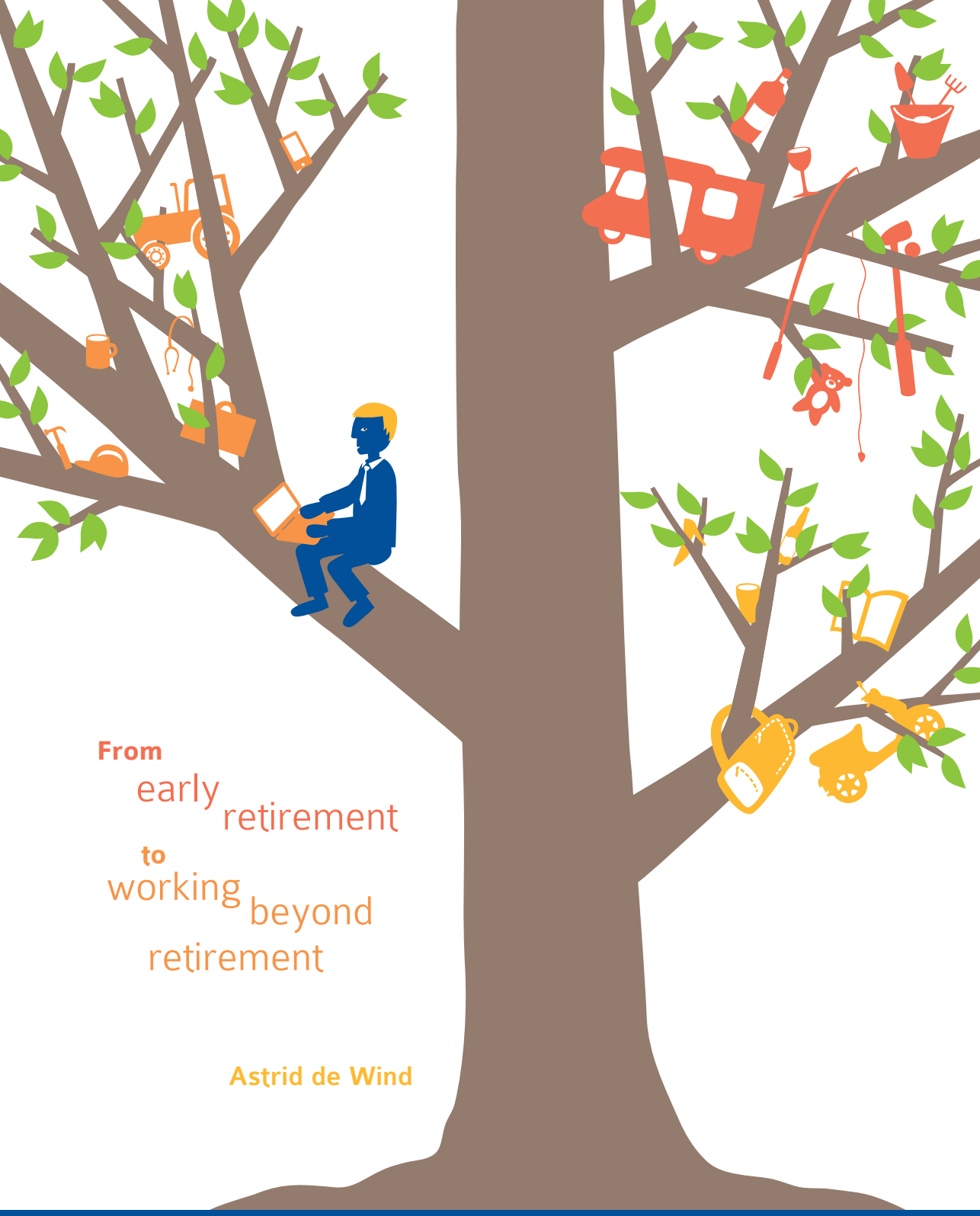


From early retirement to working beyond retirement

Astrid de Wind

BODY@WORK

From early retirement to working beyond retirement

Astrid de Wind

The study presented in this thesis was performed at the VU University Medical Center (Department of Public and Occupational Health, EMGO+ Institute for Health and Care Research) and the Netherlands Organisation for Applied Scientific Research TNO (Department Work, Health and Care). These institutes participate in Body@Work, Research Center on Physical Activity, Work and Health, which is a joint initiative of VU University Medical Center, VU University Amsterdam, and the Netherlands Organisation for Applied Scientific Research TNO.

The study presented in this thesis was funded by Body@Work, Research Center on Physical Activity, Work and Health. The Study on Transitions in Employment, Ability and Motivation (STREAM) was funded by the Dutch Ministry of Social Affairs and Employment.

Financial support for the printing of this thesis has kindly been provided by Body@Work, Research Center on Physical Activity, Work and Health.

English title:	From early retirement to working beyond retirement
Nederlandse titel:	Van vroegpensioen tot werken na pensioen
ISBN:	978-94-6233-239-3
Cover design and layout by:	Esther Ris, Proefschriftomslag.nl
Printed by:	Gildeprint

VRIJE UNIVERSITEIT

From early retirement to working beyond retirement

ACADEMISCH PROEFSCHRIFT

ter verkrijging van de graad Doctor aan
de Vrije Universiteit Amsterdam,
op gezag van de rector magnificus
prof.dr. V. Subramaniam,
in het openbaar te verdedigen
ten overstaan van de promotiecommissie
van de Faculteit der Geneeskunde
op vrijdag 22 april 2016 om 13.45 uur
in de aula van de universiteit,
De Boelelaan 1105

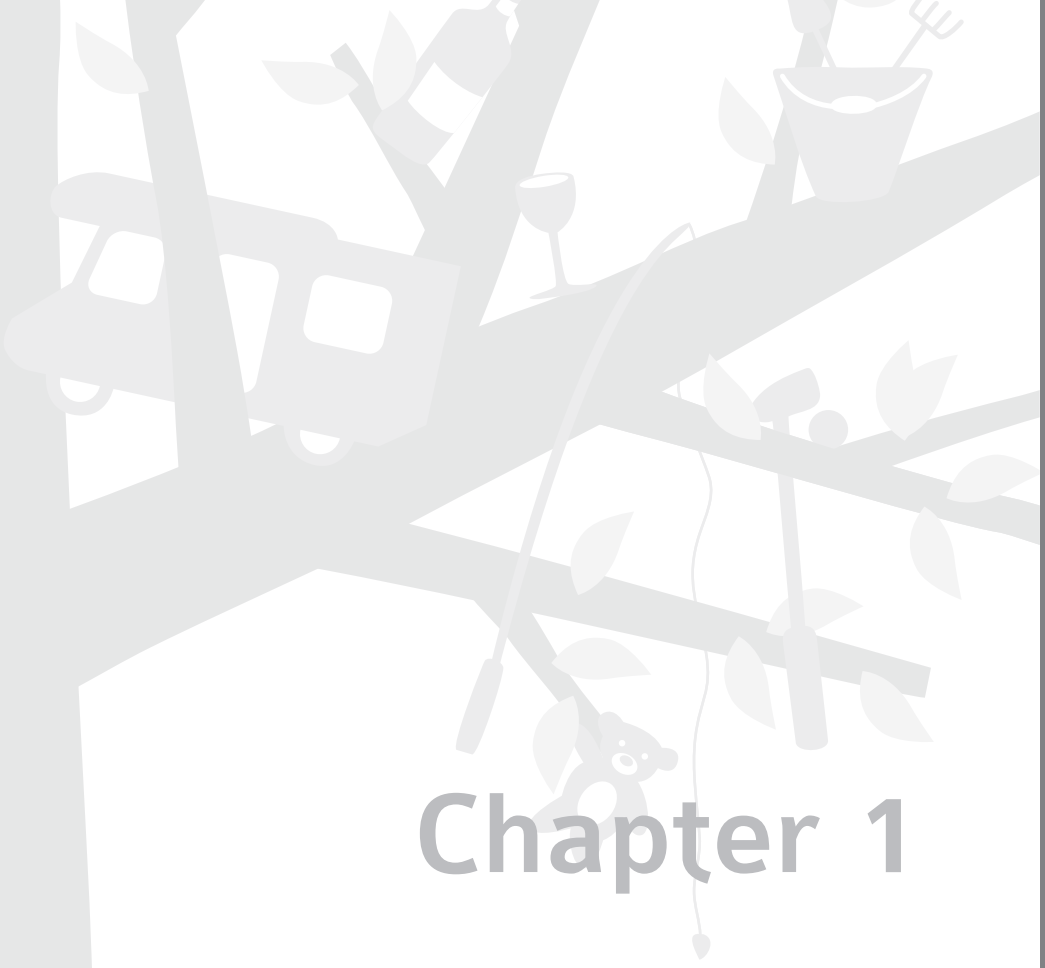
door

Astrid de Wind

geboren te Leiden

promotoren:	prof.dr. A.J. van der Beek
	prof.dr.ir. P.M. Bongers
copromotor:	dr. G.A. Geuskens

Contents



Chapter 1

General introduction

Many developed countries are confronted with ageing populations, due to the increase in life expectancy and long-term decline in fertility rates. The rising ratio of the older inactive population to the younger active working population puts pressure on the social security system, and causes tension in the solidarity between generations [1]. Many European governments responded to the ageing of the population by increasing the statutory retirement age and discouraging early exit from the workforce. In the Netherlands, the average age of leaving employment strongly increased in previous years, i.e. from 60.8 years in 2001 to 64.1 years in 2014 [2]. However, still many workers leave the workforce before the statutory retirement age. In addition, the current average age of leaving employment is still far away from the expected future statutory retirement age. Hence, the prolongation of working lives is an ongoing challenge.

Before focusing on the aim and outline of this thesis, a short history of early retirement in the Netherlands will be sketched, including today's paradox of a demand for prolonged working lives on the one hand and poor labor market opportunities for older workers on the other hand. This is followed by a summary of previous research about determinants of early retirement. Subsequently, the aim of this thesis, the chosen perspective and level of analysis, and the data used will be described. This general introduction concludes with a brief outline of this thesis.

History of early retirement in the Netherlands

When the state old age pension was established in the Netherlands in 1957, statutory retirement age was 65 years. Working until the age of 65 years was the norm until the 1970's. In the 1970's, youth unemployment was high, and as a response to this problem, early retirement schemes were introduced (in Dutch: Vervroegde Uittreding (VUT)). The early retirement schemes were supposed to facilitate that relatively expensive older workers would be replaced by younger workers. Older workers could leave the workforce earlier with financially attractive arrangements, whereas younger workers could enter the workforce. After reaching a certain eligibility age, that varied by sector and ranged between 58 years and 62 years, a worker could retire and received an early retirement benefit of about 80% of the last earned wage [1]. VUT was often mentioned as an offer one cannot refuse [3].

In the eighties and nineties, the awareness arose that early retirement schemes could no longer be affordable in future due to the increasing longevity and decreasing fertility rates. In 1997, the VUT was replaced with less generous pre-pension schemes [1]. After that, the Dutch government implemented various other pension system reforms, among others the gradual increase of the statutory retirement age from 65 years in 2012 to 67 years in 2021 [4]. In addition, fiscal measures made early retirement schemes offered by the employer or sector financially less attractive [5].

The shifting policy focus from promoting early retirement to the prolongation of working lives, is reflected in an increasing average age of leaving employment since the beginning of this century, i.e. from 60.8 years in 2001 to 64.1 years in 2014 [2]. Despite this increase, many employees still leave the workforce before the statutory retirement age. In addition, the mean age of leaving employment is still far away from the statutory retirement age of 67 years, which will apply in only five years from now (2021) [4]. As Figure 1 shows, a further increase in statutory retirement age is expected in future [6], as from 2021 onwards it will be linked to life expectancy [4]. Therefore, the prolongation of working lives will be an ongoing challenge.

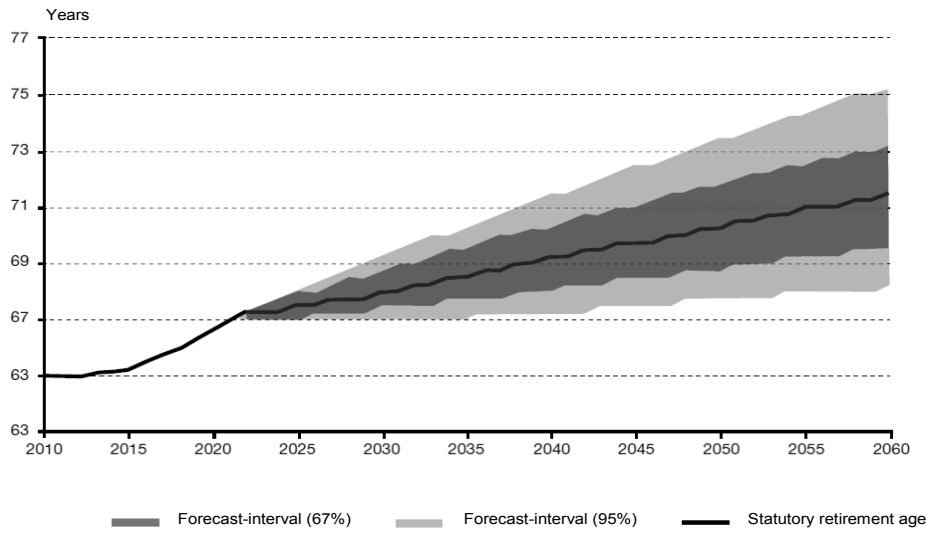


Figure 1. Forecast statutory retirement age until 2060 [6]

Today's paradox

Although there is a societal need for workers to prolong their working lives, labor market opportunities for persons aged 55 years and older are poor in the Netherlands. If older workers lose their job, the chance of finding a new job is substantially lower, and many of those get into long-term unemployment (>1 year). The proportion of older persons in long-term unemployment is almost two times the proportion of the entire workforce [7]. In addition, the proportion of older persons in long-term unemployment in the Netherlands is large in comparison with other countries. In Europe, on average 25% of those long-term unemployed is older than 50 years, in the Netherlands this is 40% [7]. These figures may be explained by a relatively negative perspective on older workers among Dutch employers. To illustrate, an international comparison showed that Dutch employers do relatively little to recruit and keep older workers compared to employers in, for example, Denmark, Germany, and Italy [8]. Besides, in 2012, only 27% of the employers reported it is important for staffing that employees continue working until their statutory retirement age [9]. In addition, wages that continue increasing at older ages are considered to play a role in the unfavorable labor market opportunities in the Netherlands [10].

Hence, with an increasing statutory retirement age and abolishment of early retirement schemes in the Netherlands, older workers are encouraged to prolong their working life in spite of non-optimal labor market opportunities. This paradox could be illustrated by a quote of a Dutch employee interviewed by the Council for Public Health and Health Care in the Netherlands [11]: *"You cannot demand that people work longer if there are no jobs."* Although at a societal level there is a need to prolong working lives, it is of interest how this works out at the meso-level (employer) and micro-level (employee).

Previous research on determinants of early retirement

The topic of early retirement has previously been studied from a broad range of disciplines, e.g. health sciences, social sciences, and economics. Health scientists and occupational epidemiologists mostly focused on health and work ability in relation to work force participation, whereas psychologists focused on motivational processes and psychosocial job demands. Economists often focused on the role of financial factors and policy reforms. Research derived from these disciplines showed that factors in the

domains health, job characteristics, skills and knowledge, and social and financial factors influence early retirement.

Previous research showed that workers with specific diseases, such as depression, rheumatoid arthritis, diabetes, and cancer, have a higher risk of an early exit from the workforce due to work disability [12-15]. Studies on the role of health in early retirement present an inconclusive picture. A literature review showed that poor perceived health was a risk factor of early retirement, although the association was less strong than for disability pension [16]. A second review showed that general health was related to early retirement, but that chronic diseases only marginally related to early retirement [17]. Previous research also showed that job characteristics play a role in early retirement. High work pressure [18] and low autonomy [18-20] increased the risk of early retirement. The findings with regard to physical work demands are mixed. Two studies did not find a relationship with early retirement [18,19], but one study that adopted a more narrow definition of physical load, i.e. extreme bending of the neck, indicated that physical demands increased the risk of early retirement [21]. Another study showed that the presence of challenging work was among the most important reasons for not retiring early [22]. The relation between skills and knowledge and early retirement has less often been studied. Previous research indicated that skills and knowledge are likely to influence the transition from work to early retirement. To illustrate, providing access to training opportunities was associated with fewer workers retiring early [23]. With regard to social factors, previous research showed that having a partner increased the likelihood of early retirement [21]. A Dutch study also pointed to the importance of social factors by showing that support of the partner to continue working was associated with retirement at an older age [24]. Finally, previous research showed that financial factors influence early retirement. To illustrate, financial advantages of working were reported as a reason for not taking full retirement in a qualitative study [22]. Other research showed that pension systems offering more generous retirement options were associated with higher rates of early retirement [25].

Hence, previous research showed that health, job characteristics, skills and knowledge, and social and financial factors push or pull workers from work to early retirement. However, these studies mostly focused on single factors that influence early retirement. Hence, the relative importance of different characteristics is unclear. To understand the complexity and to get an idea of the relative importance of the different domains, a broader perspective is needed. Moreover, it has barely been studied via which mechanisms determinants in these domains influence early retirement.

This thesis

Aim

Considering the previously mentioned gaps in our knowledge, the aim of this thesis is: *To investigate determinants of, and mechanisms underlying early retirement and working beyond retirement.*

Perspective and level of analysis

A broad perspective will be combined with a health perspective in this thesis. To understand the complexity of early retirement and to gain insight in the relative importance of health, job characteristics, skills and knowledge, and social and financial factors, a broad perspective will be used. This is helpful to gain insight in which policies and interventions would potentially have the greatest effect on the prolongation of working life. Due to the ageing of the working age population, and as a consequence, the higher prevalence of chronic diseases, special attention will be paid to the role of health as well.

The level of analysis in this thesis is the level of the employee. The level of the employer, e.g. their perspective on older workers and the effectiveness of human resource instruments aiming at prolonged working lives, and the governmental level, e.g. the influence of reforms in the retirement system on several outcomes, fall beyond the scope of this thesis.

Data

For this thesis data of the Dutch Study on Transitions in Employment, Ability and Motivation (STREAM) were used. STREAM is a prospective cohort study among 12,055 employees, 1,029 self-employed persons, and 2,034 non-working persons, all aged 45 to 64 years at baseline. The study sample was stratified by age and employment status, and was drawn from an existing internet panel. The baseline measurement was carried out in 2010. Yearly follow-up measurements took place in 2011, 2012, and 2013. The yearly online questionnaire consisted of a wide range of questions on demographics, health, job characteristics, skills and knowledge, and social and financial factors, the ability, motivation, and opportunity to work, and transitions in employment (e.g. the transition from work to early retirement). STREAM was previously extensively described elsewhere [26].

In addition to the yearly online questionnaires, qualitative in-depth information was collected by means of face-to-face interviews. In a first qualitative study, 30 Dutch employees

who retired early were selected and invited for a face-to-face interview. Data collection of this qualitative study is extensively described elsewhere in this thesis (chapter 5 and 6).

STREAM has been designed and conducted by TNO, in close collaboration with VU University Medical Center, and Erasmus Medical Center, and it was funded by the Dutch Ministry for Social Affairs and Employment. The Medical Ethical Committee of the VU University Medical Center Amsterdam declared that the Medical Research Involving Human Subjects Act does not apply to STREAM. The Medical Ethical Committee had no objection to the execution of this study.

Outline

Chapter 2 and 3 focus on determinants of early retirement. *Chapter 2* investigates the influence of health, job characteristics, skills and knowledge, and social and financial factors, and their relative contribution at population level, on the transition from work to early retirement. *Chapter 3* zooms in on a selection of chronic diseases and determines whether these chronic diseases predict transitions from work to early retirement, disability pension, and unemployment. In addition, this chapter describes whether several job characteristics strengthen or buffer these relations. From chapter 4 to 6, several studies investigate how factors influence early retirement. *Chapter 4* presents the Early Retirement Model. According to this model, determinants in the domains health, job characteristics, skills and knowledge, and social and financial factors influence early retirement through three central explanatory variables, i.e. the ability, motivation, and opportunity to work. This chapter investigates whether data support the model and how it could eventually be improved. The following two chapters are based on the qualitative data that were collected within STREAM, and concern perceptions of early retirees. Specifically, *chapter 5* investigates which non-health related factors influence early retirement, and why and how these factors are of influence. *Chapter 6* identifies pathways in which health influences early retirement. *Chapter 7* investigates whether the period before (early) retirement is characterized by a period of "mental retirement". It identifies trajectories of work engagement among older workers who approach the retirement age and investigates which trajectories, in turn, precede retirement. In *chapter 8*, working beyond retirement instead of early retirement is studied. Predictors of working beyond retirement are studied. *Chapter 9* summarizes the main findings from chapter 2-8

in this thesis, and discusses methodological considerations. In addition, the findings of this thesis are placed in the context of three important future trends, i.e. the increase in older workers with chronic diseases, the increasing demand on older workers to provide informal care, and the increasing flexibility of the labor market. Finally, recommendations for future research and practice are presented.

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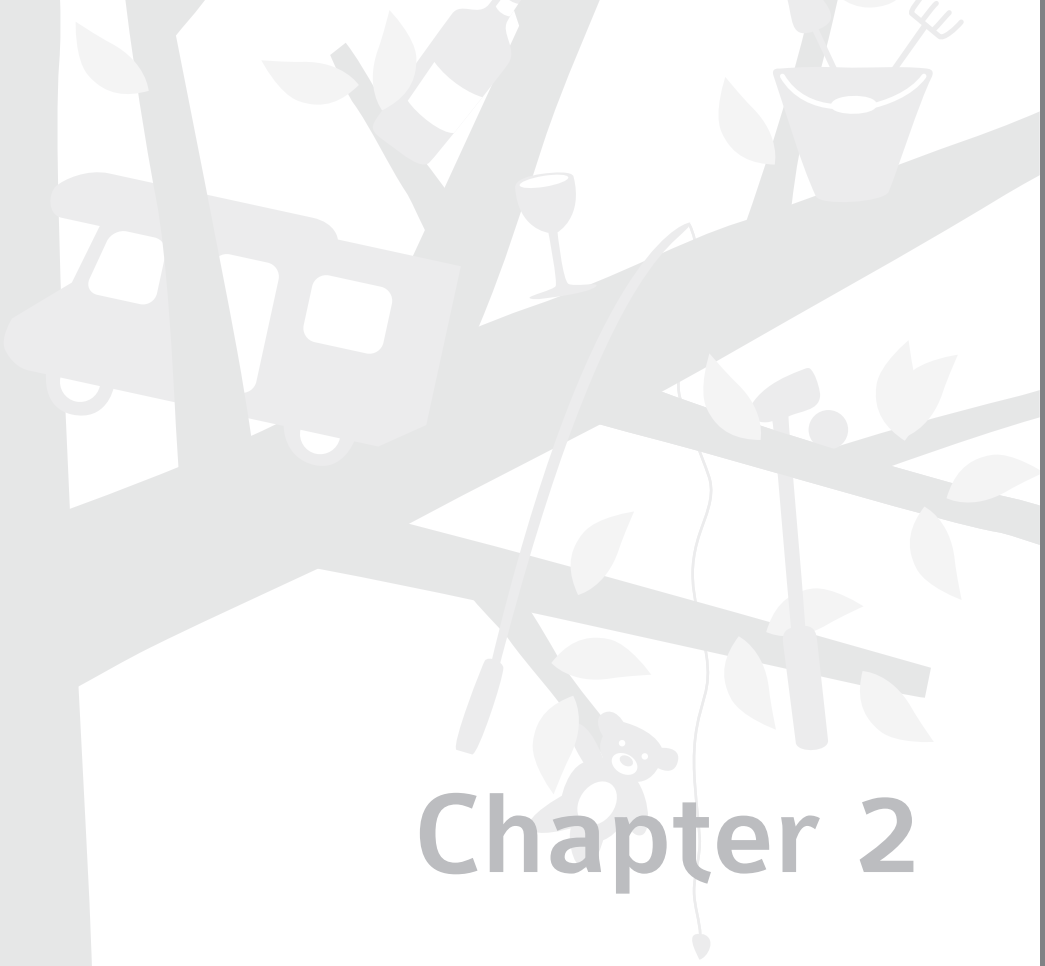

Chapter 2

Health, job characteristics, skills, and social and financial factors in relation to early retirement – Results from a longitudinal study in the Netherlands

Scandinavian Journal of Work, Environment & Health

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Bongers PM
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Abstract

Objectives

This study aimed to investigate the relative contribution of health, job characteristics, skills and knowledge, and social and financial factors to the transition from work to (non-disability) early retirement.

Methods

Employees aged 59–63 years (N=2317) were selected from the Study on Transitions in Employment, Ability and Motivation in the Netherlands (STREAM). Individual characteristics, health, job characteristics, skills and knowledge, and social and financial factors were measured using a questionnaire at baseline. Information on early retirement was derived from the one-year follow-up questionnaire. Logistic regression analyses were used to identify predictors of early retirement. Population Attributable Fractions (PAF) were calculated.

Results

Older age (odds ratio (OR) 1.79), poor physical health (OR 1.78), a positive attitude of the partner with respect to early retirement (OR 3.85), and the financial possibility to stop working before the age of 65 (OR 10.2) predicted the transition to early retirement, whereas employees that reported high appreciation at work (OR 0.58) and higher focus on development of skills and knowledge (OR 0.54) were less likely to retire early. PAF were 0.75 for the financial possibility to stop working, 0.43 for a positive attitude of the partner with respect to early retirement, 0.27 for low appreciation at work, 0.23 for a low focus on development, and 0.21 for poor health.

Conclusions

The financial possibility to stop working before the age of 65 importantly contributes to early retirement. In the context of rapidly diminishing financial opportunities to retire early in the Netherlands, the prolongation of working life might be promoted by workplace health promotion and disability management, and work-related interventions focusing on appreciation and the learning environment.

Introduction

In the Netherlands and many other countries, the population is ageing. The ratio of retired elderly to the active working population is increasing, which causes pressure on the social security system. Moreover, a shortage of workers is expected in some sectors, e.g., healthcare and the construction industry. To counter the pressure on the social security system and the expected worker shortage in the next decades, it is important that workers prolong their (healthy) working life until or beyond official retirement age. Although the average retirement age in the Netherlands increased from 61 years in 2003 to 63.1 years in 2011 [1], most workers still left work before the official retirement age of 65 in 2011.

In previous research, a variety of factors influencing (non-disability) early retirement have been identified. Van den Berg et al [2] and Schuring et al [3] reported that poor health predicts early retirement (odds, hazard, and risk ratios ranging from 1.2–3.4). High physical work demands (i.e., extreme bending of the neck) predicted early retirement in one study [odds ratio (OR) 6.8], but no significant effect of high physical work demands has been found in other studies (OR ranging from 0.9–1.1) [2]. High work pressure may also increase the likelihood of early retirement [hazard ratio (HR)1.1] [2]. A qualitative study showed that organizational changes, including restructuring and continuous changes in the way work needed to be done, and a poor social climate at work influenced the process towards early retirement as well [4]. In addition to health and job characteristics, social factors may play a role in early retirement. Lund et al [5] found that having a partner increased the likelihood of early retirement (OR 2.8). A Dutch study found that support of the partner to continue working was associated with retirement at an older age [6]. Besides this, skills and knowledge may influence early retirement. Provision of and participation in education and training was associated with a reduced intention to retire early and actual retirement behavior [7, 8]. Moreover, colleagues' limited use of one's skills and knowledge may decrease motivation to work and result in early retirement according to qualitative research [4]. In a longitudinal investigation, Fischer & Sousa-Posa [9] showed that pension systems offering more generous retirement options were associated with higher rates of early retirement. The previously mentioned qualitative study added that financial factors may shape a precondition to make the transition from work to early retirement among many employees [4]. Hence, factors in the domains of health, job characteristics, knowledge and skills, and social and financial factors may push or pull workers from work to (non-disability) early retirement.

Although previous studies have provided insight in determinants of early retirement, these studies mostly focused on a limited set of determinants. Few studies address the importance of health and job characteristics relative to skills and knowledge, and social and financial factors. This is of interest because it provides insight into what interventions or regulations would (potentially) yield the greatest effect on the prolongation of working life. Moreover, the role of individual characteristics, such as mastery and life events, has barely been studied. Mastery refers to the degree to which persons feel that they are in control of matters that affect their lives [10] and has previously been associated with retirement adjustment [11]. With respect to life events, qualitative research showed that employees who were confronted with the finiteness of life sometimes retired early to spend more time with family and friends, or spend more time on hobbies [12].

Therefore, the aim of the present study is to investigate the relative contribution of individual, health, and job characteristics, skills and knowledge, and social and financial factors to the transition from work to (non-disability) early retirement.

Methods

Study population

The study population consisted of participants of the Study on Transitions in Employment, Ability, and Motivation (STREAM) [13]. STREAM is a longitudinal study among 15 118 employees, self-employed persons, and persons without paid employment aged 45–64 years. The study population was stratified by age and employment status. STREAM consists of four yearly measurements in October and November of 2010, 2011, 2012, and 2013. In total 12 055 employees participated at baseline. In the present study, we used data from the first two waves of STREAM since data from the third and fourth wave were not available yet.

Inclusion criteria for the present study were: (i) employee at baseline and (ii) age 59–63 years. We chose 59 years as a lower age limit, since the proportion of employees that had retired early after one year strongly increased from this age onwards. We chose 63 years as the upper age limit at baseline because the official retirement age in the Netherlands was 65 years in these persons, and, hence, participants had not yet reached the official retirement age at one year follow-up.

Persons who received a disability pension or unemployment compensation at baseline or follow-up were excluded from the present study. Previous studies suggested that different factors and processes underlie the transition from work towards disability pension or unemployment [14].

Measurements

Participants completed an online questionnaire at baseline and at one-year follow-up. All independent variables were derived from the baseline questionnaire and the outcome variable "early retirement" was derived from the follow-up questionnaire.

Outcome

Information on early retirement was derived from a question on employment status. In this study, early retirement referred to employees who retired before the official retirement age of 65 years and did not receive disability compensation (i.e., non-disability early retirement). This definition excluded persons who reported being both retired and working, and, hence, those who continued working after retirement (N=170).

Individual characteristics

Information on age, gender, and educational level was available. Educational level was measured using a question on the highest level of education completed with a diploma, and categorized into low (primary school, lower and intermediate secondary education, or lower vocational training), intermediate (higher secondary education, or intermediate vocational training) or high (higher vocational education or university).

Mastery was measured using the Pearlin Mastery Scale, which reflects the degree to which persons feel they are in control of matters that affect their lives [10], e.g., "I have little control over things that happen to me". This scale consists of seven items with a 5-point answering scale ranging from "totally disagree" to "totally agree" (Cronbach's alpha 0.84).

Apart from that, the following life events in the past 12 months were assessed: got a serious illness, death of a partner, death of a close family member or friend, partner got a serious disease, and close family member of friend got a serious disease. In the analyses, we distinguished between persons who reported at least one of these life events and persons who did not.

Health

Perceived health was measured using the physical component summary scale (PCS) and the mental component summary scale (MCS) of the Short Form-12 Health Survey [15]. The scales range from 0–100 (0=worst and 100=best possible health status). An example of an MCS item is: "Have you felt downhearted and blue?" An example of a PCS item: "Does your health now limit you in climbing several flights of stairs?" Due to the skewed distribution of both scales, the interquartile range (25^{th}– 75^{th} percentile) was used to distinguish between poor, moderate, and good health.

Job characteristics

Physical load was measured using a scale consisting of six items on regular use of force, the use of vibrating tools, awkward postures, prolonged standing, and prolonged squatting based on the Netherlands Working Conditions Survey 2009 (16) and the Dutch Musculoskeletal Questionnaire [17] (Cronbach's alpha 0.86). A 5-point answer scale was used ranging from "always" to "(almost) never". Due to the skewed distribution, the interquartile range was used to distinguish between low, moderate, and high physical load.

Job demands and job autonomy were measured using four and five items, respectively, all derived from the Job Content Questionnaire (Cronbach's alpha 0.87 and 0.78, respectively) [18, 19]. A 5-point scale was used ranging from "always" to "(almost) never". An example of a job demands is "Do you have to work very fast?". An example of an autonomy item is "Are you able to decide for yourself how to do your work?". Higher scores reflect higher job demands and higher job autonomy.

Restructuring was measured using one item, i.e., "Has enterprise restructuring occurred in the past 12 months?" This item could be answered with "No", "Yes, without compulsory redundancies", and "Yes, with compulsory redundancies".

Furthermore, employees separately indicated on a 4-point scale whether appreciation and a good social climate were present at work [20]. The answers "not present at all" and "somewhat present" were classified into "not present" and "rather present" and "highly present" were classified into "present".

In addition, social support of colleagues and the supervisor was measured using a 4-item scale derived from the COPSOQ (Cronbach's alpha 0.81) [21, 22]. Employees indicated how often their colleagues or their supervisor helped or supported them and how often they were willing to listen to their work-related problems, e.g., "How often do

you get help and support from your immediate superior?". A 5-point answer scale was used ranging from "always" to "almost never". Lower scores reflect higher social support from colleagues and the supervisor.

Knowledge and skills

Developmental proactivity was measured using a 4-item scale derived from Veldhoven & Dorenbosch [23]. This scale reflects the extent to which persons (i) actively search for activities in their job that allow them to expand knowledge and skills and (ii) adapt their knowledge and skills to (future) changes in their jobs, e.g., "In my work, I search for people from whom I can learn something". Items could be answered on a 5-point scale ("totally disagree" to "totally agree") and Cronbach's alpha was 0.81. A higher score means a higher focus on development of skills and knowledge. The same 5-point answer scale was used to assess lack of knowledge by a single item, i.e., "I lack 'new' knowledge and skills that have become important due to changes in my work". We categorized the answer options in three groups: no lack of knowledge, neutral, and lack of knowledge.

Social factors

Persons provided information on their household composition. If a person was married or living together with a partner, the respondent reported the support of this partner with respect to early retirement with one item based on Henkens et al [6], i.e., "What would your partner think if you would stop working completely as soon as you get the opportunity?" The response categories were dichotomized into negative / neutral ("very upleasant", "unpleasant" and "not unpleasant, not pleasant") and positive ("pleasant" and "very pleasant").

Financial factors

The financial situation of the household was measured using the single question "What is the financial situation of your household now?". Employees could choose from the following answer categories: "very short of money", "somewhat short of money", "just adequate", "some money left" or "a lot of money left". The categories were classified into "short of money", "just adequate", or "money left".

Furthermore, employees were asked: "Could you financially afford to stop working before the official retirement age?" This question could be answered with "yes", "no", or "don't know".

Statistical analysis

Descriptive statistics were used to describe the characteristics of the study population. To check whether loss to follow-up was selective, we compared baseline characteristics of non-responders and responders by means of independent T-tests.

Predictors of early retirement (no/yes) were studied by logistic regression analyses. Odds ratios (OR) and 95% confidence intervals (95% CI) were calculated to express the likelihood of the transition from work to early retirement. In the first step of the analyses, univariate associations between individual characteristics, health, job characteristics, knowledge and skills, social factors and financial factors with early retirement were established. Second, multivariate analyses were performed for all variables in the univariate analyses with $P<0.20$ within each of these domains. Third, multivariate analyses were performed for all variables from the previous step with $P<0.20$, using stepwise backward elimination. Variables with $P<0.05$ were retained in the final multivariate model. Age and gender were included in all analyses by default.

OR give information on the strength of the relation between a predictor and early retirement. Since the prevalence of this predictor is not taken into account, OR do not reflect the relative contribution of the predictor to the outcome on population level [24]. To estimate the relative contribution of different predictors, population attributable fractions (PAF) were calculated for statistically significant predictors of early retirement in the final multivariate model ($P<0.05$; except for age). The following formula was used: $PAF=Pe(OR-1)/(1+Pe(OR-1))$, whereby Pe is the prevalence in the study population [25]. This formula is meant for dichotomous variables. To calculate the PAF of categorical and continuous predictors in this study, these variables were dichotomized. Their prevalence was calculated and the final multivariate model was run again to obtain the OR to be included in the formula.

Statistical analyses were carried out using SPSS Statistics 20 (IBM Corp, Armonk, NY, USA).

Ethical issues

The Medical Ethical Committee of the VU University Medical Center Amsterdam declared that the Medical Research Involving Human Subjects Act does not apply to STREAM. The Medical Ethical Committee had no objection to the execution of this study. In the information for participants that accompanied the online questionnaire, it was emphasized that the privacy of participants was guaranteed, all answers to the questions were treated confidentially, and all data were stored in secured computer systems.

Results

In total, 2,317 persons were included (Figure 1). At baseline, compared to participants, persons lost to follow-up reported (i) a slightly higher focus on development of skills and knowledge (3.87 versus 3.81), (ii) more often a worse household financial situation (short of money in 15% versus 13%, just adequate in 27% versus 23%, and money left in 59% versus 64%), and (iii) more often had no partner (30% versus 24%).

Table 1 shows the characteristics of the study population. In total 11.6% of the employees made the transition from work to early retirement (N=269). The correlation between baseline characteristics was small to moderate. Moderate associations were found between a good social atmosphere, the presence of appreciation, and social support of colleagues and the supervisor (Pearson's correlations ranging from 0.34–0.40). Also mastery and mental health were moderately interrelated (Pearson's correlation -0.35). Other variables were only marginally interrelated at baseline (Pearson's correlations ≤0.24).

In the univariate logistic regression analyses, older employees and those with a severe life event, poor physical health, a positive attitude of the partner with respect to early retirement, money left in the household and the financial possibility to stop working before the age of 65 years retired more often (Table 2). Women and employees with higher job demands, appreciation at work, a good social work atmosphere, higher social support of colleagues and the supervisor, and a higher focus on development of skills and knowledge (i.e., developmental proactivity) retired less often.

In the multivariate regression analyses, older age (OR 1.79), poor physical health (OR 1.78), a positive attitude of the partner with respect to early retirement (OR 3.85), not having a partner (OR 1.96) and having the financial possibility to stop working before the age of 65 (OR 10.2) predicted early retirement, whereas employees that reported high appreciation at work (OR 0.58) and higher focus on development (OR 0.54) retired less often. Life events, job demands, a good social atmosphere, social support of colleagues and the supervisor, and the financial situation of the household were not included in the final model (Table 2). The influence of these factors was attenuated in the multivariate (domain) analyses.

Table 3 presents the PAF of the predictors included in the final multivariate regression model of early retirement. The relative contribution was highest for the financial possibility to stop working before the age of 65 (PAF 0.75), followed by a positive attitude of the partner with respect to early retirement (PAF 0.43), absence of appreciation at work (PAF 0.27), a low focus on development of skills and knowledge (PAF 0.23), and a poor physical health (PAF 0.21).

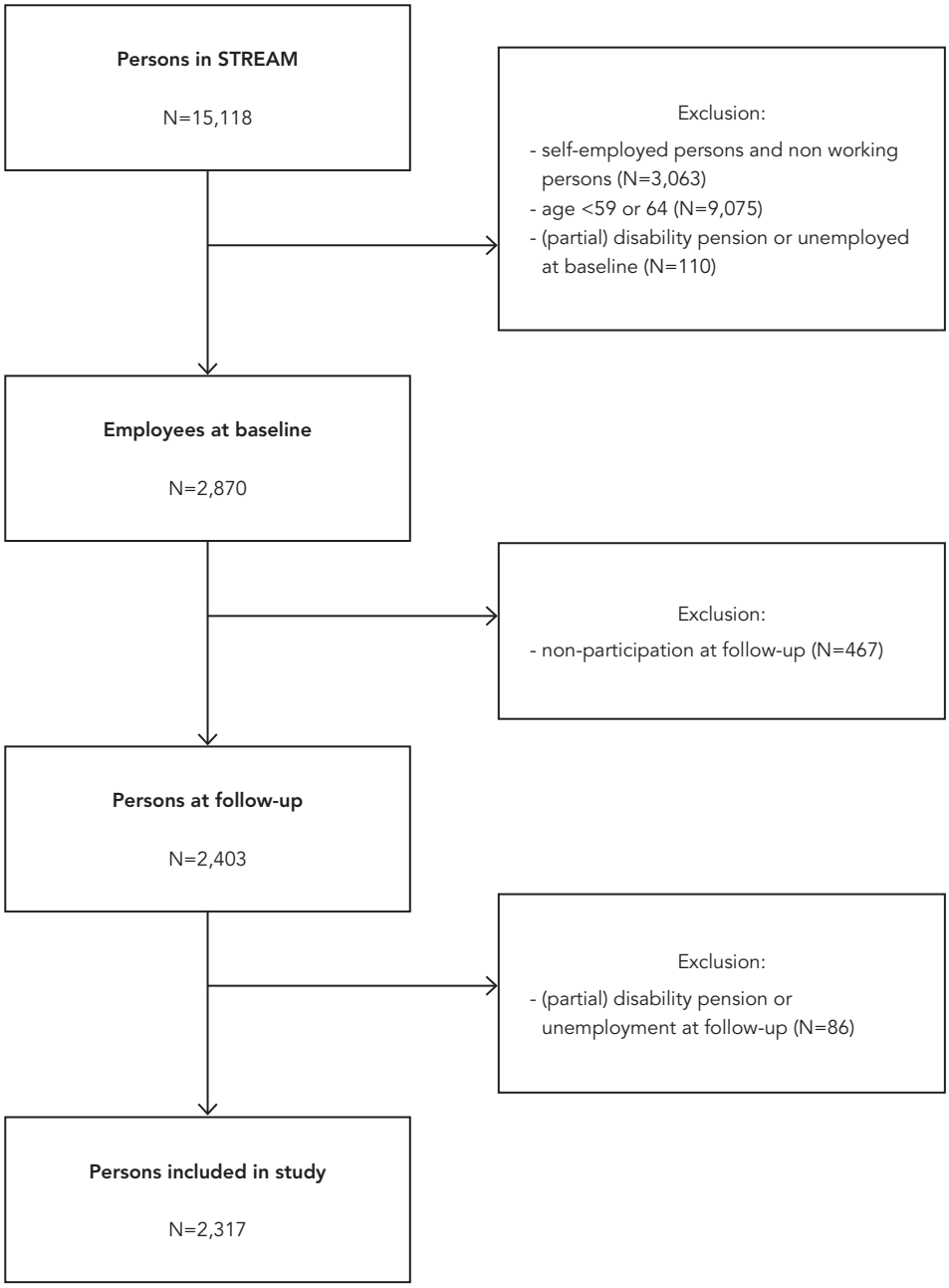

Figure 1. Flow of the study population resulting in 2,317 persons included in the present study

Table 1. Characteristics of study population (N=2,317) [IQR=interquartile range (25th-75th percentile)]

Characteristics		Frequency (%)	Mean	IQR
Individual characteristics				
Age (59-64)		-	60.7	60-62
Gender	Female	41.6%	-	
Educational level	Low	31.3%	-	
	Intermediate	34.1%	-	
	High	34.6%	-	
Mastery (1-5)		-	3.8	3.4-4.3
Severe life event	Yes	35.6%	-	
Health				
Physical health	Good (58-100)	16.9%	-	
	Moderate (48-57)	56.7%	-	
	Poor (1-47)	26.4%	-	
Mental health	Good (59-100)	24.2%	-	
	Moderate (52-58)	50.8%	-	
	Poor (1-51)	25.0%	-	
Work characteristics				
Physical demands	Low (0.0-0.9)	38.4%	-	
	Medium (1.0-2.2)	38.2%	-	
	High (2.3-4.0)	23.4%	-	
Job demands (1-5)		-	2.9	2.5-3.5
Autonomy (1-5)		-	3.9	3.6-4.4
Restructuring	No	66.5%	-	
	Yes, without compulsory redundancies	22.1%	-	
	Yes, with compulsory redundancies	11.4%	-	
Appreciation	Present	58.1%	-	
Good social atmosphere	Present	81.5%	-	
Social support (1-5)		-	3.5	3.0-4.0
Skills and knowledge				
Developmental proactivity (1-5)		-	3.8	3.5-4.0
Lack of knowledge	No lack of knowledge	54.4%	-	
	Lack of knowledge	15.4%	-	
	Neutral	30.2%	-	
Social factors				
Partner's attitude to early retirement	Negative / neutral	40.0%	-	
	Positive	36.2%	-	
	No partner	23.8%	-	
Financial factors				
Financial situation	Money left	64.7%	-	
	Just adequate	23.3%	-	
	Short of money	12.0%	-	
Financially possible to stop working before age 65	No	36.4%	-	
	Yes	52.7%	-	
	Don't know	10.9%	-	
Outcome				
Early retirement		11.6%	-	

Table 2. Predictors of early retirement in logistic regression analyses (N=2,317) [OR=odds ration; 95% CI=95% confidence interval]

Characteristics		Univariate		Multivariate per domain		Multivariate	
		OR	95% CI	OR	95% CI	OR	95% CI
Individual characteristics							
Age (59-64)		1.71**	1.55-1.89	1.72**	1.55-1.90	1.79**	1.58-2.01
Gender	Female	0.64**	0.49-0.84	0.61**	0.46-0.80	0.79*	0.57-1.09
Educational level	Low	1.00	-	-	-	-	-
	Intermediate	0.83	0.60-1.34	-	-	-	-
	High	1.03	0.76-1.40	-	-	-	-
Mastery (1-5)		1.07	0.87-1.32	-	-	-	-
Severe life event	Yes	1.22*	0.94-1.59	1.24*	0.95-1.62	-	-
Health							
Physical health	Good (58-100)	1.00	-	1.00	-	1.00	-
	Moderate (49-57)	1.01	0.69-1.46	1.01	0.69-1.46	0.92	0.60-1.40
	Poor (1-48)	1.37*	0.91-2.04	1.37*	0.91-2.04	1.78**	1.11-2.85
Mental health	Good (59-100)	1.00	-	-	-	-	-
	Moderate (52-58)	0.95	0.69-1.30	-	-	-	-
	Poor (1-51)	0.92	0.63-1.33	-	-	-	-
Work characteristics							
Physical demands	Low (0.0-0.9)	1.00	-	-	-	-	-
	Medium (1.0-2.2)	1.07	0.80-1.44	-	-	-	-
	High (2.3-4.0)	1.13	0.81-1.58	-	-	-	-
Job demands (1-5)		0.87*	0.75-1.02	0.83**	0.71-0.97	-	-
Autonomy (1-5)		0.93	0.78-1.10	-	-	-	-
Restructuring	No	1.00	-	-	-	-	-
	Yes, without compulsory redundancies	1.05	0.77-1.42	-	-	-	-
	Yes, with compulsory redundancies	0.75	0.48-1.17	-	-	-	-
Appreciation	Present	0.64**	0.50-0.83	0.77*	0.57-1.03	0.58**	0.43-0.79
Good social atmosphere	Present	0.60**	0.44-0.80	0.76*	0.54-1.08	-	-
Social support (1-5)		0.74**	0.64-0.87	0.79**	0.67-0.93	-	-
Skills and knowledge							
Developmental proactivity (1-5)		0.49**	0.40-0.61	0.49**	0.40-0.61	0.54**	0.42-0.68
Lack of knowledge	No lack of knowledge	1.00	-	-	-	-	-
	Lack of knowledge	1.07	0.74-1.55	-	-	-	-
	Neutral	1.12	0.84-1.49	-	-	-	-

Table 2 continued

Characteristics		Univariate		Multivariate per domain		Multivariate	
		OR	95% CI	OR	95% CI	OR	95% CI
Social factors							
Partner's attitude to early retirement	Negative / neutral	1.00	-	1.00	-	1.00	-
	Positive	3.66**	2.65-5.04	3.66**	2.65-5.04	3.85**	2.68-5.53
	No partner	1.49*	0.99-2.22	1.49*	0.99-2.22	1.96**	1.25-3.08
Financial factors							
Financial situation	Money left	1.00	-	1.00	-	-	-
	Just adequate	0.90	0.66-1.22	1.44**	1.04-2.00	-	-
	Short of money	0.54**	0.34-0.88	1.30	0.78-2.18	-	-
Financially possible to stop working before age 65	No	1.00	-	1.00	-	1.00	-
	Yes	8.82**	5.64-13.80	9.78**	6.15-15.55	10.18**	6.23-16.62
	Don't know	2.19**	1.10-4.35	2.25**	1.13-4.83	3.29**	1.58-6.84

*p value<0.20, **p value<0.05

Table 3. Population attributable fractions (PAF) of factors that significantly predicted early retirement in multivariate logistic regression analyses [OR=odds ratio; 95% CI=95% confidence interval]

Characteristics		Proportion (%)	OR	95% CI	PAF
Physical health	Moderate and good physical health (49-100)	73.6	1.00		0.21
	Poor physical health (1-48)	26.4	1.90	1.36-2.65	
Appreciation	Present	58.1	1.00		0.27
	Not present	41.9	1.73	1.28-2.34	
Developmental proactivity	High focus on development (3.5-5)	80.5	1.00		0.23
	Low focus on development (0-3.5)	19.5	2.24	1.60-3.13	
Partner's attitude to early retirement	Negative / neutral, or no partner	63.8	1.00		0.43
	Positive	36.2	3.01	2.22-4.08	
Financially possible to stop working before age 65	No or don't know	47.3	1.00		0.75
	Yes	52.7	6.78	4.56-10.09	

Discussion

Older age, poor physical health, a positive attitude of the partner with respect to early retirement and the financial possibility to stop working before the age of 65 predicted the transition from work to (non-disability) early retirement, whereas employees that reported high appreciation at work and higher focus on development of skills and knowledge retired less often. Especially the financial possibility to stop working before the age of 65, the attitude of the partner with respect to early retirement, and appreciation at work strongly contributed to early retirement.

Earlier studies have shown that poor health, work-related factors, skills and knowledge, and social and financial factors are determinants of early retirement [2, 3, 5, 7–9]. In the present study, the relation between financial factors and early retirement seems relatively strong compared to previous studies [26, 27]. However, comparison to previous studies is hampered by differences in the aspects of the financial situation assessed and differences in the outcome variables. The relatively strong relationship between the financial possibility to stop working and early retirement compared to other predictors in the present study may (partly) be explained by the short follow-up period of one year. Since retirement is a process instead of a sudden event for many people, some employees may already have known it was financially possible to retire in the months before actual retirement, and hence, at the baseline assessment. It could be hypothesized that the shorter the period of time between assessment of financial factors and early retirement, the stronger the association. This is supported by a previous qualitative study that showed that the financial possibility to retire early often becomes important after other push and pull factors towards retirement arise [4]. Therefore, we recommend future research to study within one dataset whether the strength of the association between different predictors and early retirement depends on the period of time between the assessment of these variables.

Our finding on the influence of health on early retirement contradicts the results of a recent study, in which Robroek et al [28] found no significant effect of poor health on early retirement. These contradictory results might be explained by the fact that two distinct processes play a role. On the one hand, poor health could result in early retirement among persons who are not able to work at all, or experience a decrease in their ability to work. On the other hand, good health may contribute to early retirement among persons who want to enjoy life as long as their health allows them to do so [12].

As opposed to the review by Van den Berg et al [2], we did not find a significant relation between physical demands and task demands on the one hand, and early retirement on the other hand. This might (partly) be explained by the healthy worker effect. In the review by Van den Berg et al, much younger populations were included (≥25 years) than in our study (59–63 years). Our population may be a healthier population, since employees with health problems due to high physical and/or task demands may have dropped out of work before the age of 59. Another explanation might be that some employees who had retired at follow-up, had already planned to do so at baseline and had already reduced their physical and/or task demands.

Our result on the influence of partners supplements the finding that having a partner increases the likelihood of early retirement [5] and that partners' support to continue working positively influences retirement age [6]. We obtained insight in the circumstances in which having a partner positively influences the transition from work towards early retirement. It is not so much having a partner that increases the likelihood of early retirement, but having a partner who stimulates such early retirement. Hence, our study endorses the importance of support of a partner in the retirement decision.

To our knowledge, the present study is the first study that investigated a wide range of predictors of early retirement at the same time, and hence, provided insight in the relative importance of different domains. Especially the financial possibility to retire early appeared to be important in the transition from work to early retirement. At the time of the data collection of the present study, early retirement schemes were still widely accessible, which may have contributed to the relatively large PAF for the financial possibility to retire early in our study. Favorable arrangements to retire early will decline in the near future due to changes in the social security system with the official retirement age increasing from 65 in 2012 to 67 in 2023 in the Netherlands [29]. This might affect the relative importance of predictors of early retirement addressed in the present study. Moreover, the decline in favorable early retirement schemes might decrease the proportion of persons who leave the workforce through early retirement, but might increase the proportion of persons who leave the workforce via different pathways, e.g., disability pensions or unemployment. We would recommend future research to investigate changes in the relative importance of predictors of early retirement and pathways out of employment.

A strength of the present study is that we used longitudinal data, which allowed us to investigate predictors of early retirement instead of associations between early retirement and certain characteristics. Moreover, we studied a broad set of predictors in a diversity

of domains and participants performed a broad variety of jobs. However, this study also has limitations. A first limitation is the previously mentioned short follow-up period of one year, which may have influenced baseline measurements and their associations with early retirement. For example, employees who knew they would retire during the next months possibly focused less on the development of new skills, had already reduced their physical and job demands, and knew it was financially possible to stop working. Second, the response of the study was 83%. Although this response is high and differences between respondents and non-respondents were small, bias due to non-response at follow-up cannot be ruled out. Third, due to the large number of predictors we investigated in the present study, there is a risk of overlap between the predictors of interest. To minimize this risk, we performed multivariate domain analyses, and thereby reduced the number of predictors in the final multivariate model. Fourth, in line with Van den Berg et al [14] and Mykletun et al [30], we used OR instead of relative risks to calculate PAF. This may have resulted in some overestimation of the PAF. However, since the sum of the PAF exceeds 1, we would like to point out that the presented PAF should be interpreted only as a measure of ranking the relative importance of different factors rather than an exact estimate of the proportion of workers with early retirement due to a specific predictor. Fifth, all data relied on self-reports since register data were not available. It may be difficult to measure certain job characteristics, such as physical demands [31], by self-report, but previous research showed that subjective health assessments are valid health status indicators in middle-aged populations [32]. To our knowledge, no previous study investigated the validity of self-reported employment status. However, for none of the variables we have reasons to assume differential misclassification. Sixth, the item measuring the financial possibility to stop working explicitly referred to "retirement", in contrast to other independent variables. This may have contributed to the relatively strong relation with early retirement in addition to the short follow-up period. Seventh, differences between subgroups of employees were not presented due to a lack of statistical power. Additional analyses stratified by gender and educational level did not reveal substantial differences. However, the relation between a positive attitude of the partner with respect to stopping to work and early retirement might be stronger among high- compared to low-educated employees. We recommend future studies with sufficient statistical power to investigate differences between subgroups of workers. Finally, data collection took place at the same time as an extensive public debate on the need to prolong working life in the Netherlands. Employees might have felt obligated to continue working, which might have buffered the

relation between the predictors that were studied and early retirement.

In conclusion, our results indicated that especially the financial possibility to stop working before 65 played an important role in the transition from work towards early retirement. On the basis of these results, we expect that the present gradual increase of the official retirement age and constraining the financial possibilities to retire early will indeed contribute to the prolongation of working life. In the context of rapidly diminishing financial opportunities to retire early in the Netherlands, the prolongation of working life may be supported by health-promotion programs in the workplace. Moreover, since more older workers are expected to continue working in spite of chronic health problems in the future, disability management may also gain importance to support extended working careers. Previous reviews have shown that these interventions may positively affect health and work-related outcomes, including absenteeism, presenteeism, and work performance [33, 34]. Furthermore, the prolongation of working life might be supported by work-related interventions, focusing on appreciation and the learning environment. Jobs could for example be designed in such a way that persons are continuously stimulated to expand their knowledge and skills and adapt their knowledge and skills to changes in their work. The results of the present study show that the causes of early retirement are multifactorial, which advocates that policies, regulations, and interventions focus on a diversity of factors to prolong working lives.

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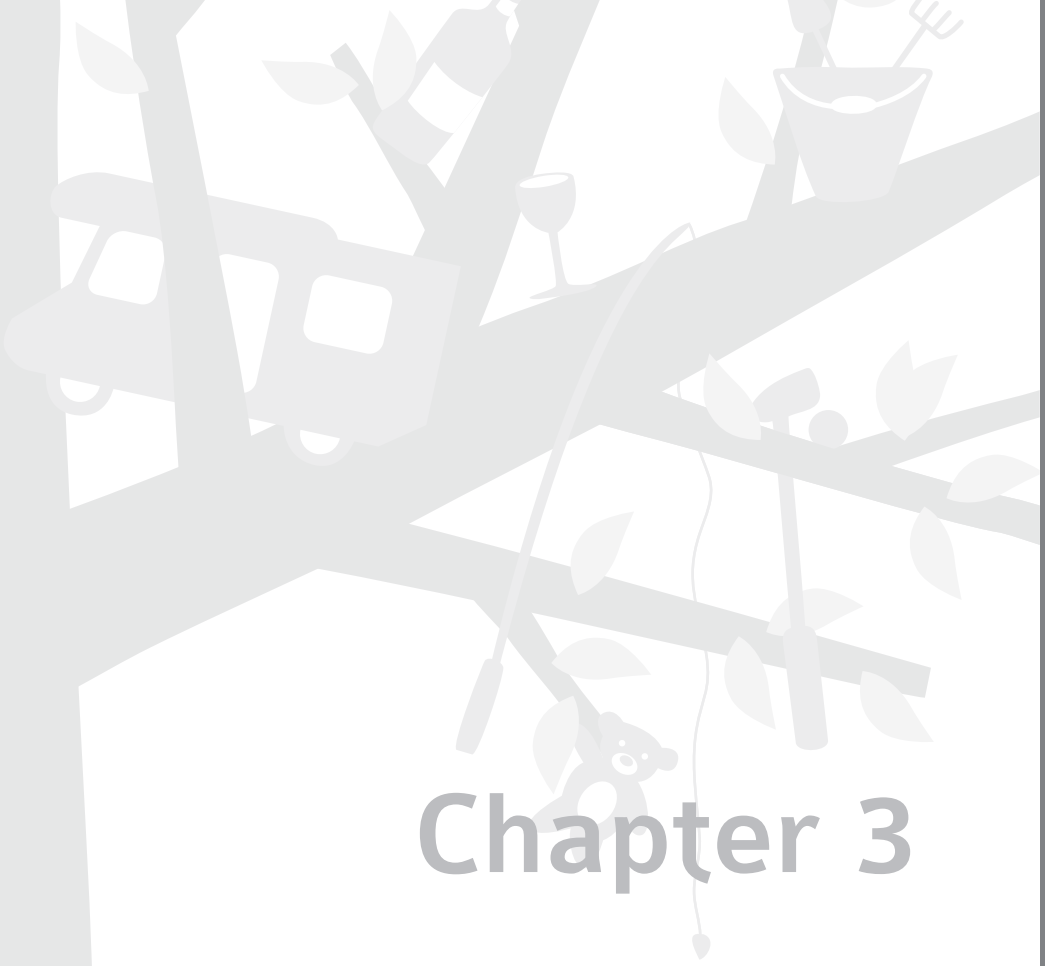

Chapter 3

The influence of chronic health problems and work-related factors on loss of paid employment among older workers

Journal of Epidemiology & Community Health

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Abstract

Background

With an ageing society and increasing retirement ages, it is important to understand how employability can be promoted in older workers with health problems. The current study aimed to determine whether (1) different chronic health problems predict transitions from paid employment to disability benefits, unemployment and early retirement, and (2) how work-related factors modify these associations.

Methods

Self-report questionnaire data was used from the Dutch longitudinal Study on Transitions in Employment, Ability and Motivation with 3 years of follow-up (2010-2013), among employees aged 45-64 years (n=8,149). The influence of baseline chronic health problems and work-related factors on transitions from paid employment to disability benefits, unemployment and early retirement during follow-up was estimated in a competing risks proportional hazards model. Relative excess risk of transitions due to the interaction between chronic health problems and work-related factors was assessed.

Results

Severe headache, diabetes mellitus and musculoskeletal, respiratory, digestive and psychological health problems predicted an increased risk of disability benefits (HR range 1.78-2.79). Circulatory (HR=1.35) and psychological health problems (HR=2.58) predicted unemployment, and musculoskeletal (HR=1.23) and psychological health problems (HR=1.57) predicted early retirement. Work-related factors did not modify the influence of health problems on unemployment or early retirement. Psychosocial work-related factors, especially autonomy, modified the influence of health problems on disability benefits. Specifically, among workers with health problems, higher autonomy, higher support and lower psychological job demands reduced the risk of disability benefits by 82%, 49%, and 11%, respectively.

Conclusions

All health problems affected disability benefits to a similar extent, but psychological health problems especially predicted unemployment and early retirement. For older workers with health problems, promoting an optimal work environment has the potential to contribute to sustainable employment.

Introduction

Western society is being confronted with an ageing population. The resulting strain on social security systems has made it increasingly important that older workers remain in employment for a longer time period. As a consequence of living more years with chronic health problems, older workers are now also more likely to experience health-driven labor force exit, while (re-)employment has in fact been found to be good for health [1,2].

A recent systematic literature review on longitudinal studies showed that self-perceived general health, mental health and various chronic diseases were associated with exit from the workforce through unemployment and work disability [3]. A benefit for work disability can be granted temporarily, but return to paid employment is often relatively low [4].

Studies on the role of health in early retirement present an inconclusive picture. In the aforementioned review, general health was related to early retirement, but chronic diseases only showed a marginal relation and in a qualitative study both good and poor health were found to be important for early retirement [3,5]. Comparing the influence of different health problems on multiple exit routes is difficult because only few original articles [6] have focused on more than one specific exit route and/or health problem.

When comparing the influence of health on different transitions out of paid employment, it should be acknowledged that these transitions are related events. The probability of one exit route, that is, early retirement, disability pension or unemployment, may depend on the probability of other exit routes. For example, workers with health problems have a higher risk of transitioning to disability benefits, leaving healthier employees viable for other transitions at a later point in time, in essence the healthy worker effect [7]. Furthermore, disability and unemployment are to some extent communicating vessels that depend on eligibility criteria in the social security system; empirical evidence has shown that restrictions in disability enrolment had spill-over effects on transitions to unemployment [8]. When studying determinants of early exit from paid employment, the interdependency and time-dependency of different routes needs to be considered, which requires an analytical approach that incorporates such so-called 'competing risks'.

Work-related factors may also play a role in whether and when workers exit from the workforce. Several studies have reported that work-related factors may directly influence exit from the workforce [9-12]. Recent findings show that among workers with chronic health problems, favorable psychosocial resources relate to remaining in employment

and reducing sickness absence [13,14]. In the current study, we will determine whether work-related factors modify the influence of health on early exit from the workforce via disability benefits, unemployment and early retirement. Such knowledge can contribute to the development of workplace interventions aimed at keeping employees (with health problems) in employment for a longer time period.

In summary, the objectives of the current study were to add to the existing literature by determining among older workers whether (1) the presence of *different* chronic health problems predict a future transition from paid employment to disability benefits, unemployment or early retirement, and (2) work-related factors modify the influence of chronic health problems on these transitions.

Methods

Study design

In the current study, data from the Study on Transitions in Employment, Ability and Motivation (STREAM) were used. STREAM is a longitudinal Dutch cohort study with 3 years of follow-up (2010-2013). The STREAM sample was drawn from an online panel and was stratified according to 5-year age groups and work status (i.e., employed, self-employed, non-employed). Participants between the ages of 45 and 64 annually filled in an online questionnaire on a variety of topics, including employment status, work characteristics and health. More detailed information on the STREAM study design can be found elsewhere [15]. The current study builds on prior STREAM publications that have focused on facets of sustainable employability of employees still working, for example, sickness absence, work ability and productivity [14,16].

In total, 15,118 respondents participated in the first wave of STREAM (2010). Only baseline employed respondents were included in the current study (n=10,464), with complete baseline information on work-related factors (n=10,383). Self-employed workers were excluded because these workers may experience different working circumstances than employees, for example, with regard to social support from colleagues or supervisors, or the level of autonomy in conducting work tasks. Furthermore, only employees who participated in more than one wave were included in the current study (n=9,501) because we were interested in transitions that could occur during the follow-up period. Lastly, a selection was made of respondents that remained employed or made

a transition to disability pension, unemployment or early retirement during follow-up. Thus, workers who made other transitions, for example, to self-employment, statutory retirement or to becoming a housewife/houseman were excluded as well as persons with a mixed participation status, for example, simultaneously in paid employment and early retirement (overall excluding a further 1,352 persons). This resulted in a total study population of 8,149.

The VU University Medical Center Amsterdam medical ethical committee declared that the Medical Research Involving Human Subjects Act does not apply to STREAM. The medical ethical committee had no objection to the execution of this study. In the information provided to STREAM participants, it was made clear that their privacy would be guaranteed, that all answers would be treated confidentially and that data would be stored in secured computer systems [15].

Loss of paid employment

The outcome of interest in the current study was loss of paid employment. Employment status was operationalised with the question "In which situation are you currently?" (one or more paid jobs as an employee, work disabled, unemployed, (early) retired) and a question on whether persons received different types of government financial benefits. Based on this, four mutually exclusive employment status were defined at each follow-up wave: disability benefits, unemployment, early retirement and employment. Subsequently, three transitions groups were defined from baseline employment to disability benefits, unemployment and early retirement during follow-up, as well as a group with sustained employment.

The work status disability benefits was defined on the basis of whether participants stated they were currently receiving work disability benefits. In the Netherlands, disability benefits are calculated on the basis of a disability percentage, determined by the difference between what an individual can theoretically earn with his or her maintained functional abilities and what he or she earned prior to the disability or what a comparable person without any disability earns. Only if there is a reduction of (potential) income greater than 35%, disability benefits will be granted (http://www.government.nl). From the moment of initial sickness absence, it generally takes 2 years before one can apply for disability benefits. Thus, the transition from employment to disability benefits was defined over a 2-year period in the current study.

Unemployment was defined on the basis of whether persons indicated they were unemployed. If respondents indicated that they were early retired or retired and under the

age of 65 at the time of the questionnaire, then this was defined as the work status "early retirement". The transition from employment to unemployment and early retirement could occur over a 1-year period.

Employment was defined as having one or more paid job(s) as an employee. Employment was also defined as having less than 100 sickness absence days (≈6 months) in the past 12 months in order to ensure that the predictors (health and work-related factors) were measured prior to the transitions, as long-term sickness absence is an inherent predecessor of disability benefits.

Chronic health problems

The presence of a chronic health problem was assessed at baseline using the following question, "Do you (currently) have one or more of the following chronic diseases, disorders or handicaps?" [17]. Thirteen answer options (i.e., chronic diseases, disorders or handicaps) were provided for which participants could indicate whether these were present. Seven categories of health problems were created for the current study: severe headache or migraines, diabetes mellitus and musculoskeletal, circulatory, respiratory, digestive and psychological health problems. Different musculoskeletal disorders were classified together into one category. Specific answer options were not studied, namely, rare health problems with a prevalence typically below 1% (e.g., epilepsy). We also classified participants into two groups based on whether any of the seven categories of health problems were present or whether none of these categories were present.

Work-related factors

Physical work load and three psychosocial work-related factors (i.e., psychological job demands, autonomy and support) were assessed at baseline. Physical load was assessed using five items on force exertion, static load and vibration (Cronbach's alpha=0.86) [18,19] Psychological job demands was assessed using four items on how fast, how much, how hard and how hectic an individual's work is (Cronbach's alpha=0.86) [20]. Autonomy was assessed using five items on making decisions, deciding the order and speed of conducting tasks, having to find solutions, and being able to take time off (Cronbach's alpha =0.77) [21]. Support at work was assessed using four items on whether colleagues and/or supervisors are willing to help and listen to work-related problems (Cronbach's α=0.80).20 Items on the four work-related factor scales were all measured on five-point Likert scales ranging from 1 '(almost) never' to 5 'always', and were all dichotomised at the median value.

Individual factors

The factors age, gender and educational level were included as potential confounders. Three categories of educational level were used: low (lower general secondary educational, preparatory secondary vocational education), medium (intermediate vocational training, higher general secondary education, pre-university education) and high (higher vocational education, university education).

Statistical analyses

Descriptive statistics were used to report on the baseline characteristics (i.e., work-related, health, demographic and occupation factors) of the study population and the frequencies of transitions between the annual waves.

The influence of baseline chronic health problems and work-related factors on transitions from paid employment to disability benefits, unemployment, and early retirement during follow-up was assessed in a competing risks proportional hazards model [22]. This model takes into account that these outcome routes are related events; that is, the risk of one event depends on whether the other event has occurred. This is of particular importance for labor force exit routes, since disability will most often occur at a younger age than early retirement and eligibility criteria and financial consequences also play a role.

Sub-HR and their 95% CIs are presented from multivariable models that included all health problems simultaneously in order to take multimorbidity into consideration, as well as work-related and individual factors. The influence of having any of the health problems as compared to having none of these on loss of paid employment was analysed in a multivariable model including work-related and individual factors. An HR greater than one for a particular determinant indicates an increased risk of a specific transition occurring during the follow-up, considering the competing risks of the other transition routes.

In order to determine whether taking competing risks into account indeed influenced our findings, sensitivity analyses with standard Cox proportional hazards models were also conducted. The findings from the two models were compared by looking at the percent change in (sub)HR. In order to determine whether work-related factors modify the influence of health problems on transitions from paid employment, relative excess risk due to interaction (RERI) terms were calculated. Multiple testing and chance findings would have been a problem had the interaction effect of each specific health problem with

each work-related factor on the three forms of loss of paid employment been analysed (i.e., 7×4×3=84 statistical tests). The dichotomous classification of any of the specific health problems being present as compared to none of these health problems was used for the effect modification analyses. In sensitivity analyses, the specific interaction of musculoskeletal and psychological health problems with work-related factors on transitions were also assessed. RERI terms were calculated using HRs as estimates of relative risk; RERI=(HR (*health problem and unfavorable work factor*)) - (HR (*health problem and favorable work factor*)) - (HR (*no health problem and unfavorable work factor*)) + 1 [23,24]. The HR terms used to calculate the RERI term, the RERI term itself and its 95% CI, as calculated with the delta method, are reported [23,25]. To determine the role of work-related factors in loss of paid employment specifically among workers with health problems, the risk of loss of paid employment between workers with health problems and favorable versus unfavorable work-related factors was also compared in terms of percent change in HR. All RERI analyses were adjusted for age, gender and educational level. Analyses were conducted in SPSS V.20 and STATAV.13.1.

Results

Study population

Baseline characteristics of the study population are presented in Table 1. Participants were on average 53 years old, and slightly more males than females participated in the current study. Most participants had a medium or high educational level. At baseline, workers were predominantly employed in the following types of companies: health and well-being, public administration, education and industry (according to EU NACE classification of economic activities of organizations).

Musculoskeletal health problems were most prevalent (29.6%), followed by circulatory health problems and severe headache. Psychological health problems were the least prevalent (2.9%); 49.1% of the study sample had one or more health problem.

During the 3 year follow-up, 14.1% of the sample (n=1,147) lost their paid employment; 7% of the workers retired early (n=570; 27.9 per 1,000 person-years), 5.8% became unemployed (n=474; 23.2 per 1,000 person-years) and 1.3% started receiving disability benefits (n=103; 5.0 per 1,000 person-years).

Table 1. Baseline characteristics of the sample: individual factors, work-related factors and chronic health problems in older employees (n=8,149)

Individual factors			
Age		Mean (SD)	53.4 (5.07)
Gender	Male	n (%)	4,611 (56.6)
Education	Low	n (%)	2,144 (26.3)
	Medium	n (%)	3,202 (39.3)
	High	n (%)	2,803 (34.4)
Work-related factors			
Physical load		Mean (SD)	1.79 (0.88)
	Higher (>1.40)	n (%)	3,878 (47.6)
	Lower (≤1.40)	n (%)	4,271 (52.4)
Psychological job demands		Mean (SD)	3.16 (0.76)
	Higher (>3.25)	n (%)	3,059 (37.5)
	Lower (≤3.25)	n (%)	5,090 (62.5)
Autonomy		Mean (SD)	3.85 (0.69)
	Lower (<4.00)	n (%)	3,846 (47.2)
	Higher (≥4.00)	n (%)	4,303 (52.8)
Support		Mean (SD)	3.60 (0.76)
	Lower (<3.75)	n (%)	4,023 (49.4)
	Higher (≥3.75)	n (%)	4,126 (50.6)
Health problem			
Any health problem		n (%)	3,998 (49.1)
Musculoskeletal		n (%)	2,412 (29.6)
Severe headache or migraines		n (%)	658 (8.1)
Circulatory		n (%)	737 (9.0)
Respiratory		n (%)	564 (6.9)
Digestive		n (%)	445 (5.5)
Diabetes mellitus		n (%)	506 (6.2)
Psychological		n (%)	234 (2.9)

Note: SD=standard deviation.

Determinants of loss of paid employment

Chronic health problems

With the exception of circulatory health problems, the presence of all health problems at baseline were related to an increased risk of disability benefits, ranging from 1.78 (95% CI 1.06 to 2.99) for severe headache to 2.79 (95% CI 1.45 to 5.39) for psychological health problems. Employees with circulatory (HR 1.35; 95% CI 1.03 to 1.77) and psychological (HR 2.58; 95% CI 1.83 to 3.62) health problems at baseline were at an increased risk of unemployment. Employees with musculoskeletal (HR 1.23; 95% CI 1.06 to 1.42) and

psychological (HR 1.57; 95% CI 1.05 to 2.34) health problems were at an increased risk of early retirement.

The sensitivity analyses showed that HRs estimated by the standard Cox proportional hazards model (see Appendix Table A) for chronic health problems on the transition to disability benefits were larger than in the competing risks model, up to 20% for psychological health problems. For unemployment and early retirement, estimates were approximately the same (maximum change 1.1%) (Table 2).

Table 2. Multivariable analyses of the relations between the presence of a chronic health problem and loss of paid employment using competing risks proportional hazards models (n=8,149)

		Disability benefit n = 103/8,149	**Unemployment** n = 474/8,149	**Early retirement** n = 570/8,149
		HR (95% CI)	HR (95% CI)	HR (95% CI)
Any of the health problems		3.48 (2.18-5.56)	1.32 (1.10-1.58)	1.11 (0.96-1.28)
Specific health problem				
Musculoskeletal		2.19 (1.49-3.22)	1.05 (0.87-1.28)	1.23 (1.06-1.42)
Severe headache or migraines		1.78 (1.06-2.99)	0.95 (0.68-1.33)	1.18 (0.86-1.63)
Circulatory		1.49 (0.88-2.54)	1.35 (1.03-1.77)	1.01 (0.81-1.26)
Respiratory		2.02 (1.18-3.44)	0.96 (0.68-1.35)	0.69 (0.50-0.93)
Digestive		1.97 (1.17-3.33)	0.89 (0.60-1.33)	0.86 (0.64-1.14)
Diabetes mellitus		2.43 (1.44-4.09)	1.14 (0.82-1.60)	1.15 (0.92-1.44)
Psychological		2.79 (1.45-5.39)	2.58 (1.83-3.62)	1.57 (1.05-2.34)
Individual factors				
Age (years)		1.05 (1.01-1.10)	1.01 (0.99-1.03)	1.66 (1.60-1.71)
Gender (male)		0.77 (0.51-1.15)	0.88 (0.74-1.06)	1.40 (1.19-1.64)
Education	Low	1.56 (0.92-2.63)	1.50 (1.20-1.88)	0.83 (0.69-1.00)
	Medium	1.44 (0.87-2.36)	1.17 (0.94-1.45)	0.85 (0.72-1.02)
	High	Reference	Reference	Reference
Work-related factors				
Higher physical load		1.08 (0.71-1.63)	0.82 (0.68-0.99)	1.16 (1.00-1.36)
Higher psychological job demands		0.88 (0.60-1.28)	0.87 (0.72-1.06)	0.98 (0.84-1.14)
Lower autonomy		1.22 (0.82-1.83)	1.14 (0.95-1.38)	1.08 (0.93-1.25)
Lower support		1.33 (0.90-1.98)	1.46 (1.22-1.75)	1.16 (1.00-1.35)

Note: HR=Sub hazard ratio. HRs for the specific health problems, individual and work-related factors are presented from the same multivariable analyses. HRs presented for the category any of the health problems are from multivariable analyses including individual and work-related factors.

Work-related factors

In the multivariable analyses, adjusted for individual factors and health, work-related factors were not statistically significant independent risk factors of disability benefits. Lower physical load was a risk factor of unemployment. Lower support was a risk factor of both unemployment and early retirement (Table 2).

Effect modification of work-related factors on health-employment transitions

The only statistically significant RERI was for health problems and autonomy for disability benefits (RERI 2.09; 95% CI 0.77 to 3.41). Specifically, workers with health problems and lower autonomy had an 82% greater risk of disability benefits than those with health problems and higher autonomy (see HRs in Table 3). Although other RERIs were not statistically significant, we observed some indications that, among workers with a health problem, those with unfavorable psychosocial work-related factors had a greater risk of disability benefits compared to those with favorable psychosocial work-related factors. Namely, workers with lower social support and higher psychological job demands showed 49% and 11%, respectively, greater risk of disability benefits than workers with health problems and higher social support and lower psychological job demands (see HRs in Table 3).

Likewise, although the overall RERI was not statistically significant, we found an indication that workers with health problems and higher physical load had a 27% greater risk of early retirement than workers with health problems and lower physical load (see HRs in Table 3). There was no indication of modification by work-related factors for the effects of health problems on unemployment (see Table 3).

Similar to the overall health problem analyses, in the sensitivity analyses too we found that persons with musculoskeletal and psychological health problems and unfavorable psychosocial work-related factors were at a greater risk of disability benefits (see Appendix Tables B and C). This increased risk ranged from 28% to 45% for musculoskeletal health problems, and from 108% to 185% for psychological health problems.

Table 3. Modification of work-related factors on the relation between chronic health problems and loss of paid employment using relative excess risk due to interaction

			Disability benefit n = 103/8,149		**Unemployment** n = 474/8,149		**Early retirement** n = 570/8,149	
		n	RERI (95% CI)	HR (95%CI)	RERI (95% CI)	HR (95%CI)	RERI (95% CI)	HR (95%CI
Health problem	physical load		-0.20 (-2.39-1.99)		0.00 (-0.38-0.37)		0.17 (-0.14-0.48)	
Not present	Lower	3,071		Reference		Reference		Reference
Not present	Higher	1,080		1.45 (0.62-3.36)		0.81 (0.62-1.06)		1.11 (0.89-1.40)
Present	Lower	1,928		4.16 (2.08-8.33)		1.31 (1.03-1.67)		1.05 (0.86-1.29)
Present	Higher	2,070		4.41 (2.19-8.86)		1.12 (0.88-1.43)		1.33 (1.10-1.61)
Health problem	psychological job demands		0.80 (-0.66-2.17)		-0.33 (-0.78-0.12)		0.15 (-0.17-0.46)	
Not present	Lower	2,668		Reference		Reference		Reference
Not present	Higher	1,483		0.56 (0.21-1.51)		1.04 (0.78-1.38)		0.95 (0.74-1.20)
Present	Lower	2,422		2.90 (1.68-5.03)		1.46 (1.17-1.82)		1.08 (0.91-1.29)
Present	Higher	1,576		3.22 (1.82-5.70)		1.16 (0.89-1.51)		1.17 (0.95-1.44)
Health problem	autonomy		2.09 (0.77-3.41)		-0.27 (-0.77-0.22)		0.16 (-0.15-0.47)	
Not present	Higher	2,295		Reference		Reference		Reference
Not present	Lower	1,856		0.43 (0.17-1.11)		1.30 (0.99-1.70)		1.05 (0.84-1.32)
Present	Higher	2,008		1.87 (1.02-3.45)		1.49 (1.15-1.93)		1.06 (0.87-1.30)
Present	Lower	1,990		3.40 (1.94-5.96)		1.52 (1.17-1.96)		1.28 (1.05-1.56)
Health problem	social support		1.35 (-0.44-3.14)		-0.05 (-0.58-0.47)		-0.20 (-0.58-0.18)	
Not present	Higher	2,200		Reference		Reference		Reference
Not present	Lower	1,951		1.13 (0.49-2.61)		1.58 (1.20-2.08)		1.31 (1.04-1.64)
Present	Higher	1,926		3.02 (1.52-5.99)		1.41 (1.06-1.86)		1.25 (0.99-1.59)
Present	Lower	2,072		4.50 (2.33-8.71)		1.94 (1.50-2.51)		1.36 (1.09-1.69)

Note: Analyses are adjusted for age, gender and educational level. HR=Sub hazard ratio; RERI=Relative excess risk due to interaction.

Discussion

Workers with chronic health problems had an increased risk of starting to receive disability benefits during the 3 year follow-up, ranging from 1.78 with severe headache to 2.79 with psychological health problems. Alongside psychological health problems, only circulatory and musculoskeletal health problems were related to transitions to unemployment and early retirement, respectively. Within the group of workers with health problems, those with favorable psychosocial work-related factors had a lower risk of disability benefits; this risk reduction was up to 82% with higher autonomy.

As poor health is a pre-requisite of receiving disability benefits, it is not surprising that workers with health problems were at an increased risk. The effects of the seven health problems on disability benefits were relatively comparable in the current study. Similarly, in the review by van Rijn et al [3], the risk of disability pension ranged from 1.80 with poor mental health to 2.35 with respiratory health problems. In the prospective French GAZEL cohort study, greater differences were found between health problems with psychiatric diagnosis being the strongest predictor of disability pension (HR 7.56 for men, HR 4.14 for women) and respiratory diagnosis the weakest (HR 3.92 for men, HR 2.62 for women) [26]. There may be diverse reasons for mixed findings, such as the registry method of health via self- versus physician-reports, the severity of the health problems and different definitions of disability across different systems.

When compared to other health problems, psychological health problems had the strongest relation with unemployment and early retirement in the current study. Past studies using STREAM data on the effects of chronic health problems on sickness absence, productivity and work ability, have also shown especially large effects of psychological health problems [14,16]. In line with this, the recent Organisation for Economic Co-operation and Development (OECD) report on mental health and work in the Netherlands states that more needs to be achieved for workers with moderate and mild mental health problems [27]. Workplace adjustments and accommodations may be needed because health problems can cause an imbalance in demands and resources [16]. Workers with psychological health problems, however, are less likely to disclose their health problems to their managers, and disclosure is a prerequisite for obtaining necessary accommodations [28,29]. In the current study, the prevalence of psychological health problems was 2.9%; this group possibly contains persons with moderate to severe mental health problems, as in 2011 the prevalence of mild mental health problems in the Netherlands was found

to be 9.6%, moderate 2.5% and severe 1.6% [30]. This could in part explain the strong effects of psychological health problems on loss of paid employment.

For early retirement it should be acknowledged that this is a complex transition: not only poor health is a predictor, but good health can also play a role in that workers want to enjoy their retirement while still in good health [5]. Financial arrangements and opportunities at both the national and organizational level must also be considered in early retirement transitions [31]. Macro level determinants should be considered in future research on loss of paid employment, such as the economic situation in an occupational sector or an organization, as this may also lead to socioeconomic differences.

Among workers with any of the seven categories of chronic health problems, higher autonomy had the strongest modifying effect on the risk of disability benefits, followed by higher social support and lower psychological job demands. In order to restore the balance between demands and resources for those workers with health problems, autonomy can play a crucial role as it allows a worker to make necessary adjustments (e.g., deciding how and in which order to conduct work tasks, being able to think of solutions for how to approach things and decide when to take time off from work) [32]. Furthermore, colleague and supervisor support can emotionally help a worker, but also makes it easier for him or her to attain accommodations in the workplace [32]. In line with this, the greater the perceived adjustment latitude a worker with health problems has, that is, the extent to which his or her work effort can be adjusted, the lower the sickness absence [33]. If interventions can successfully ensure that favorable work-related factors are present, our findings suggest that the risk of loss of paid employment would decrease. Future research should also explore the modifying role of other work-related factors that have been found to have a direct association with continued employment, such as challenging work and organizational commitment [31,34].

Strengths and limitations

A strength of the current study is that different health problems, work-related factors and forms of early loss of paid employment were incorporated in one study; this made it possible to compare effects. This allowed for competing risk analyses to be used, which take into account multiple competing events and help to compare these findings to that of a traditional Cox model. In the current study we found that the influence of health on disability benefits reduced with up to 20% for psychological health problems in the competing risks model. Such an attenuation may be expected, and has been shown in

a simulation study [35], because a portion of the workers with, especially psychological, health problems also show transition to unemployment and early retirement and thus less workers with (such) health problems are viable to transition to disability benefits.

A limitation in this study is that work status was based on self-reported data and we did not have information on the exact percentage of work disability benefits that workers actually received. Furthermore, we did not consider whether and when workers returned to paid employment or to other employment status. For workers who started to receive disability benefits or retired early, re-entering to paid employment was relatively rare, 9% and 0.1%, respectively. Unemployment, however, was a more temporary transition, namely, 25% returned to paid employment within the next year. In future research it would be beneficial to use objective work status information, for example, based on tax registry information alongside self-reported data to study the main source of income, different routes out of employment and combined work status (e.g., being early retired and working part-time) that can allow for different approaches to be used, such as multistate and working life expectancies models [36,37]. Related to this, a limitation of the current study is that the time of an event was studied on a 1-year basis, that is, between questionnaire waves. This, however, is somewhat crude and again using objective information could allow for the exact time of a transition.

When assessing effect modification we did not look at separate health problems, because otherwise too many interaction terms would be tested and statistical power was low due to too few events during follow-up in some subgroups. In sensitivity analyses of effect modification of musculoskeletal and psychological health problems, findings from the overall analyses were confirmed. All of the effect modification terms had large CIs. For this reason we also determined the role of work-related factors in loss of paid employment, specifically in workers with health problems based on the clinically relevant differences in HRs.

Conclusions

The presence of almost all chronic health problems predicted, to a similar extent, that workers started to receive disability benefits, whereas predominantly psychological health problems predicted unemployment and, to a lesser extent, early retirement. Favorable psychosocial work-related factors reduced the risk of receiving disability benefits for persons with health problems. Alongside good health, our study suggests that promoting favorable psychosocial work-related factors among ageing workers can contribute to sustainable employment.

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Appendix

Table A. Sensitivity analyses of the multivariate relations between the presence of a chronic health problem and loss of paid employment in a standard Cox proportional hazards model

HR (95% CI)		**Disability benefit** n = 103/8,149	**Unemployment** n = 474/8,149	**Early retirement** n = 570/8,149
		HR (95% CI)	HR (95% CI)	
Any of the health problems		3.61 (2.25-5.80)	1.32 (1.10-1.59)	1.11 (0.94-1.31)
Specific health problem				
Musculoskeletal		2.21 (1.48-3.31)	1.06 (0.87-1.29)	1.23 (1.03-1.46)
Severe headache or migraines		1.74 (1.01-3.00)	0.96 (0.68-1.34)	1.18 (0.84-1.65)
Circulatory		1.62 (0.93-2.80)	1.35 (1.02-1.78)	1.01 (0.80-1.29)
Respiratory		2.03 (1.20-3.44)	0.96 (0.67-1.37)	0.69 (0.48-0.97)
Digestive		1.91 (1.09-3.35)	0.89 (0.59-1.33)	0.86 (0.61-1.22)
Diabetes mellitus		2.55 (1.47-4.41)	1.15 (0.82-1.63)	1.16 (0.89-1.51)
Psychological		3.35 (1.72-6.55)	2.59 (1.82-3.69)	1.58 (0.99-2.52)
Individual factors				
Age		1.09 (1.04-1.14)	1.02 (0.99-1.03)	1.66 (1.60-1.72)
Gender (Male)		0.76 (0.51-1.13)	0.89 (0.74-1.07)	1.40 (1.17-1.67)
Education	Low	1.54 (0.91-2.61)	1.50 (1.18-3.70)	0.83 (0.70-1.04)
	Medium	1.35 (0.82-2.24)	1.16 (0.93-1.46)	0.85 (0.70-1.04)
	High	Reference	Reference	Reference
Work-related factors				
Higher physical load		1.14 (0.76-1.71)	0.82 (0.68-1.00)	1.16 (0.98-1.39)
Higher psychological job demands		0.90 (0.59-1.35)	0.87 (0.72-1.06)	0.98 (0.82-1.17)
Lower autonomy		1.23 (0.82-1.84)	1.14 (0.95-1.38)	1.08 (0.91-1.28)
Lower support		1.38 (0.93-2.06)	1.46 (1.21-1.76)	1.16 (0.98-1.38)

Note: HR=Hazard ratio; HRs for the specific health problems, individual and work-related factors are presented from the same multivariable analyses. HRs presented for any health problem are from multivariable analyses including with individual and work-related factors.

Table B. Modification of work-related factors on the effect of musculoskeletal health problem on loss of paid employment

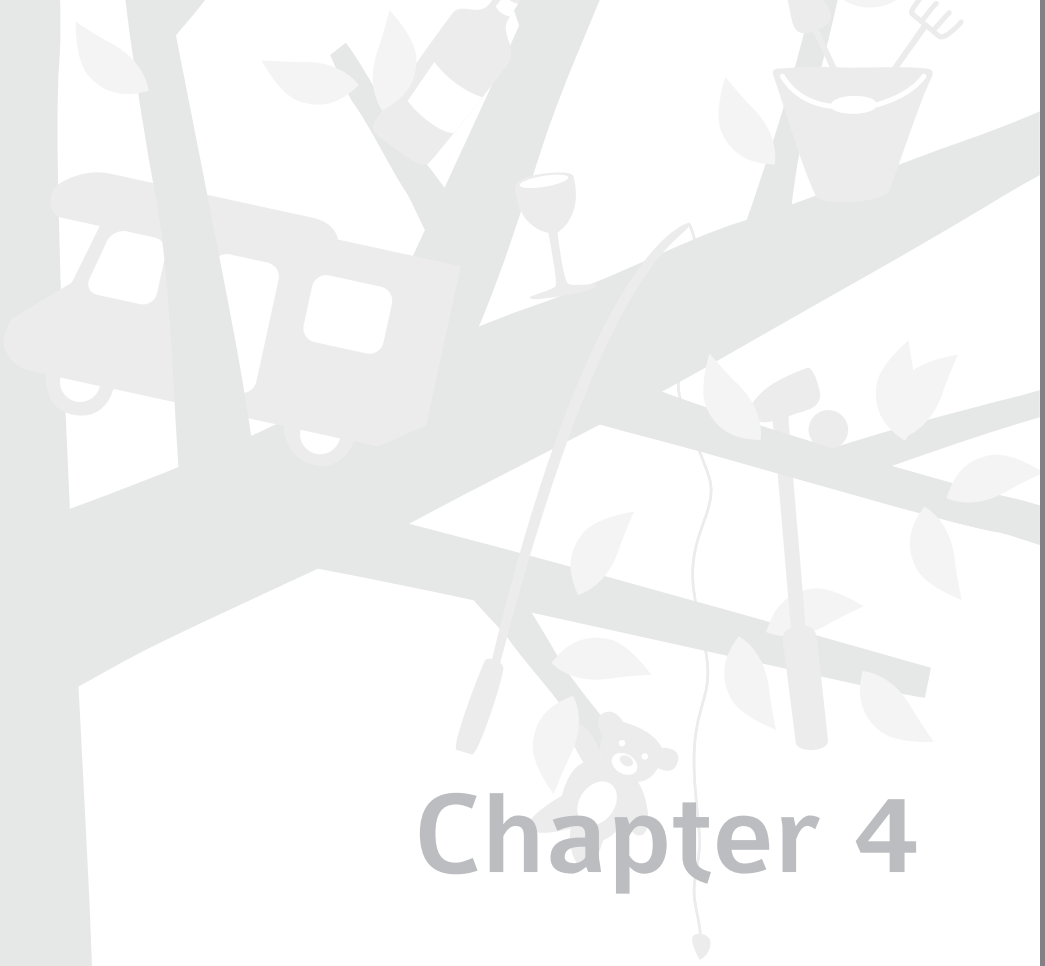
			Disability benefit n = 103/8,149		**Unemployment** n = 474/8,149		**Early retirement** n = 570/8,149	
		n	RERI (95% CI)	HR (95%CI)	RERI (95% CI)	HR (95%CI)	RERI (95% CI)	HR (95%CI)
Musculoskeletal	physical load		0.84 (-0.54-2.22)		0.06 (-0.30-0.43)		0.28 (-0.06-0.63)	
Not present	Lower	3,190		Reference		Reference		Reference
Not present	Higher	2,547		0.91 (0.50-1.64)		0.83 (0.66-1.03)		1.10 (0.91-1.33)
Present	Lower	1,081		2.14 (1.21-3.80)		1.05 (0.80-1.37)		1.11 (0.88-1.39)
Present	Higher	1,331		2.89 (1.72-4.87)		0.93 (0.72-1.21)		1.49 (1.23-1.79)
Musculoskeletal	psychological job demands		1.34 (0.18-2.49)		-0.15 (-0.55-0.25)		0.10 (-0.26-0.45)	
Not present	Lower	3,661		Reference		Reference		Reference
Not present	Higher	2,067		0.51 (0.26-1.04)		0.95 (0.75-1.19)		0.98 (0.80-1.20)
Present	Lower	1,429		1.89 (1.17-3.05)		1.13 (0.90-1.44)		1.22 (1.02-1.47)
Present	Higher	992		2.74 (1.69-4.45)		0.93 (0.69-1.24)		1.30 (1.04-1.62)
Musculoskeletal	autonomy		0.93 (-0.64-2.50)		0.14 (-0.27-0.55)		-0.15 (-0.52-0.23)	
Not present	Higher	3,149		Reference		Reference		Reference
Not present	Lower	2,588		1.17 (0.66-2.08)		1.10 (0.89-1.36)		1.19 (0.99-1.43)
Present	Higher	1,154		2.32 (1.30-4.13)		1.00 (0.75-1.32)		1.33 (1.08-1.63)
Present	Lower	1,258		3.41 (2.01-5.81)		1.23 (0.95-1.59)		1.37 (1.11-1.68)
Musculoskeletal	social support		0.21 (-1.72-2.15)		-0.17 (-0.68-0.34)		-0.21 (-0.62-0.20)	
Not present	Higher	2,970		Reference		Reference		Reference
Not present	Lower	2,767		1.66 (0.91-3.01)		1.55 (1.25-1.93)		1.26 (1.04-1.53)
Present	Higher	1,156		3.07 (1.68-5.64)		1.16 (0.86-1.56)		1.40 (1.11-1.78)
Present	Lower	1,256		3.94 (2.21-7.02)		1.54 (1.18-2.01)		1.46 (1.18-1.80)

Note: RERI=Relative excess risk due to interaction; HR=Sub hazard ratio.; Musculoskeletal=Musculoskeletal health problem. Analyses are adjusted for age, gender and educational level.

Table C. Modification of work-related factors on the effect of psychological health problem on loss of paid employment

			Disability benefit n = 103/8,149		Unemployment n = 474/8,149		Early retirement n = 570/8,149	
		n	RERI (95% CI)	HR (95%CI)	RERI (95% CI)	HR (95%CI)	RERI (95% CI)	HR (95%CI)
Psychological	physical load		-0.93 (-6.36-4.51)		0.09 (-1.48-1.67)		0.39 (-1.04-1.82)	
Not present	Lower	4,383		Reference		Reference		Reference
Not present	Higher	3,756		1.26 (0.82-1.94)		0.84 (0.70-1.01)		1.20 (1.04-1.39)
Present	Lower	112		4.79 (1.91-11.95)		2.49 (1.55-4.01)		1.50 (0.80-2.80)
Present	Higher	122		4.12 (1.67-10.16)		2.42 (1.53-3.82)		2.09 (1.24-3.54)
Psychological	psychological job demands		2.90 (-2.08-7.87)		-0.16 (-1.81-1.50)		0.18 (-1.13-1.50)	
Not present	Lower	4,951		Reference		Reference		Reference
Not present	Higher	2,964		0.93 (0.61-1.41)		0.90 (0.74-1.09)		1.01 (0.87-1.19)
Present	Lower	139		2.63 (0.98-7.09)		2.67 (1.76-4.06)		1.57 (0.90-2.73)
Present	Higher	95		5.46 (2.42-12.34)		2.42 (1.43-4.09)		1.77 (1.00-3.12)
Psychological	autonomy		3.61 (-1.58-8.80)		-1.40 (-3.38-0.57)		0.31 (-1.06-1.68)	
Not present	Higher	4,211		Reference		Reference		Reference
Not present	Lower	3,704		1.27 (0.84-1.91)		1.16 (0.97-1.40)		1.13 (0.98-1.31)
Present	Higher	92		2.16 (0.54-8.71)		3.62 (2.28-5.76)		1.52 (0.80-2.88)
Present	Lower	142		6.04 (2.86-12.78)		2.39 (1.49-3.82)		1.96 (1.19-3.24)
Psychological	social support		3.73 (-1.57-9.02)		0.36 (-1.72-2.44)		0.45 (-0.95-1.85)	
Not present	Higher	4,032		Reference		Reference		Reference
Not present	Lower	3,883		1.37 (0.90-2.07)		1.47 (1.22-1.77)		1.17 (1.01-1.36)
Present	Higher	94		2.22 (0.54-9.14)		2.79 (1.60-4.87)		1.43 (0.70-2.92)
Present	Lower	140		6.32 (3.04-13.16)		3.62 (2.39-5.50)		2.05 (1.26-3.33)

Note: RERI=Relative excess risk due to interaction; HR=Sub hazard ratio; Psychological=Psychological health problem. Analyses are adjusted for age, gender and educational level.



Chapter 4

The role of ability, motivation, and opportunity to work in the transition from work to early retirement – Testing and optimizing the Early Retirement Model

Scandinavian Journal of Work, Environment & Health

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Abstract

Objectives

Determinants in the domains health, job characteristics, skills, and social and financial factors may influence early retirement through three central explanatory variables, namely, the ability, motivation, and opportunity to work. Based on the literature, we created the Early Retirement Model. This study aims to investigate whether data support the model and how it could be improved.

Methods

Employees aged 58–62 years (N=1862), who participated in the first three waves of the Dutch Study on Transitions in Employment, Ability and Motivation (STREAM) were included. Determinants were assessed at baseline, central explanatory variables after one year, and early retirement after two years. Structural equation modeling was applied.

Results

Testing the Early Retirement Model resulted in a model with good fit. Health, job characteristics, skills, and social and financial factors were related to the ability, motivation and/or opportunity to work (significant β range: 0.05–0.31). Lower work ability (β=-0.13) and less opportunity to work (attitude colleagues and supervisor about working until age 65: β=-0.24) predicted early retirement, whereas the motivation to work (work engagement) did not. The model could be improved by adding direct effects of three determinants on early retirement, i.e., support of colleagues and supervisor (β=0.14), positive attitude of the partner with respect to early retirement (β=0.15), and not having a partner (β=-0.13).

Conclusions

The Early Retirement Model was largely supported by the data, but could be improved. The prolongation of working life might be promoted by work-related interventions focusing on health, work ability, the social work climate, social norms on prolonged careers, and the learning environment.

Introduction

In the Netherlands, as in many other countries, the population is ageing due to the increase in life expectancy and decrease in fertility rate. This causes a pressure on the social security system and an expected shortage of workers in some sectors [1]. Therefore, there is a societal need for workers to prolong their working life. Several pension system reforms have been implemented, targeting different pillars of the pension system. The Dutch pension system consists of three pillars: the state old-age pension, supplementary pension schemes by virtue of the employer or sector (about 90% of all employees), and private savings [2]. The statutory retirement age at which persons receive their state old-age pension was for example raised from 65 years in 2012 to 67 in 2023 [3]. Besides, fiscal measures made early retirement schemes by the employer or sector financially less attractive [4].

At the time of this study, statutory retirement age was still 65 years, and most employees still had access to extensive early retirement schemes. Dutch employers did relatively little to recruit and keep older workers compared to employers in, for example, Denmark, Germany, and Italy [5]. In 2012, only 27% of employers reported it is important for staffing that employees continue working until the statutory retirement age [6]. However, legislation protects older workers against age discrimination [7].

In previous research, a variety of factors influencing (non-disability) early retirement have been identified. Two systematic literature reviews reported that self-perceived poor health predicts early retirement with risk estimates ranging from 1.28–3.36, whereas having a musculoskeletal disorder or a respiratory disease did not [8, 9]. Others found that depressive symptoms also predict early retirement [10].

Besides health, job characteristics may predict early retirement. High physical work demands, i.e., extreme bending of the neck, predicted early retirement in one study [odds ratio (OR) 6.8] [11], but no significant relationship was found in other studies (OR ranging from 0.9–1.1) [12, 13]. High work pressure increased the likelihood of early retirement [hazard ratio (HR) 1.1] (13). Employees who experienced high appreciation at work were less likely to retire early (OR=0.58). A qualitative study showed that a poor social climate, i.e., conflicts at work, influenced the process towards early retirement [14]. Besides, knowledge and skills may influence early retirement. Provision of and participation in education and training was associated with reductions in intention to retire early and actual retirement behavior [15, 16]. Persons with a higher focus on development of skills and knowledge also appeared less likely to retire [17].

Social factors may play a role in early retirement as well. Lund et al [11] found that having a partner increased the likelihood of early retirement (OR 2.8). Others added that partner support for continuing to work and retiring early predicted, respectively, retirement at older age and early retirement [17, 18]. A longitudinal study showed that pension systems offering more generous retirement options were associated with higher rates of early retirement [19].

Other studies have shown that financial aspects might be a reason for not taking early retirement [20] and that the financial possibility to retire early strongly contributed to early retirement [17]. Hence, factors in the domains of health, job characteristics, skills and knowledge, and social and financial factors may influence the transition from work to (non-disability) early retirement. As Schultz proposed, these factors can be seen as "push and pull" factors [21]. Push factors are defined as negative circumstances that lead to early retirement. Poor health or high physical work demands may fall within this category. Pull factors are defined as positive factors that attract an individual towards early retirement, such as having a partner to spend more time with [21].

Qualitative research suggested that the ability, motivation, and opportunity to work mediate the relationship between determinants in the domains health, job characteristics, skills and knowledge, and social and financial factors, on the one hand, and early retirement on the other hand [14, 22, 23]. For example, employees experiencing physically demanding work or high work pressure retired early because they felt their work demands reduced their ability to continue working [14]. Also, employees who experienced that their health problems impaired their ability to function at work, retired early [22, 23]. Conflicts at work and continuous changes in the way work needed to be done resulted in a decreased motivation to continue working, and this in turn resulted in early retirement [14]. Employees with poor health retired early because they felt pushed out by their employer, and hence, experienced a reduced opportunity to work [23].

Based on the literature, the research framework of the Dutch longitudinal Study on Transitions in Employment, Ability and Motivation (STREAM) was developed [24]. According to this framework, determinants in the domains health, job characteristics, skills and knowledge, and social and financial factors influence work productivity and transitions in employment status through three central explanatory variables (i.e., the ability, motivation, and opportunity to work). The ability to work refers to the concept of work ability [25]. The motivation to work refers to both intrinsic and extrinsic motivations to work and work values and their fulfillment. The opportunity to work refers, for example, to support at

work for continuing employment. Figure 1 shows the framework applied to early retirement (i.e., the Early Retirement Model). To our knowledge, this model is the first of its kind to integrate both determinants and mechanisms underlying early retirement.

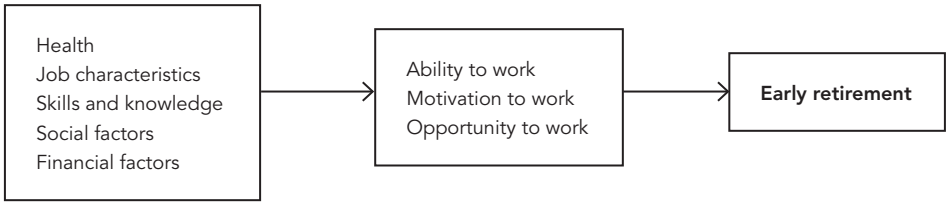

Figure 1. Early Retirement Model (based on STREAM research framework [24])

Although several studies identified determinants of early retirement, *how* determinants influence early retirement has barely been studied in quantitative research. More insight into mechanisms underlying early retirement could be helpful to develop effective interventions that promote continued employment until higher ages. Therefore, in the present study the Early Retirement Model was studied. Our first research question was: Do data support the Early Retirement Model? We hypothesized that all determinants described in Figure 1 influence the ability, motivation, and opportunity to work and that these variables in turn influence early retirement. For example, health is associated with work ability [26–28] and decreased work ability is a predictor of early retirement [29]. In addition, social support is associated with a higher motivation to work [30, 31], and a lower motivation to work is associated with early retirement [32].

Our second research question was: How could the Early Retirement Model be improved? We explored whether direct relations between determinants and early retirement improved the Early Retirement Model, e.g., if factors other than the ability, motivation, and opportunity to work underlie the relation between determinants and early retirement.

Methods

Study population

The study population consisted of STREAM participants. STREAM is a Dutch longitudinal study among 15 118 persons including employees (N=12 055), self-employed persons (N=1029), and persons without paid employment (N=2034) aged 45–64 years. The study population of STREAM was previously described in detail elsewhere [24]. In short, persons participated in the internet panel of GfK Intomart, a company specialized in market research. The study population was stratified by employment status and age. Within the age groups 45–49, 50–54, 55–59, and 60–64 years, we aimed for the population to be representative of the Dutch population with respect to gender and educational level. Participants of STREAM completed online questionnaires annually in October / November 2010 (T1), 2011 (T2), 2012 (T3), and 2013 (T4). Participants were paid to fill out a questionnaire, i.e. for every completed questionnaire, the savings balance of the participant was increased by about €3.00. In the present study, we used data of the first three waves of STREAM.

Persons were included in the present study if they were employee at baseline and after one year of follow-up and aged 58–62 years at baseline. We chose 58 years as a lower age limit since the proportion of employees that had retired early strongly increased from this age onwards after two years of follow-up. We chose 62 years at baseline as the upper-age limit because the official retirement age was 65 years in the Netherlands at the time of the study. Hence, after two years of follow-up, the participants had not yet reached the official retirement age. Persons who indicated they were (partially) work disabled or unemployed at baseline, or after one or two years of follow-up, were excluded from the present study. Previous studies suggested that different factors and processes underlie these transitions out of work [33]. Moreover, persons with missing information on one of the variables were excluded from the present study.

In total, 1862 persons were included (Figure 2). Of the employees participating at T1, 84% participated again at T2 and 75% at T3. To investigate whether loss to follow-up was selective, we compared baseline characteristics of respondents who participated in all measurements and those who did not. At baseline, persons lost to follow-up were slightly younger (59.7 versus 59.9 years, $P<0.05$), reported a slightly poorer mental health (score 52.7 versus 53.5, $P<0.05$) and higher focus on development of knowledge and skills (score 3.9 versus 3.8, $P<0.05$), more often had no partner (29% versus 23%, $P<0.05$), and more often had a partner who did not work (61% versus 56%, $P<0.05$).

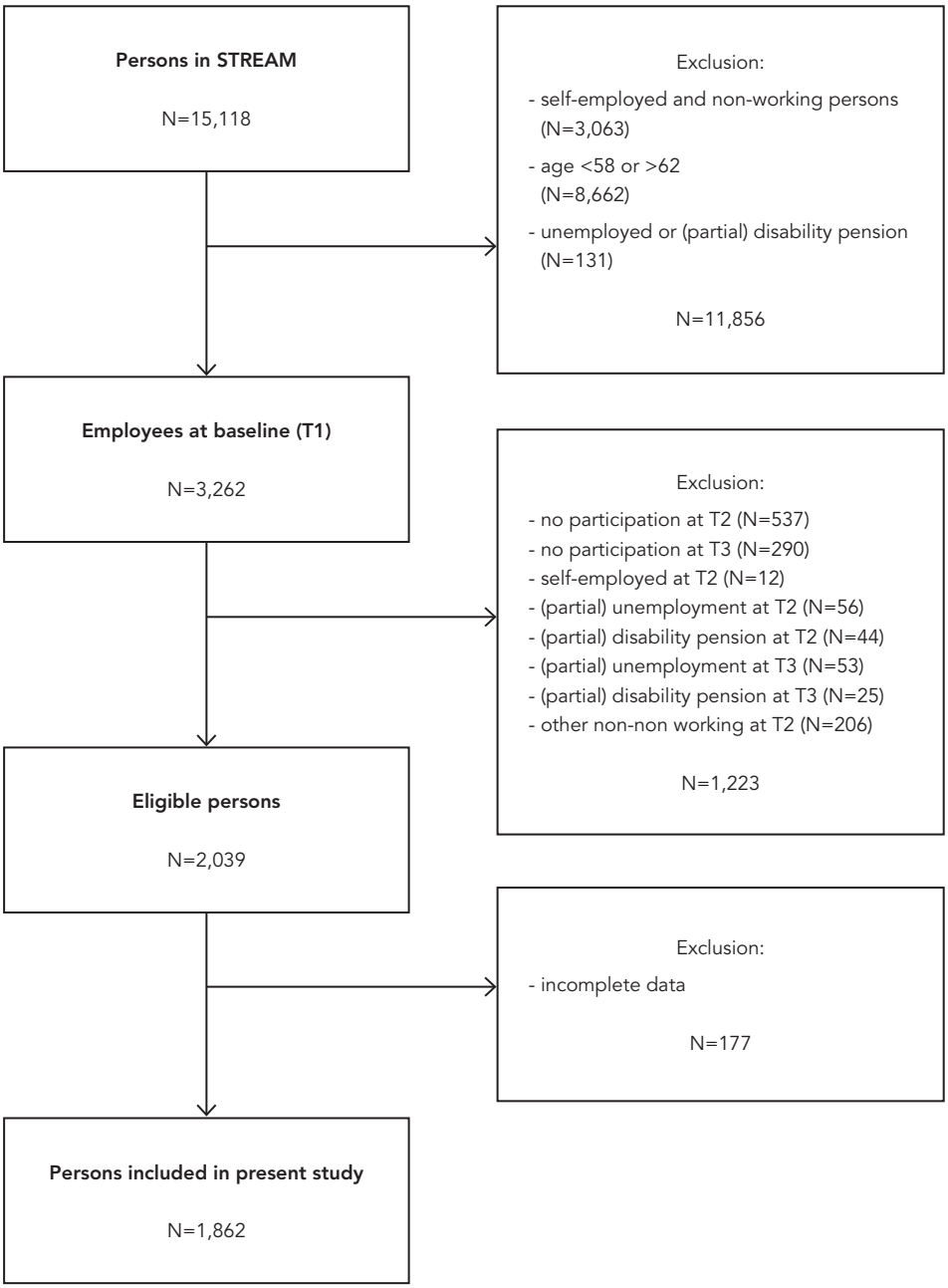

Figure 2. Study population

Measurements

Participants completed a yearly online questionnaire. Information on determinants, i.e., demographics, health, job characteristics, skills and knowledge, and social and financial factors was derived from the baseline questionnaire. Information on the ability, motivation, and opportunity to work was derived from the questionnaire after one year of follow-up. The outcome variable "early retirement" was derived from the questionnaire after two years of follow-up.

Determinants of early retirement

Information on age, gender and educational level was available. Educational level was measured using a question on the highest level of education completed with a diploma, and categorized into low (primary school, lower and intermediate secondary education, or lower vocational training), intermediate (higher secondary education, or intermediate vocational training) or high (higher vocational education or university).

Perceived health was measured using the physical component summary (PCS) and mental component summary (MCS) scales of the Short Form-12 Health Survey (version 1). The scales range from 0 (worst possible health status) to 100 (best possible health status) [34].

Physical job demands were measured using a 6-item scale on regular use of force, the use of vibrating tools, awkward postures, prolonged standing, and prolonged squatting based on the Netherlands Working Conditions Survey [35] and the Dutch Musculoskeletal Questionnaire [36] (Cronbach's alpha 0.86). The 5-point response scale to these items (e.g., "Does your job require that you stand for long periods of time?") ranged from "always" to "(almost) never". Job demands were measured with four questions derived from the Job Content Questionnaire (Cronbach's alpha 0.87). Responses to these items [e.g., "Do you have to work very fast?" [37, 38]] were on a 5-point scale ranging from "always" to "(almost) never". Social support of colleagues and the supervisor was measured using four items derived from The Copenhagen Psychosocial Questionnaire (COPSOQ) [39] (Cronbach's alpha 0.81). Employees indicated how often their colleagues or their supervisor helped or supported them and how often they were willing to listen to their work-related problems. The 5-point response scale to these items (e.g., "How often do you get help and support from your colleagues?") ranged from "always" to "almost never". Higher scores reflect higher social support from colleagues and the supervisor. In addition, participants indicated on a 4-point scale (ranging from "not present at all" to "highly present") whether appreciation was present at work [35].

In the domain of skills and knowledge, developmental proactivity was measured using a 4-item scale derived from Van Veldhoven and Dorenbosch [40]. This scale reflects the extent to which persons actively search for activities in their job that allow them to expand knowledge and skills, and the extent to which persons adapt their knowledge and skills to (future) changes in their jobs. The 5-point response scale ranged from "totally disagree" to "totally agree"; Cronbach's alpha was 0.81. A higher score reflects a higher focus on development of skills and knowledge.

With respect to social factors, participants provided information on their household composition. In the analyses, we distinguished between persons with and without a partner. If a person had a partner, the respondent reported the support of this partner with respect to early retirement with one item, i.e., "What would your partner think if you would stop working completely as soon as you get the opportunity?" [18]. Responses were on a 5-point scale, ranging from 1 ("very unpleasant") to 5 ("very pleasant"). If someone did not have a partner, we granted the mean population score on this variable to this person, following the missing value procedure by Cohen and Cohen [41]. Also, the partner's employment status was assessed. In the analyses, we distinguished between non-working and working. If someone did not have a partner, we coded this as a non-working partner for further analyses, which was corrected for by including the variable for (not) having a partner to the analysis. In addition, the following life events in the past 12 months were assessed: death of a partner, death of a close family member or friend, partner got a serious disease, and a close family member or friend got a serious disease. In the analyses, we distinguished between persons who reported at least one of these life events and persons who did not.

In the domain of financial factors, the financial situation of the household was measured using the following item: "What is the financial situation of your household now?". Responses were: "very short of money", "somewhat short of money", "some money left" and "a lot of money left". In the analyses, we considered the financial situation of the household as a continuous variable. A higher score reflects a better financial situation of the household.

Central explanatory variables

We operationalized the motivation to work as work engagement. This concept was measured by means of two dimensions of the Utrecht Work Engagement Scale (UWES) (42): "vigor" (three items) and "dedication" (three items). Vigor refers to having a lot of energy at work and mental resilience, feeling strong and fit, and not getting tired from

work very fast (eg "At my job, I feel strong and vigorous"). Dedication refers to enthusiasm, inspiration, pride, and job satisfaction (e.g., "I am enthusiastic about my job"). The dimensions vigor and dedication were combined to one scale for work engagement (Cronbach's alpha 0.93). Items could be answered on a 7-point scale (ranging from "never" to "always"), with a higher score reflecting a higher work engagement.

The ability to work was measured with the following item of the Work Ability Index: "By 'work ability', we mean the degree to which you are able to work, both physically and mentally. If you assign ten points to your work ability in the best period of your life, how many points would you assign to your work ability at this moment?" The answer scale ranged from 0–10 [25].

The opportunity to work was operationalized by means of two variables, i.e., age discrimination and attitude of colleagues and supervisor about working until age 65. Age discrimination was measured using three items derived from the Nordic Age Discrimination Scale on discrimination of older compared to younger workers with respect to opportunities for promotion, education and training, and development [43]. These items (e.g., "Elderly workers do not have equal opportunities for training during work time") could be answered on a 5-point scale (ranging from "totally disagree" to "totally agree") and Cronbach's alpha was 0.87. The attitude of colleagues and supervisor about working until age 65 was assessed using two items, i.e., "Do your colleagues think it is important that you continue working until the official retirement age?" and "Does your supervisor think it is important that you continue working until the official retirement age?" [18]. Items were answered on a 5-point scale ("very unimportant" to "very important", and "don't know"). We granted the mean population score to employees with both items missing or a "don't know" response (16.8%). If persons had missing information or "don't know" on one of the items, we granted the score on the other item to these employees. In the analyses we considered the attitude of colleagues and supervisor as a continuous variable, with a higher score reflecting a more positive attitude of colleagues and supervisor about working until age 65.

Outcome

Information on early retirement was derived from one question asking persons to indicate their employment status. In this study, early retirement referred to employees who retired before the official retirement age of 65 years. This definition excluded persons who indicated that they had retired but were still working as an employee or self-employed person.

Analysis

In order to test and improve the Early Retirement Model, structural equation modeling (SEM) was applied. SEM is in many respects similar to ordinary regression analyses. It tests the associations between one or more independent variables and one or more dependent variables. Independent variables are called exogeneous variables, and include only variables that are not influenced by other variables in the model, i.e., demographics in our model. Dependent variables are called endogeneous variables, and include the outcome variable early retirement, but also the determinants and central explanatory variables as they all may be influenced by exogenous variables and / or by other endogenous variables. The big advantage of SEM above ordinary regression analyses is that it deals simultaneously with multiple relationships between exogeneous variables and endogeneous variables. The interpretation of the findings is very similar to ordinary linear regression analyses. Structural equation modeling provides standardized betas for the relations between pairs of variables, that usually vary from -1, which means perfect negative association, through 0, which means no association at all, to +1, which means a perfect positive association. When performing SEM a researcher specifies a model about expected relations between several variables. Since we only used observed variables, a path model was constructed.

We used a robust maximum likelihood estimation, with correction of the standard errors of the estimates for non-normal distributions by using the asymptotic covariance matrix (44). First, we tested the Early Retirement Model. The hypothesized pathways within our model are presented in Figure 3. We specified a model with relations between determinants (T1) and central explanatory variables (T2), and between central explanatory variables (T2) and early retirement (T3). We assumed no direct relations between determinants and early retirement. In these analyses, we controlled for the demographics age, gender, and educational level as assessed at T1. Secondly, we improved the Early Retirement Model. This step was explorative, and aimed to investigate whether direct relations between determinants and early retirement would contribute to the model. Improving the model took place in three steps: (i) we added direct relations between determinants and early retirement to the Early Retirement Model; (ii) we removed relations between determinants and central explanatory variables, determinants and early retirement, and central explanatory variables and early retirement with $P>0.20$ all at once; and (iii) we removed all relations with $P>0.05$ one-by-one by means of backward selection. In the final model we only kept significant relations ($P<0.05$).

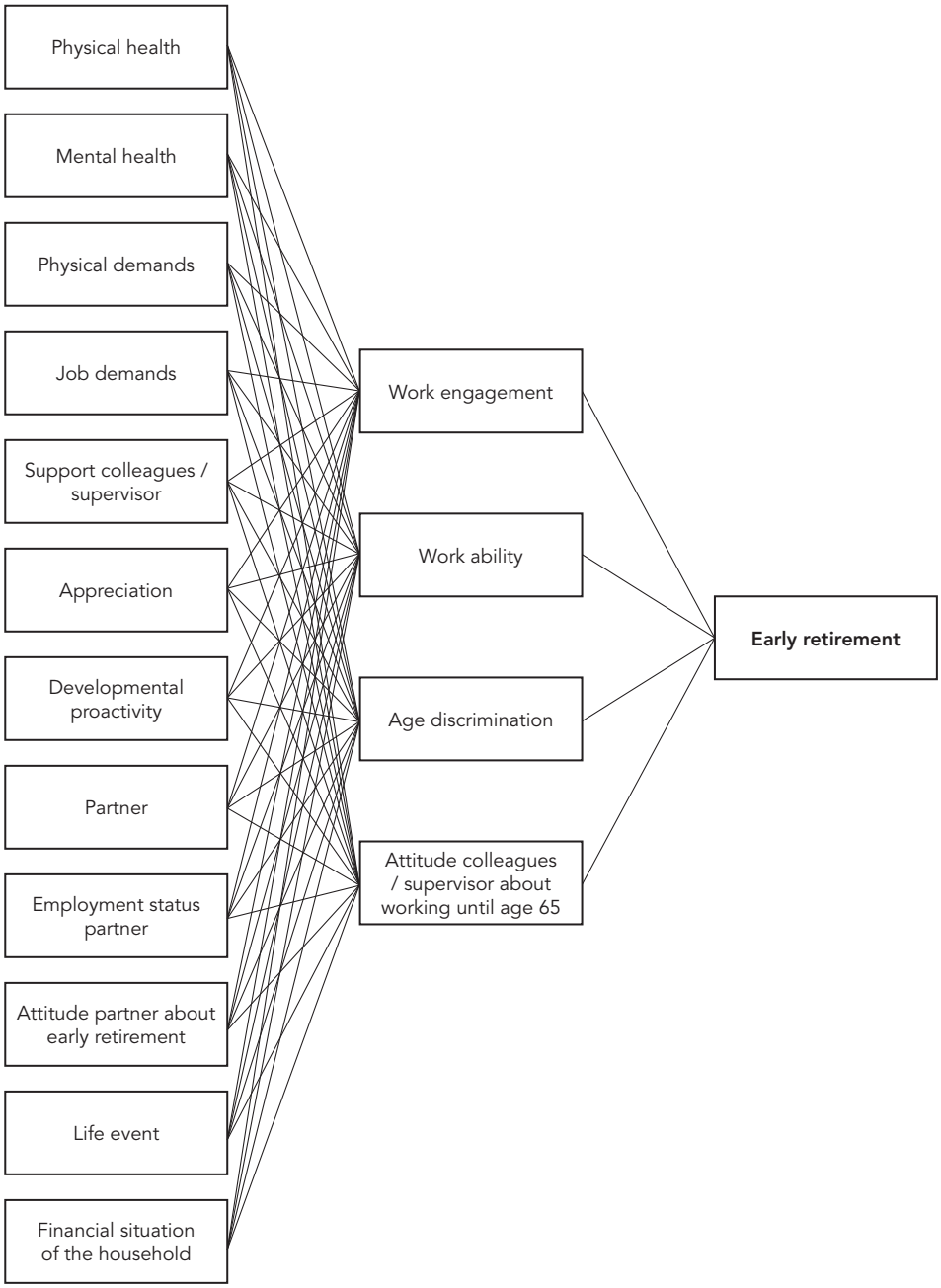

Figure 3. The Early Retirement Model with predicted relationships

Model fit was assessed using four different fit indices, based on recommendations by Hooper et al [45] and Hu and Bentler [46]: model fit was evaluated with X^2, root mean square error of approximation (RMSEA), standardized root mean square residual (SRMR), and comparative fit index (CFI). Model fit was considered to be good if: RMSEA<0.05, SRMR<0.05, and CFI≥0.90.

We used SPSS (IBM Corp, Armonk, NY, USA) for calculating descriptive statistics, and preparing a dataset that could be used in LISREL and PRELIS. LISREL is an application for structural equation modeling. PRELIS is a related application that, among others, computes covariance matrices for the purpose of analyses in LISREL. PRELIS was used to calculate a covariance matrix (relations between all variables) and an asymptotic covariance matrix for the purpose of analyses in LISREL. Structural equation modeling was done in LISREL.

Ethical issues

The Medical Ethical Committee of the VU University Medical Center Amsterdam declared that the Medical Research Involving Human Subjects Act does not apply to STREAM. The Medical Ethical Committee had no objection to the execution of this study. In the information for participants that accompanied the online questionnaire, it was emphasized that the privacy of participants was guaranteed, all answers to the questions were treated confidentially, and all data were stored in secured computer systems.

Results

Table 1 shows the characteristics of the study population. Employees with the following professions were included: craft and industrial professions (5.7%), transport professions (4.3%), office clerks (16.4%), commercial professions (5.7%), service professions (8.3%), professions in health care and assistance (14.0%), teacher/ lecturer (10.1%), specialists (8.6%), agricultural workers (0.6%), executive staff (9.2%), and other professions (17.0%). In total 11.9% of the employees made the transition from work to early retirement between T2 and T3 (N=221). In general, the correlation between determinants was small to moderate (0.01–0.23). A stronger association was found between appreciation at work and social support of colleagues and supervisor (Pearson's r=0.43). The correlation between central explanatory variables was small to moderate (Pearson's r range: 0.13–0.36).

Table 1. Descriptives of the study population (N=1,862) [SD=standard deviation]

Characteristics	Frequency (%)	Mean	SD
Age (58-62)	-	59.7	1.3
Gender (female)	41	-	-
Educational level			
Low	29	-	-
Intermediate	34	-	-
High	37	-	-
Physical health (1-100) [a]	-	51.8	7.3
Mental health (1-100) [a]	-	53.8	7.1
Physical demands (1-5) [a]	-	1.7	0.8
Job demands (1-5) [a]	-	3.0	0.8
Support from colleagues / supervisor (1-5) [a]	-	3.5	0.8
Appreciation (1-4) [a]	-	2.7	0.8
Developmental proactivity (1-5) [a]	-	3.9	0.6
Partner (no) [b]	24	-	-
Partner's attitude to early retirement (1-5) [c]	-	3.4	0.9
Employment status partner (working) [d]	44	-	-
Life event (yes) [e]	34	-	-
Financial situation of the household (1-5) [a]	-	3.6	0.9
Work engagement (1-7) [a]	-	4.5	1.2
Work ability (0-10) [a]	-	7.9	1.5
Age discrimination (1-5) [a]	-	2.6	0.8
Attitude colleagues and supervisor about working until age 65 (1-5) [c]	-	3.2	0.8
Early retirement (yes)	12	-	-

Note: [a] higher score reflects better physical and mental health, higher physical demands, higher job demands, more appreciation at work, higher focus on development of knowledge and skills, better financial situation, higher work engagement, higher work ability, more age discrimination; [b] higher score reflects having no partner; [c] higher score reflects more positive attitude of partner with respect to early retirement, more positive attitude of colleagues and supervisor about working until age 65; [d] higher score reflects the partner has a paid job; [e] higher score reflects having experienced a life event

Test of Early Retirement Model

Testing the Early Retirement Model resulted in a model with an overall fit (X^2) of 180.96 with 12 degrees of freedom. The RMSEA, SRMR, and CFI measures (0.031, 0.018, and 0.97, respectively) indicated a good fit. Therefore, the Early Retirement Model was considered to be a good model. The explained variance of early retirement in this model was r^2=0.19. Table 2 shows that better physical and mental health were related to higher work engagement, higher work ability, less age discrimination, and a positive attitude of colleagues and supervisor about working until age 65. Higher physical demands were

related to lower work ability and a less positive attitude of colleagues and supervisor about working until age 65. Higher job demands were related to higher work engagement, more age discrimination, and a positive attitude of colleagues and supervisor about working until age 65. Social support of colleagues and supervisor was related to higher work engagement and less age discrimination. More appreciation at work was related to higher work engagement, less age discrimination, and a positive attitude of colleagues and supervisor about working until age 65. A higher focus on development of knowledge and skills was related to higher work engagement, higher work ability, more age discrimination and a positive attitude of colleagues and supervisor about working until age 65. A positive attitude of the partner with respect to early retirement was related to lower work ability, more age discrimination, and a less positive attitude of colleagues and supervisor about working until age 65. A better financial situation of the household was only significantly related to less age discrimination at work. In addition, Table 2 shows that employees with a higher work ability and a positive attitude of colleagues and supervisor about working until 65 less often retired early. Work engagement and age discrimination were not related to early retirement.

Improved model

Improving the Early Retirement Model resulted in an overall fit (X^2) of 93.72 with 39 degrees of freedom. The RMSEA, SRMR, and CFI measures were 0.0027, 0.012, and 0.99 respectively, and hence, indicated a good fit. Therefore, the improved model was considered to be a good model. The explained variance of early retirement in this model was r^2=0.25. Table 3 shows that the Early Retirement Model could be improved by adding direct effects of determinants on the outcome early retirement. Persons who reported higher support of colleagues and supervisor and persons who reported that their partner had a positive attitude with respect to early retirement were more likely to retire early, whereas persons with no partner were less likely to retire early. In the improved model, physical health was no longer related to the attitude of colleagues and supervisor about working until age 65, and developmental proactivity and financial situation of the household were no longer related to age discrimination. Having experienced a life event was significantly related to work engagement in the improved model, whereas this was not the case when testing the Early Retirement Model. The relations between all other variables in the improved model remained similar to those in the Early Retirement Model (maximum change in standardized β=0.02).

Table 2. LISREL analysis testing the Early Retirement Model, standardized betas

			Central explanatory variables T2		Outcome T3
	Work engagement	Work ability	Age discrimination	Attitude colleagues / supervisor about working until age 65	Early retirement
Determinants T1					
Physical health[a]	**0.11**	**0.31**	**-0.09**	**0.05**	-
Mental health[a]	**0.27**	**0.24**	**-0.10**	**0.06**	-
Physical demands[a]	0.03	**-0.05**	0.03	**-0.05**	-
Job demands[a]	**0.06**	0.04	**0.07**	**0.06**	-
Support from colleagues / supervisor[a]	**0.06**	0.00	**-0.20**	0.03	-
Appreciation[a]	**0.17**	0.03	**-0.19**	**0.15**	-
Developmental proactivity[a]	**0.25**	**0.08**	**0.05**	**0.11**	-
Partner[b]	-0.03	0.01	0.01	0.03	-
Partner's attitude to early retirement[c]	-0.03	**-0.07**	**0.06**	**-0.09**	-
Employment status partner[d]	-0.02	-0.03	0.04	-0.03	-
Life event[e]	0.04	0.01	0.03	**0.05**	-
Financial situation of the household[a]	0.00	0.02	**-0.04**	0.00	-
Central explanatory variables T2					
Work engagement[a]	-	-	-	-	0.02
Work ability[a]	-	-	-	-	**-0.13**
Age discrimination[a]	-	-	-	-	-0.04
Attitude colleagues / supervisor about working until age 65[c]	-	-	-	-	**-0.24**

Note: [a] higher score reflects better physical and mental health, higher physical demands, higher job demands, more appreciation at work, higher focus on development of knowledge and skills, better financial situation, higher work engagement, higher work ability, more age discrimination; [b] higher score reflects having no partner; [c] higher score reflects more positive attitude of partner with respect to early retirement, more positive attitude of colleagues and supervisor about working until age 65; [d] higher score reflects the partner has a paid job; [e] higher score reflects having experienced a life event, associations with $p<0.05$ in bold

Table 3. Improved model, standardized betas

			Central explanatory variables T2		Outcome T3
	Work engagement	Work ability	Age discrimination	Attitude colleagues / supervisor about working until age 65	Early retirement
Determinants T1					
Physical health[a]	0.11	0.31	-0.09	-	-
Mental health[a]	0.27	0.24	-0.10	0.05	-
Physical demands[a]	-	-0.05	-	-0.06	-
Job demands[a]	0.05	-	0.09	0.05	-
Support from colleagues / supervisor[a]	0.05	-	-0.19	-	0.14
Appreciation[a]	0.17	-	-0.18	0.16	-
Developmental proactivity[a]	0.26	0.09	-	0.13	-
Partner[b]	-	-	-	-	-0.13
Partner's attitude to early retirement[c]	-	-0.05	0.05	-0.08	0.15
Employment status partner[d]	-	-	-	-	-
Life event[e]	0.04	-	-	0.05	-
Financial situation of the household[a]	-	-	-	-	-
Central explanatory variables T2					
Work engagement[a]	-	-	-	-	-
Work ability[a]	-	-	-	-	-0.12
Age discrimination[a]	-	-	-	-	-
Attitude colleagues / supervisor about working until age 65[c]	-	-	-	-	-0.23

Note: [a] higher score reflects better physical and mental health, higher physical demands, higher job demands, more appreciation at work, higher focus on development of knowledge and skills, better financial situation, higher work-related engagement, higher work ability, more age discrimination; [b] higher score reflects having no partner; [c] higher score reflects more positive attitude of partner with respect to early retirement, more positive attitude of colleagues and supervisor about working until age 65; [d] higher score reflects the partner has a paid job; [e] higher score reflects having experienced a life event, only associations with $p<0.05$ are presented

Discussion

The Early Retirement Model was largely supported by the data. Determinants in the domains health (poor physical health and poor mental health), job characteristics (high physical demands, low job demands, and low appreciation), skills and knowledge (low developmental proactivity), and social factors (positive attitude of the partner with respect to early retirement, and life events) influenced the transition from work to early retirement via lower work ability and less opportunity to work (more negative attitude of colleagues and supervisor about working until age 65). Improving the Early Retirement Model showed that high social support of colleagues and supervisor and a positive attitude of the partner with respect to early retirement also influenced early retirement directly, and that having a partner was only directly related to early retirement.

The finding that work ability and the opportunity to work mediate the relation between health, job characteristics, skills and knowledge, and social factors is in line with previous qualitative research [14, 22, 23]. Unexpectedly, work engagement did not mediate the relation between these determinants and early retirement, although previous qualitative research suggested this [14]. In addition, a Dutch study showed that persons who were not willing to work until age 65 were more likely to retire early [47]. It may be that we adopted a too limited operationalization of the motivation to work in the present study by focusing on work engagement. Actual work values and work motives may play a role as well. Besides, the motivation *not* to work, i.e., to do things outside of work, may also need to be included in models and analyses. It might be that determinants, such as having a partner, attitude of the partner with respect to early retirement, and health, influence early retirement via a desire to enjoy life or spend more time with family [14] instead of the motivation to work. Although the domestic domain is also included in various other models that address early retirement [48, 49], the motivation to do things outside of work has not previously been included. Therefore, we recommend that future research investigates the mediating role of the motivation to do things outside work in addition to the ability, motivation and opportunity to work.

Previous research showed that a better psychosocial work environment, i.e., more appreciation at work, decreased the likelihood of early retirement [17]. However, in the present study, persons who reported higher social support of colleagues and supervisor were more likely to retire early. It may be that persons experience more support at work in case of important life events, e.g., when approaching retirement. Therefore, we

recommend future research to study within one dataset whether the strength of the association between support of colleagues and supervisor and early retirement depends on the period of time between the assessment of these variables. Another explanation could be that our measure on social support does not reflect how supportive a working environment is, but reflects support to persons experiencing life events that result in early retirement, e.g., disease of their partner. Besides, in contradiction with previous research [17, 20, 50], the financial situation of the household was not related to early retirement, neither directly, nor indirectly. These contradictory findings might be explained by differences in the follow-up period and differences in the aspects of the financial situation that were assessed. We tested the latter possibility by post-hoc analyses in which we included the financial possibility to retire early ("Could you financially afford to stop working before the official retirement age?") [17] instead of the financial situation of the household. In line with our previous study [17], the financial possibility to retire had a direct influence on early retirement. Hence, different financial characteristics influence early retirement differently. Future research needs to further clarify which aspects of the financial domain are of importance with respect to early retirement.

Favorable early retirement schemes were still widely accessible in the Netherlands at the time of data collection, whereas labor market opportunities were limited. These circumstances may have influenced our findings. Favorable retirement arrangements will decline in the near future, e.g., due to the official retirement age increasing from 65 years in 2012 to 67 years in 2023 [3]. At the same time, due to the extensive public debate on the need to prolong working life, the social norm at work may become more favorable with respect to prolonged careers. In the present study, this importantly contributed to early retirement. Hence, we expect that increasing job opportunities for older workers may strongly contribute to the prolongation of working life.

A strength of the present study is that we addressed not only determinants of early retirement but also mediating variables and, hence, underlying mechanisms. In addition, determinants, mediating variables and early retirement were measured at separate moments in time in a longitudinal study. Another strength is that variables frequently studied in different areas of expertise, i.e., health, job characteristics, skills and knowledge, social and financial factors, work ability, motivation and opportunity to work, were incorporated in one study. However, this study also has limitations. First, the results are likely to be influenced by the operationalization of the variables in this study. As already mentioned, this may be true for the operationalization of the motivation to work and

financial factors. Moreover, the operationalization of the opportunity to work by means of age discrimination and the attitude of colleagues and supervisor about working until age 65 reflect the opportunities to work within the work organization. This could be supplemented with labor market opportunities in general, which may also play an important role in early retirement [14]. A second limitation is the relatively short follow-up period of two years in the present study. Moreover, the time periods between determinants and central explanatory variables and between central explanatory variables and early retirement were fixed to one year. To capture the complete pre-retirement process, a longer follow-up period may be needed. Besides, future research needs to shed light on the time windows of different underlying mechanisms, e.g., from poor health to reduced work ability, to early retirement. Third, our study population participated in an internet panel. Although 97% of the persons aged 12–65 and 74% of those aged 65–75 years use the internet in the Netherlands [51], generalizability of our findings to certain vulnerable groups may be limited, e.g., illiterate persons, persons who do not master the Dutch language and those without internet access. Fourth, we found some differences in baseline characteristics between participants and persons lost to follow-up. Although these differences were small, bias due to non-response at follow-up cannot be ruled out. Fifth, the standardized betas in the present study are relatively small. However, we believe they are meaningful. SEM deals simultaneously with multiple relationships between several variables, and hence, all associations are corrected for overlap with other variables. Taking that into account, we think the standardized betas in our study are of moderate size. Sixth, in our SEM analysis a large number of associations was estimated simultaneously. As the risk of obtaining a false significant association is α=0.05 for each individual association, it is possible that some of our significant associations were false positive, as in all analyses with multiple parameters tested. Finally, differences between subgroups of employees, e.g., different occupations, could not be presented due to a lack of statistical power. However, we did perform an additional multi-group analysis to examine the Early Retirement Model among employees with different educational levels. Relations between variables appeared roughly similar among employees with low-, intermediate- and high-education levels. We recommend future studies with sufficient statistical power to investigate differences between other subgroups of employees.

As previously described, future research is needed to improve the operationalization of the motivation and opportunity to work, study persons for a longer period of time, and investigate differences among subgroups of workers. Besides, it would be of interest

to study additional determinants in the Early Retirement Model. For example, we recommend future research to include information on (the availability of) early retirement schemes and private savings for retirement in order to gain insight in their impact on early retirement. In addition, within the domain of social factors, the influence of having co-resident children and providing informal care could be addressed. Finally, we recommend future research to study mechanisms underlying early retirement in different countries to investigate whether similar determinants and mechanisms play a role in countries with different pension systems.

In conclusion, the Early Retirement Model was largely supported by the data, but could be further improved. Work ability and the opportunity to work provided within the work organization (i.e., the social norm with respect to early retirement) mediated the relation between health, job characteristics, skills and knowledge, and social factors, on the one hand, and early retirement on the other hand. Hence, increasing work ability and job opportunities within work organizations may contribute to the prolongation of working life. In the present study, these mediating variables were importantly influenced by health, appreciation at work, and developmental proactivity. Therefore, workplace health promotion, interventions improving the social climate at work, and designing jobs in such a way that employees are continuously stimulated to expand their skills and knowledge and adapt to changes in their work may support employees to work until older age. It should be noted that factors in the domestic domain, i.e., the attitude of the partner with respect to early retirement and life events, also contributed to early retirement. These are factors that cannot be influenced directly by workplace interventions. Finally, the results of the present study indicate that various determinants and mechanisms underlie early retirement, and hence, that policies, regulations and interventions that aim to prolong working life need to cover a diversity of factors and need to be tailored to the individual employee.

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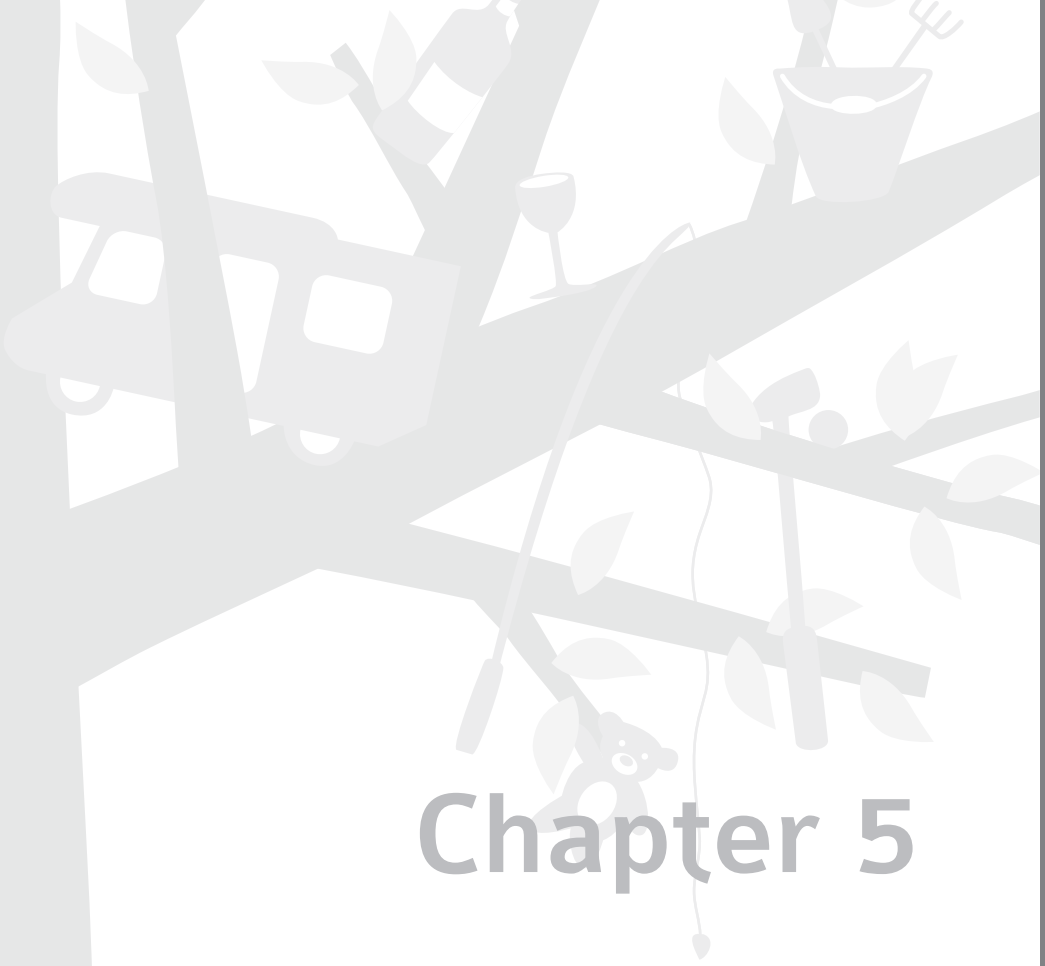

Chapter 5

‘All those things together made me retire’: Qualitative study on early retirement among Dutch employees

BMC Public Health

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Abstract

Background

Due to the ageing of the population, there is a societal need for workers to extend their working lives. One way in which this can be achieved is by employees refraining from retiring early. Factors predicting early retirement have been identified in quantitative research, but little is known on why and how these factors influence early retirement. The present qualitative study investigated which non-health related factors influence early retirement, and why and how these factors influence early retirement.

Methods

A qualitative study among 30 Dutch employees (60–64 years) who retired early, i.e. before the age of 65, performed by means of face-to-face interviews. Participants were selected from the cohort Study on Transitions in Employment, Ability and Motivation (STREAM).

Results

For most employees, a combination of factors played a role in the transition from work to early retirement, and the specific factors involved differed between individuals. Participants reported various factors that pushed towards early retirement ("push factors"), including organizational changes at work, conflicts at work, high work pressure, high physical job demands, and insufficient use of their skills and knowledge by others in the organization. Factors attracting towards early retirement ("pull factors") included the wish to do other things outside of work, enjoy life, have more flexibility, spend more time with a spouse or grandchildren, and care for others. In addition, the financial opportunity to retire early played an important role. Factors influenced early retirement via changes in the motivation, ability and opportunity to continue working or retire early.

Conclusion

To support the prolongation of working life, it seems important to improve the fit between the physical and psychosocial job characteristics on the one hand, and the abilities and wishes of the employee on the other hand. Alongside improvements in the work environment that enable and motivate employees to prolong their careers, a continuous dialogue between the employer and employee on the (future) person-job fit and tailored interventions might be helpful.

Background

Similar to other European countries, the average retirement age has increased from 60.9 years in 2001 to 63.1 years in 2011 in the Netherlands [1]. Despite this increase, many workers still retire before the official retirement age of 65 years. Currently, the general population is ageing because of decreasing birth rates [2] and increasing longevity [3]. Moreover, the baby boom generation has started to leave work. The increasing ratio of retired persons to the working age population puts pressure on the social security systems in many European countries [4]. For example, in the Netherlands it is estimated that the costs of the General Old Age Pension Act (AOW) will increase from the current 27 billion euros to 47 billion euros in 2040 [5]. Thus, there is a societal need for workers to extend working life.

A transition from work to (non-disability) retirement before the age of 65, i.e. early retirement, can be seen as influenced by so-called push and pull factors [6]. Push factors are defined as negative circumstances that lead to early retirement, such as poor health or lack of job satisfaction [6]. In a recent review of longitudinal studies on determinants of early retirement, poor health and high physical and psychosocial work demands were identified as risk factors for early retirement [7]. These findings from quantitative studies were confirmed in focus groups with employees working in the printing industry [7]. Pull factors are defined as positive factors that attract an individual towards early retirement, such as the desire to spend more time on volunteer work or leisure time activities [6]. In a study conducted among waste collectors and municipal workers, having a partner also increased the likelihood of retiring early [8]. In addition to push and pull factors, the employees' skills and knowledge may influence the transition to early retirement. Provision of and participation in education and training has been associated with a reduced intention to retire early and actual retirement behavior [9,10]. Moreover, in previous research it has been shown that pension systems offering generous early retirement options encourage early departure from the labor market [11]. Hence, health, work-related factors, skills and knowledge, social factors, and financial factors may influence the transition from work to early retirement.

Despite the current public debate on extending working life, relatively few studies have been performed that explore the factors that influence transitions to early retirement. As a consequence, some push or pull factors may have been overlooked. This is especially true since many of the available studies did not investigate early retirement, but the

intention to retire early [7,12,13]. Factors that influence the intention to retire may differ from those that influence actual retirement [14]. In addition, although a variety of factors that predict early retirement have been identified in quantitative studies, little is known on why these factors push or pull individuals to retire early and how they influence the retirement process. This knowledge may contribute to the development of interventions that aim to prolong working life and thus may contribute solutions to the challenges posed by our ageing population. Therefore, the present study aimed to explore reasons for retirement before the age of 65 in Dutch employees. Specifically, we investigated which non-health related factors influence early retirement, and why and how these factors influence early retirement.

Methods

Design and study population

The present study was part of a larger qualitative investigation on why persons retire early. The role of health in early retirement was extensively described elsewhere [15].

Face-to-face semi-structured interviews with Dutch employees who retired early were conducted. Early retirement referred to retirement before the official retirement age of 65. Persons who left the workforce due to (partially) compensated work disability or unemployment were excluded, since previous research suggests that different factors underlie these transitions out of work [16].

Participants were selected from the Study on Transitions in Employment, Ability and Motivation (STREAM). The aim of this prospective cohort study is to identify under which circumstances persons aged 45 to 64 years prolong their working life, while maintaining good health and good work productivity [17]. Persons were eligible for the present study if (a) they had given permission in the STREAM 2010 questionnaire to be contacted for additional research, (b) had a paid job as an employee at the time of STREAM 2010, (c) had retired before the age of 65 in the last 12 months in 2011, or were going to retire early in the next six months and already formally arranged this with their employer when contacted about the interview, and (d) were aged 58 to 64 years at the time of the interview.

To ensure heterogeneity in the study population, participants were purposefully selected [18] based on age, educational level, and their intention to retire assessed in the

STREAM 2010 questionnaire. We selected on age, since different reasons might underlie retirement in those who retired at a relatively young age (e.g. 59 years) compared to those who retired at a higher age (e.g. 64 years). Similarly, educational differences in reasons of early retirement may exist, e.g. due to exposure to different physical and psychosocial working conditions. The intention to retire was assessed with one question in the STREAM 2010 questionnaire, i.e. 'Are you planning to stop working in the next 12 months?'. This item could be answered on a 5-point Likert scale ranging from 'certainly not' to 'certainly'. Persons who answered 'maybe', 'probably' or 'certainly' were eligible for the present study. We selected purposefully on the intention to retire to assure that both persons in which longstanding processes and persons in which more sudden events influenced early retirement were included.

In total 620 of the 15,118 persons included in STREAM gave permission to be contacted for additional research, were employed in 2010, and were aged 58 to 64 at the time of the interview (Figure 1). After purposeful sampling on age, education level, and intention to retire in 2010, 221 persons were contacted by telephone between July 2011 and October 2011 to check whether they met the inclusion criteria. The aim and content of the interview study was explained and their willingness to participate in a face-to-face interview was checked. Eighty-eight persons did not meet the selection criteria. They had either not retired yet, or retired early due to compensated work disability. In total 91 persons could not be reached by telephone. These persons were called at least once again after one or two weeks, but could still not be reached. Twelve persons were unwilling to participate. Reasons were personal circumstances (N=4), no time (N=2), unwillingness to talk about work history and early retirement (N=2), and miscellaneous reasons (N=4). Participants were enrolled in the present study by clusters of two to six persons at the same time. In total 30 persons who were eligible and gave permission for an interview were included.

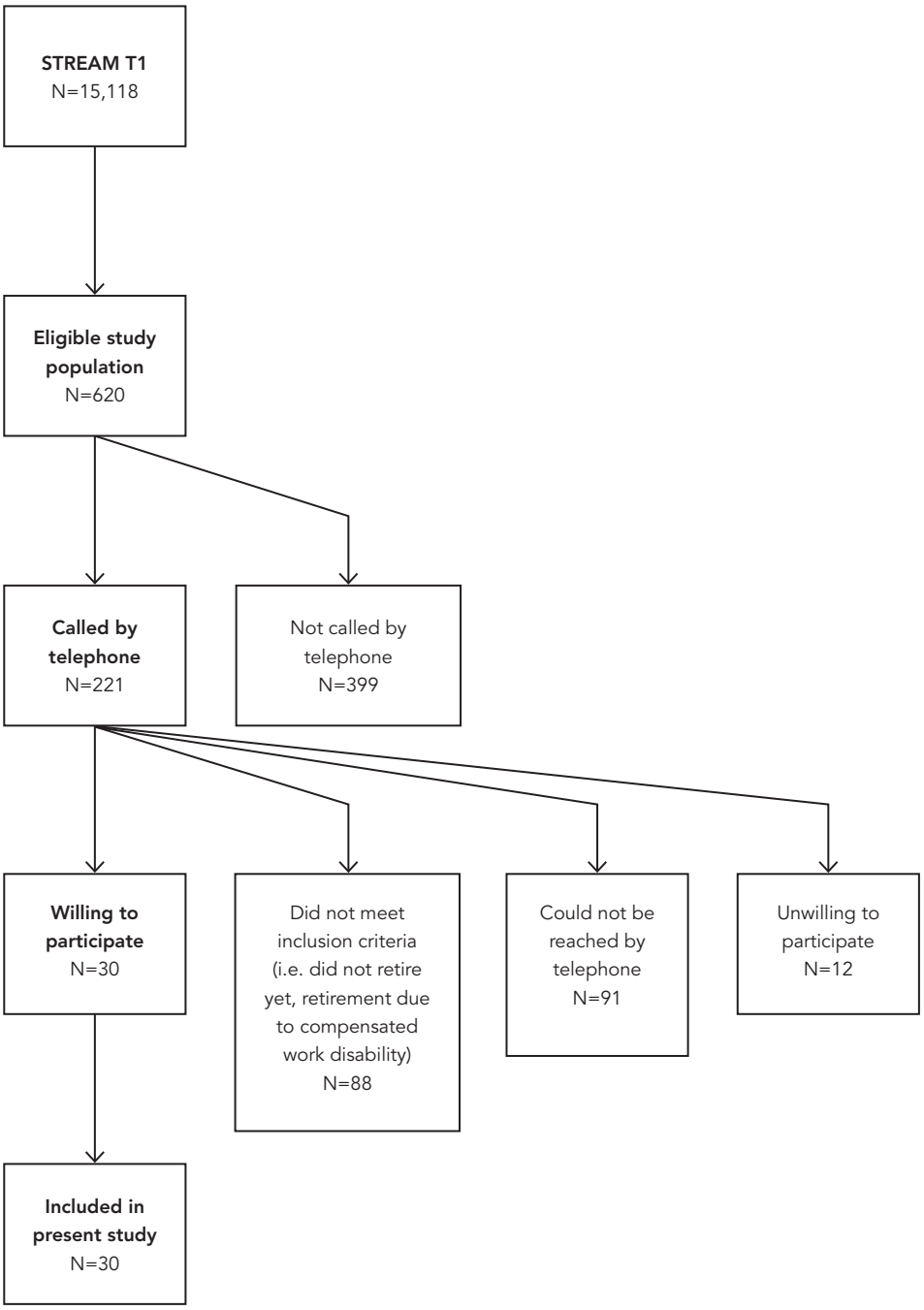

Figure 1. Study population

Interview guide

Prior to the beginning of the study, a comprehensive semi-structured interview guide was created based on the life course perspective [19] and determinants of early retirement according to the literature (Annex 1). The life course perspective considers transitions from work to retirement as a part of the life course. The processes leading to the transition are influenced by someone's individual history and characteristics, and the context of the transition. The life course perspective has previously been used to understand how persons experience (the transition to) retirement [19]. According to the literature, transitions towards early retirement may be influenced by determinants in the following domains: health, work-related factors, skills and knowledge, social factors, and financial factors [6,7,8,9,10,11]. The interview guide was tested by means of three role plays of the interviewer with other researchers involved in this study. Subsequently, more examples of in-depth follow-up questions were include in the interview guide.

Interview procedure

The interviews were carried out by the second author (AdW). The interviewer was familiar with interview techniques, such as clarification, paraphrasing, and summarizing. During most of the interviews, a second interviewer was present who took notes (KR or DR). The interviewers did not have a prior relationship with any of the participants. The interviews were carried out in participants' homes throughout the Netherlands, except for one person, who, upon request, was interviewed at work. Interviews were digitally recorded. All participants agreed to this procedure. Before the start of the interview, the interviewer introduced herself, and again explained the aim and content of the interview and subsequent study. Anonymity and confidentiality were assured. Hereafter, open-ended questions were postulated, pertaining to six topics (Appendix 1). The first part was aimed at getting acquainted with the interviewee and focused on the personal and home situation. The second part was about the person's work history and job-job transitions. Together with the participant, the interviewer created a timeline of the interviewee's work history and other important (positive or negative) events, such as education, marriage, divorce, birth, death of family or friends, and periods of illness. The third part focused on the reasons why an interviewee had retired early, or had made arrangements to do so. Understanding of these reasons was gained through in-depth follow-up questions. The fourth part focused on the timing of the transition from work to early retirement. The fifth part focused on circumstances under which the interviewee would have prolonged

his or her working life. The sixth part of the interview concentrated on satisfaction with the transition from work to early retirement. In addition, participants described how they perceived their life in the coming years.

On average interviews lasted 80 min (range: 40-156 min). During 9 interviews non-participants were present (spouse (N=7), spouse and daughter (N=1), and granddaughter (N=1)). In one interview the spouse helped the respondent come up with ideas about what was asked. In two interviews the spouse interfered substantially. Issues brought up by these spouses were interpreted with caution in the analysis.

Analysis

Analysis of the interviews took place in four steps and in Dutch. First, the interviews were transcribed verbatim. All interviews were listened to at least twice and compared with the transcriptions to check accuracy. Second, 10 interviews were independently summarized using transcriptions and field notes, and were open-coded by AdW and KR. The aim of this step was to understand why and how the transition from work to early retirement had taken place for these persons. Afterwards, AdW and KR discussed summaries, timelines, and codes extensively until consensus was reached about the factors involved in early retirement, and why and how these factors influenced early retirement. If AdW and KR could not reach consensus by comparing their arguments, a third person was consulted and decisive (MW or GG). In the third step, the remaining 20 interviews were summarized, and open-coded by either AdW or KR. Summaries and coded interviews were cross-checked, and AdW and KR regularly met to discuss findings. During these meetings, data saturation was monitored. No new information on reasons of early retirement was derived from the last cluster of five interviews, i.e. from interview 26 to 30. In the fourth step the aim was to investigate how and why the transition to early retirement had taken place in more detail. KR extracted the part in all interview transcriptions in which the transition to early retirement was addressed, and open coded these parts in more detail. These detailed codes were discussed with AdW, and clustered deductively into coding families according to the domains identified in the literature (i.e. health, work-related factors, skills and knowledge, social factors and financial factors) [20]. If codes did not fit into these existing coding families, new coding families were defined, i.e. inductive coding [20].

Parallel to the four steps described above, AdW and KR regularly met to compare interviews on a thematic level. Leading questions during these discussions were: (a) what similarities can be identified between interviewees' experiences?, and (b) why did certain

processes take place in some persons, but not in others? To enhance robustness of the findings, main results were also discussed with other project members (MW and GG). In order to manage the data of the interviews, the computer package for qualitative analysis Atlas.ti 6.1.17 [21] was used.

Ethical considerations

The Medical Ethics Committee of the VU University Medical Center Amsterdam declared that no ethical approval was needed to conduct this study. Informed consent was obtained verbally from all participants during the telephone conversation in which persons were invited for the interview.

Results

Characteristics of the study population are reported in Table 1. The participants' jobs before retirement varied and included both blue and white collar jobs, such as mechanic, manager, and teacher. Different reasons for early retirement were reported, namely factors that pushed employees out of work to early retirement, factors that pulled employees towards early retirement, and financial factors. An overview of these factors is presented in Figure 2. In most persons an interplay of factors played a role.

Table 1. Characteristics of the study population (N=30)

Characteristic			
Gender	Women	N%	6 (20%)
Age (years)		Median (range)	62 (60-64)
Retirement age		Median (range)	61 (60-64)
Educational level	Low	N (%)	12 (40%)
	Moderate	N (%)	4 (13%)
	High	N (%)	14 (47%

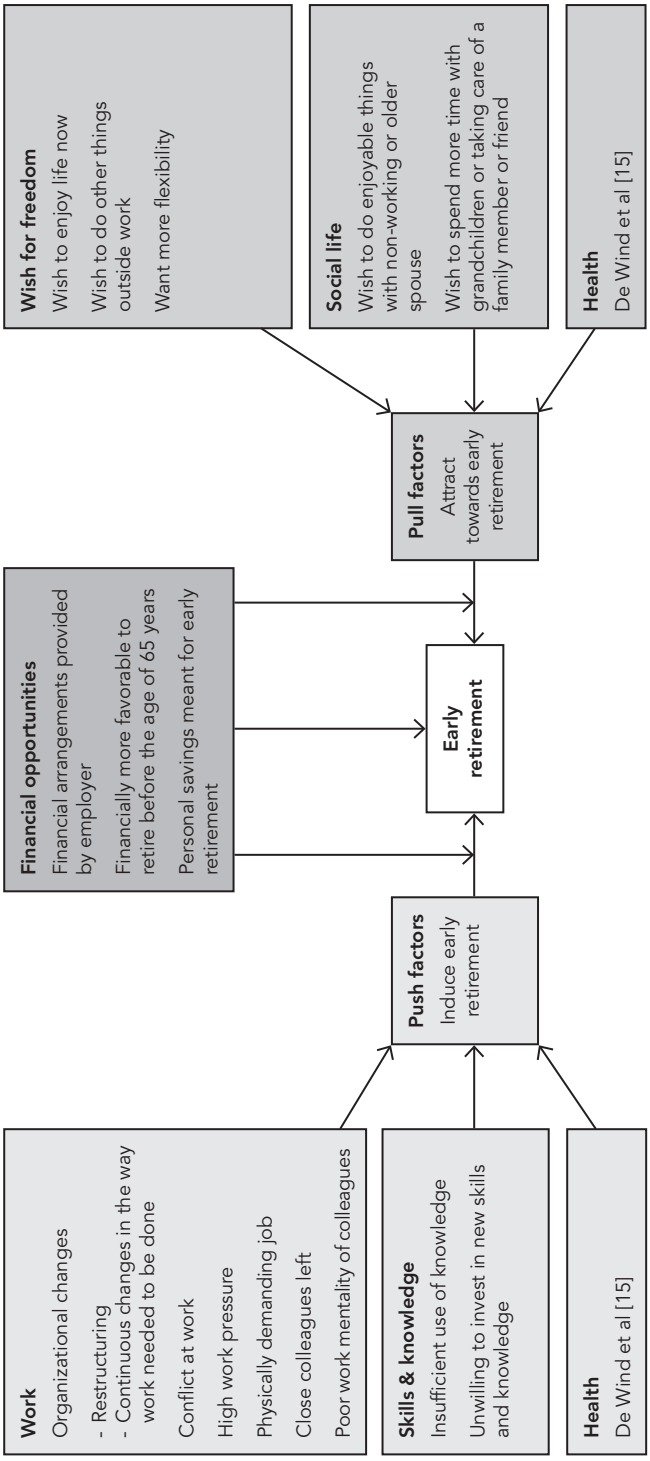

Figure 2. Factors involved in early retirement

Factors that pushed towards early retirement

Work

Work-related factors were frequently described as a reason for early retirement (Figure 2). Changes in the work organization, e.g. restructuring, often preceded early retirement. One man (64), who worked in the welfare sector, reported that after recurrent restructuring, the department he worked for closed down. He felt that due to his age, he would be unable to find a new job. He had been rejected one year earlier for another position (*"But yeah, then they want some young person."*). In his view, due to this lack of opportunities, retirement was unavoidable. When he was asked why he had retired before the age of 65, he answered:

"Well, there was no perspective anymore. As of July 1st the department I worked in was closed."

Another man (61), who worked as a mechanic, reported that when enterprise restructuring occurred, his employer played a substantial role in his early retirement process. His employer decided not to fire him, but to offer an early retirement arrangement:

"Last year I was almost fired due to a reorganization but then administration said… as of next year he can already retire early, and receive his pension, firing him will take a few months anyways so we might as well just keep him. Well that's what they did then."

In addition to large organizational changes, continuous changes in the way work needed to be done was reported as a reason for early retirement. Employees became tired of continuous changes in work tasks and the need for these changes was not always fully understood. This decreased their motivation to continue working.

Conflicts at work were mentioned as a reason to leave the workforce before the age of 65 as well. A woman (64), who had an administrative job, described that she did not enjoy her work as much as she had before when a conflict with her colleagues arose. She explained:

"Couldn't get on that well with my colleagues. Or they couldn't get on with me. Sometimes it clashed… that was very unpleasant, no, not nice at all."

Furthermore, high work pressure and physically demanding work were reported as push factors for early retirement, because they reduced the ability to continue working until an older age in a particular job. A technician (60), who worked offshore in engine rooms

of freighters and oil rigs around the world, explained that the physical burden of his job did not allow him to continue working until the age of 65. Although he was given the opportunity to get an office job as a clerk, he was not willing to perform this type of work. He was offered a favorable financial arrangement by his employer and retired early. He argued:
"When I was around 40 I already noticed the first of the wear and tear. And then you think, guys, I won't make it to 65."

Skills and knowledge
Factors related to skills and knowledge were mentioned as push factors towards early retirement. Some employees were not willing to invest in their careers anymore, and, for example, retired early before they had to take a new course or training. Others described that they were dissatisfied with the limited use of their skills and knowledge, which decreased their motivation to work for the company, and pushed them out of the workforce. A man (64) who worked in the welfare sector argued that he had a lot of knowledge that, he felt, was not sufficiently used by his supervisors:
"I had a lot more knowledge than others. So from their point of view I would have said: make use of that. I was actually 'used' way too little. And that of course also gives a certain negative feeling… and then you give up earlier."

Factors that pulled towards early retirement

Desire for freedom
Many respondents described that they wished to do other things outside of work, wanted to enjoy life, or looked forward to more flexibility in their life. As these wishes gained importance, respondents became less motivated to continue working and were more attracted to early retirement. A woman (60) who worked as a physical therapist explained:
"And also enjoying yourself. I think that with physical therapy work you are really inflexible. For people with office jobs… With nice weather they can say I'm taking the afternoon off, going to the beach, well we couldn't do that because you were fully booked and the following week as well. So I think it's really restricting."

A 62 year old economics teacher said:
"I think that after working for 40 years it's now time for other things. And aside from that I wanted something else, I wanted to be more flexible with my time."

Importance of family and friends

Respondents mentioned that as they got older, spending time with family or friends became more important to them. An older or non-working spouse often pulled the employee towards early retirement, since respondents wished to spend more time together. A woman (60), who worked in the health care sector her whole career, emphasized:

"The fact that [name partner] is 10 years older than I am is decisive for my stopping work at an earlier age, if I want to do fun things, then I shouldn't keep working until I'm 65."

Some persons were attracted to early retirement because they wished to take care of a partner, family member (e.g. grandchild), or friend. A primary school teacher (female, 61) described:

"And by now I have grandchildren. That is also one of the reasons that I stopped a little sooner, because I'm going to be babysitting soon."

Financial factors

In addition to the "push" and "pull" factors towards early retirement described above, financial factors influenced early retirement (Figure 2). Most employees had the opportunity to opt for early retirement schemes (e.g. financial arrangements provided by the employer or sector, flexible early retirement schemes), which made early retirement accessible. Others saved money to facilitate an early exit from working life. In some persons, financial opportunities to retire early became important in the context of other push and pull factors, whereas financial opportunities played a more direct role for others. In all cases, the financial opportunity to retire early was essential in the final decision to leave the workforce before the age of 65. Some described that they had known for years at what age they would qualify for early retirement arrangements and changed their mindset accordingly. A man (60), who worked in the police force, explained:

"I knew during my contract time that I could retire at 60… Then it turned into 62, but if you participated in the life-course savings scheme you could do it early."

A troubleshooter in machine construction (61) who enjoyed his job, described his financial opportunity to retire as follows:

"The Social Benefit taxes that I paid, that bag of money was laying there. I can use that and if I don't, then at 65 it's gone… That money that I saved all those years, someone else will use it. And then I say, no that is my money, I'm using it."

Discussion

For most employees, a combination of factors played a role in the process towards early retirement, although the specific factors involved differed between individuals. Push factors towards early retirement included, among others, organizational changes at work, conflicts at work, high work pressure, high physical job demands, and dissatisfaction with the limited use of one's particular skills and knowledge. Pull factors towards early retirement included the wish to do other things outside of work, enjoy life, have more flexibility, spend more time with a spouse or grandchildren, and care for others. In addition, the financial opportunity to retire early played an important role for all respondents.

Our findings on the influence of work-related factors, the wish to do other things outside of work, and financial factors are in line with previous qualitative and quantitative studies on early retirement [7,12]. The present study also identified an additional factor, namely insufficient use of older workers' skills and knowledge. Moreover, the present study provided new insights into how and why different factors influenced early retirement. Push factors towards early retirement seemed to cause early retirement via a decrease in motivation, ability, and opportunity to continue working. For example, insufficient use of skills and knowledge decreased a person's motivation to continue working and physically demanding work reduced an employee's ability to continue working until the age of 65. Our results suggest that employees who felt unable to find a new job due to their age when confronted with a push factor experienced a reduced opportunity to continue working, and as a consequence, retired early. In line with this, earlier studies have shown that age discrimination impacts the opportunity for older workers to remain in or re-enter the workforce [22]. Pull factors towards early retirement, such as spending more time with a significant other, mainly influenced early retirement via an increased motivation to retire early. Moreover, financial factors, such as favorable retirement schemes, importantly influenced the opportunity to retire before the age of 65.

In line with previous research [23], the process towards early retirement appeared to be multi-factorial and was frequently not determined by one single factor. This suggests that interventions and policies should not focus on one factor but integrate measures on a combination of relevant factors. When ranking the relative importance of factors involved in the early retirement process, financial factors appeared to be most important and were often a precondition for early retirement. Push and pull factors seemed of equal importance for early retirement in our study population. We recommend that

future quantitative research investigates the relative importance of factors involved in early retirement in different groups of workers to shed more light on the potential of interventions.

Since different factors played a role for different persons, it seems that especially interventions tailored to the individual and the specific working conditions may support the prolongation of working life. Work-related interventions can address both push and pull factors, though the intervention potential may differ between these factors. Push factors towards early retirement can be targeted directly, whereas pull factors relate to private life, and hence, can only be accommodated. With respect to push factors, work-related interventions could include measures that improve working conditions such as work pressure, social climate and use of individual's knowledge. The impact of organizational and task-related changes on early retirement stresses the importance of a working environment that supports maintaining a high employability and flexibility throughout employees' careers. With respect to pull factors, work-related interventions are recommended to include measures that match working conditions with factors pulling individuals towards early retirement [24,25]. Flexible working hours could for example fit with the wish to spend more time with a spouse or take care of others and maintain a satisfactory work-life balance. To ensure a good fit between the demands of the job and the ability and wishes of the employee, a dialogue between employers and employees may be helpful from an early phase in the career onwards.

Due to the aging of the population and changes in retirement scheme regulations, early retirement schemes will become financially less favorable in the Netherlands in the near future. As a consequence, the opportunities to leave the workforce early will decrease. Most participants in this study still had the opportunity to opt for favorable retirement schemes, and it would be interesting in future research to explore whether reasons for early retirement will shift when these arrangements become less accessible. It could be hypothesized that push factors towards early retirement will gain importance relative to pull factors such as the wish to do other things outside of work. However, in the present study, employees who could financially afford to retire early in order to focus on other aspects of life experienced this as a positive outcome. Besides, it could be hypothesized that some employees may leave the work force via different pathways in the future, e.g. unemployment. These potential consequences further necessitate improvements in the working environment including flexible working arrangements, policies supporting employability (e.g. skills), and improvements in labor market

opportunities for older persons. Another area that could be further researched is on how to balance the societal need to prolong working life due to the ageing of the population and the older worker's preferred work-life balance. This is especially important because satisfaction with the job relates to health and well-being [26]. Future research on early retirement also needs to take the employers perspective into account; employers may, for example, be confronted with costs associated with the loss of older skilled workers and recruitment of new workers, but also with costs associated with retention of older workers.

The qualitative character of the present study was considered a strength, since it allowed us to gain insight into how various factors led to early retirement. This method also allowed respondents to report important factors that were not yet identified in the literature and played a role in their retirement process. Another strength of the current study was the study population, since only employees who had retired early, or already formally arranged with their employer to do so within six months, were included. Hence, actual early retirement was explored rather than the intention to retire early.

The present study also has some limitations. Firstly, in qualitative studies the researcher is an important instrument in data collection and analysis [27], which may have influenced the findings. Therefore, analysis of the interviews was predominantly done by two persons. Moreover, to ensure robustness of findings, members of the project team discussed data quality and results. Secondly, during the interviews, persons looked back at their transition from work to early retirement. There is a risk of recall bias and transformation of the 'real' story, since persons may not remember facts correctly or may be influenced by psychological processes, such as cognitive dissonance. The interviewer used in-depth follow-up questions to validate interviewees' answers. Moreover, to prevent biased results we checked for inconsistencies in the stories and interpreted these parts with caution. Thirdly, during some interviews a spouse, daughter, or granddaughter was present. This may have influenced the participants' answers. To limit bias, issues brought up by non-participants were interpreted with caution in the analysis. Fourthly, in the present study, differences between subgroups, e.g. gender and educational level, could not be investigated. Fifthly, it should be acknowledged that country specific pension systems may influence both the accessibility and factors involved in early retirement. This might limit the generalizability of (some of) our findings to other (non-European) countries. Finally, before retirement, some persons had expected to miss pleasant aspects of working life including social contacts with colleagues, day rhythm, and appreciation (i.e. pull factors towards work). This made the decision to retire early tough. However,

we were unable to identify reasons to *continue* working life, since we did not include employees who stayed in the workforce until the age of 65 years in the present study.

Conclusion

In conclusion, this study found that the process towards early retirement is multi-factorial. Apart from financial incentives, the prolongation of working life may be supported by improving the fit between the physical and psychosocial job characteristics on the one hand and the abilities and wishes of employees on the other hand. Work-related interventions that enable and motivate employees to prolong their careers may include measures that reduce physical and psychosocial load, support employees in coping with organizational changes and maintain employability, support the use of older workers' skills and knowledge, and offer the opportunity to perform activities outside of work (e.g. flexible working hours). Tailored interventions seem especially important, since a different combination of factors resulted in early retirement for different persons. Therefore, a continuous dialogue between employers and employees on the (future) person-job fit and tailored interventions might be helpful in promoting prolonged working lives for older employees.

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Appendix

Interview guide

I. Background information

1. To get to know you a little bit better, I would like you to tell me something about yourself… What is your home situation like? What kind of family do you come from?

II. Work history

2. Could you describe what types of jobs you have had in the past? *Draw, with the interviewee, his/her career history on a timeline.*

If respondent mentions different jobs:

3. What was the reason for the job change? Why? Since when? What triggered this? How did this happen?
4. For what reasons did you work in this job for x years?

If respondent mentions one job:

5. For what reasons did you work in this job for x years?
6. Did you work part-time or fulltime?
7. What is your educational background? Do you have any diplomas?
8. Could you mention something about your home situation during your career?
9. Did you participate in any activities outside of work, such as hobbies, volunteer work, or taking care of others? How important were those activities to you?
10. How important was work to you?
11. Did this change throughout the years? Why? Since when?
12. Could you describe your most recent job?

III. Reasons for retiring early

13. What were reasons for you to retire early?

    If someone mentions (changes in) health (examples): What kind of health problems did you have? Since when? For what reason didn't you continue working with the health problems?

If someone mentions (changes in) work stress or work-related tasks (examples): Why did your work become more stressful? Since when? Why was that? How did you experience it when teams were combined? Why was that? How did you experience it when you got a new team leader? Why was that?

If someone mentions (changes in) how their skills and knowledge matched with the job demands (examples): How did you experience it when you could not keep up with new developments? Since when? Why was that?

If someone mentions (changes in) the social situation (examples): How did you experience it when your partner stopped working? Why was that? How did you experience it when you became a grandmother/grandfather? Why was that?

If someone mentions (changes in) financial situation (examples): How did you experience it that you were financially able to stop working sooner? Why was that? How were you able to? How did you experience it that you were offered an appealing financial incentive from your employer? Why was that?

If someone mentions (changes in) the ability to work (examples): Why were you no longer able to work? Since when? Why weren't you able to work anymore since then?

If someone mentions (changes in) their motivation to work (examples): Why did your motivation to work change? Why did your work become less / more important to you? Since when? Why did your motivation to work change at that moment? Why were you no longer satisfied at work? Since when? Why were you no longer satisfied at work at that moment?

If someone mentions (changes in) their opportunity to work (examples): Why was there no longer an opportunity for you to work? Since when? Why did you perceive a decrease in the opportunity to continue working?

14. You mentioned several reasons why you retired early. *The interviewer summarizes these reasons.* Is this correct? Are there any other important reasons for which you retired early?

15. What were the most important reasons for you to retire early?
16. From the literature we know that aside from …, and …, other factors can also play a role in early retirement decisions. *Fill in blanks on the basis of the interview.*

    If health was not mentioned: For example, health. If you look back, did health play a role in your early retirement ?

    If work-related factors were not mentioned: For example, work-related factors. If you look back, did work-related factors play a role in your early retirement?

    If skills and knowledge were not mentioned: For example, skills and knowledge. If you look back, did skills and knowledge play a role in your early retirement?

    If social factors were not mentioned: For example, social factors. If you look back, did social factors play a role in your early retirement?

    If financial factors were not mentioned: For example, financial factors. If you look back, did financial factors play a role in your early retirement?

    If ability was not mentioned: For example, sometimes people are no longer able to work. If you look back, did this play a role in your early retirement?

    If motivation was not mentioned: For example, sometimes people are no longer motivated to continue working, or they no longer want to continue working. If you look back, did this play a role in your early retirement?

    If opportunity was not mentioned: For example, sometimes people no longer had the opportunity to continue working. If you look back, did this play a role in your early retirement?

IV. Timing of the transition

If someone retired early within the past 12 months:

17. On xx-xx-xxxx you retired early. Why did you retire at that moment specifically? Why not sooner? Why not later?

18. Why did the factors that you mentioned before lead to your retiring at that moment? OR You mentioned that x, x, and x played a role in your retiring early. Did something change in those factors that led you to retire on xx-xx-xxxx?
19. After you decided to retire early, you still worked x months. What kind of expectations did you have of those last x months?
20. To what extent were those expectations of the last x months accurate?

If someone will retire early within the next 6 months:

21. On xx-xx-xxxx you are going to retire early. Why are you retiring on that moment specifically? Why not sooner? Why not later?
22. When did you and your employer discuss your retiring early?
23. Could you explain how that went? Who initiated the process? Why was the process initiated? How long did this take?
24. Why did you then decide that you would keep working x months? Why not longer? Why not shorter?

V. Circumstances under which one would have continued working

25. If you could have decided yourself, would you have retired early on xx-xx-xxxx, or would you have worked longer or shorter? Why?
26. Did it feel like it was your own decision to retire early? Why?
27. Are there any circumstances under which you would have continued working? Under which circumstances would you have continued working?

If someone mentions circumstances:

28. Why would you have worked longer under those circumstances?

If someone doesn't mention circumstances:

29. Why did you not want to / could you not continue working?

If someone mentions multiple circumstances:

30. You mentioned various circumstances under which you would have continued working. *The interviewer summarizes these.* Is that correct?
31. Which circumstances were most important?

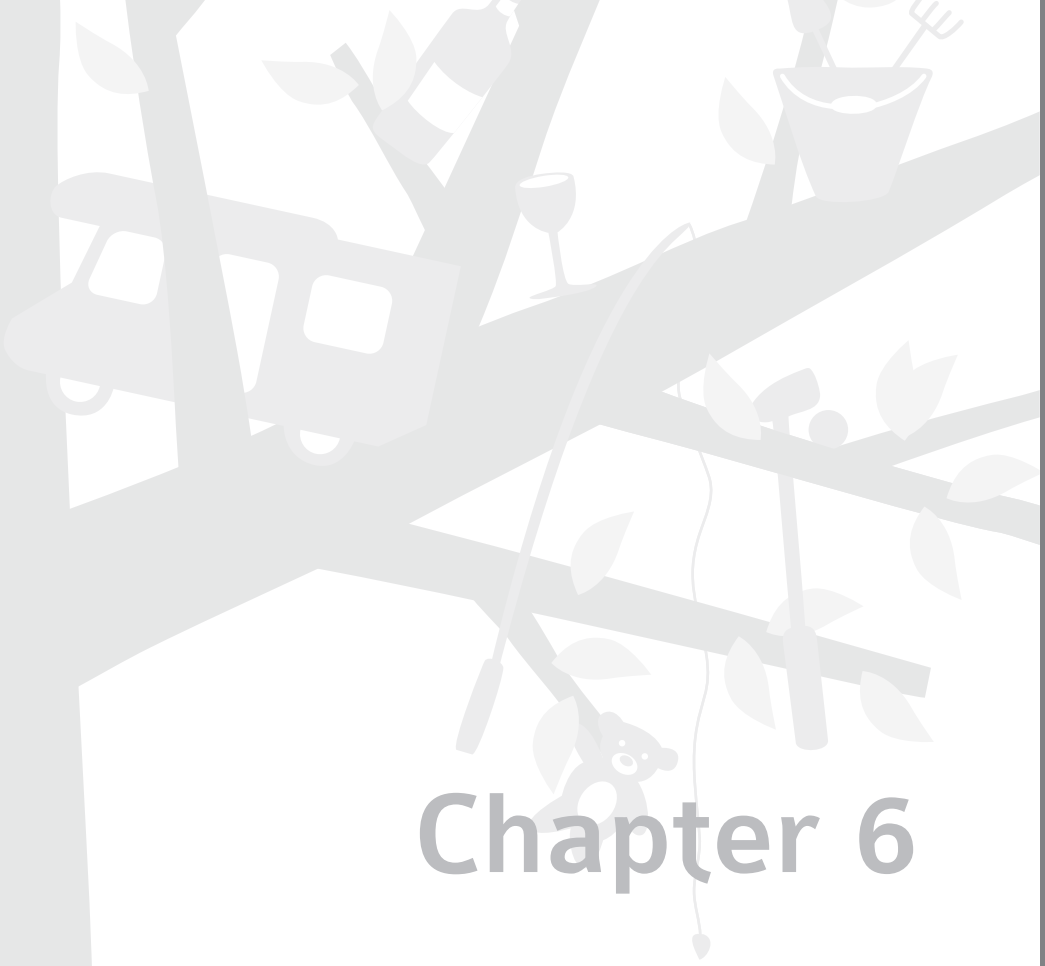
VI. Current situation and future

If someone retired early within the past 12 months:

32. You have now been retired for x months. How do you feel about it?
33. What were your expectations about early retirement?
34. To what extent does your early retirement compare to these expectations?
35. Now I have another very open question to conclude with. How do you feel about the future? Do you see this as a positive thing? Do you have plans for the future?

If someone will retire early within the next 6 months:

36. In x months you will retire early. What are your expectations about these upcoming months?
37. Soon you will retire early. What are your expectations about early retirement?
38. Now I have another very open question to conclude with. How do you feel about the future? Do you see this as a positive thing? Do you have plans for the future?



Chapter 6

Pathways through which health influences early retirement: A qualitative study

BMC Public Health

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Abstract

Background

Due to the ageing of the population, there is a societal need for workers to prolong their working lives. In the Netherlands, many employees still leave the workforce before the official retirement age of 65. Previous quantitative research showed that poor self-perceived health is a risk factor of (non-disability) early retirement. However, little is known on how poor health may lead to early retirement, and why poor health leads to early retirement in some employees, but not in others. Therefore, the present qualitative study aims to identify in which ways health influences early retirement.

Methods

Face-to-face semi-structured interviews were conducted with 30 employees (60–64 years) who retired before the official retirement age of 65. Participants were selected from the Study on Transitions in Employment, Ability and Motivation. The interviews were transcribed verbatim, a summary was made including a timeline, and the interviews were open coded.

Results

In 15 of the 30 persons, health played a role in early retirement. Both poor and good health influenced early retirement. For poor health, four pathways were identified. First, employees felt unable to work at all due to health problems. Second, health problems resulted in a self-perceived (future) decline in the ability to work, and employees chose to retire early. Third, employees with health problems were afraid of a further decline in health, and chose to retire early. Fourth, employees with poor health retired early because they felt pushed out by their employer, although they themselves did not experience a reduced work ability. A good health influenced early retirement, since persons wanted to enjoy life while their health still allowed to do so. The financial opportunity to retire sometimes triggered the influence of poor health on early retirement, and often triggered the influence of good health. Employees and employers barely discussed opportunities to prolong working life.

Conclusions

Poor and good health influence early retirement via several different pathways. To prolong working life, a dialogue between employers and employees and tailored work-related interventions may be helpful.

Background

Many industrialized countries are confronted with an ageing workforce, since the baby-boom generation ages, fertility rates have declined and younger workers enter the labor market later [1]. The ratio of retired elderly to the active working population is increasing, which causes a higher pressure on public finance. Therefore, there is a societal need for workers to extend their working lives. Although the average retirement age in the Netherlands increased from 60.9 years in 2001 to 63.1 years in 2011, many workers still leave the workforce before the official retirement age of 65 [2].

Previous research on work disability pensions showed that workers with specific diseases, such as depression [3], rheumatoid arthritis [4], diabetes [5], or cancer [6] have a higher risk of an early exit from the work force due to work disability. A recent review study showed that poor perceived health is also a risk factor of early retirement without compensated work disability [7], though the association is less strong than with disability pensions [8]. In this review moderately increased risks of early retirement were found in four of the six studies that were included (OR/HR/RR 1.28 to 1.86), a high risk was found in one study (OR 3.36) and no significant relation between health and early retirement was found in another study. The differences between these studies might be explained by the fact that poor perceived health may result in early retirement in some employees or circumstances, but not in others.

Although several longitudinal studies identified poor health as a predictor of early retirement, there is little understanding on *how* poor health may lead to early retirement. Second, little is known on *why* poor health leads to early retirement in some situations, but not in others. Third, the influence of good health on early retirement has barely been studied. More insight in the role of health in early retirement could be helpful to design interventions aiming to prolong persons working life despite health problems. Hence, the present study aims to identify through which pathways health influences early retirement.

Methods

Design

This qualitative study was part of a larger qualitative investigation on why persons retire early. The present study focuses on health-related reasons of early retirement. Non-health related reasons of early retirement are described elsewhere [9].

Face-to-face semi-structured interviews with Dutch employees who retired early were conducted. Early retirement referred to retirement before the official retirement age of 65, and excluded persons who retired early due to (partially) compensated work disability or unemployment. Persons reporting compensated work disability or unemployment were excluded because previous research suggested that different factors underlie these transitions out of work [10].

Study participants

The participants were selected from the Study on Transitions in Employment, Ability and Motivation (STREAM) [11]. The aim of this prospective cohort study is to identify in what circumstances persons aged 45 to 64 years prolong their working life, while maintaining good health and good work productivity. In total 15,118 persons were included in STREAM in 2010.

Inclusion criteria for the present study were: (1) persons had a paid job as an employee at the time of STREAM 2010, (2) retired before the age of 65 in the last 12 months or were going to retire early in the next six months and already formally arranged this with their employer at the time of the interview, and (3) were aged 58 to 64 years at the time of the interview. Moreover persons had given permission in the STREAM 2010 questionnaire to be contacted for additional research.

To ensure heterogeneity in the study participants, participants were purposefully selected [12] based on age, educational level, and their intention to retire in 2010. We selected on age, since different reasons might underlie retirement in those that retired at a relatively young age (e.g. 59 years) compared to those that retired at a higher age (e.g. 64 years). Similarly, educational differences in reasons of early retirement may exist, e.g. due to exposure to different physical and psychosocial working conditions. The intention to retire was assessed with one question in the STREAM questionnaire in 2010, i.e. 'Are you planning to stop working in the next 12 months?'. This item could be answered on a 5-point Likert scale ranging from 'certainly not' to 'certainly'. Persons who answered 'maybe', 'probably' or 'certainly' were eligible to be contacted for the present study. We selected purposefully on this characteristic to assure that both persons in which longstanding processes and persons in which more sudden events influenced early retirement were included. We chose not to contact persons who answered 'certainly not' or 'probably not', because we assumed early retirement would be rare in these persons. Health was not taken into account in the selection of participants.

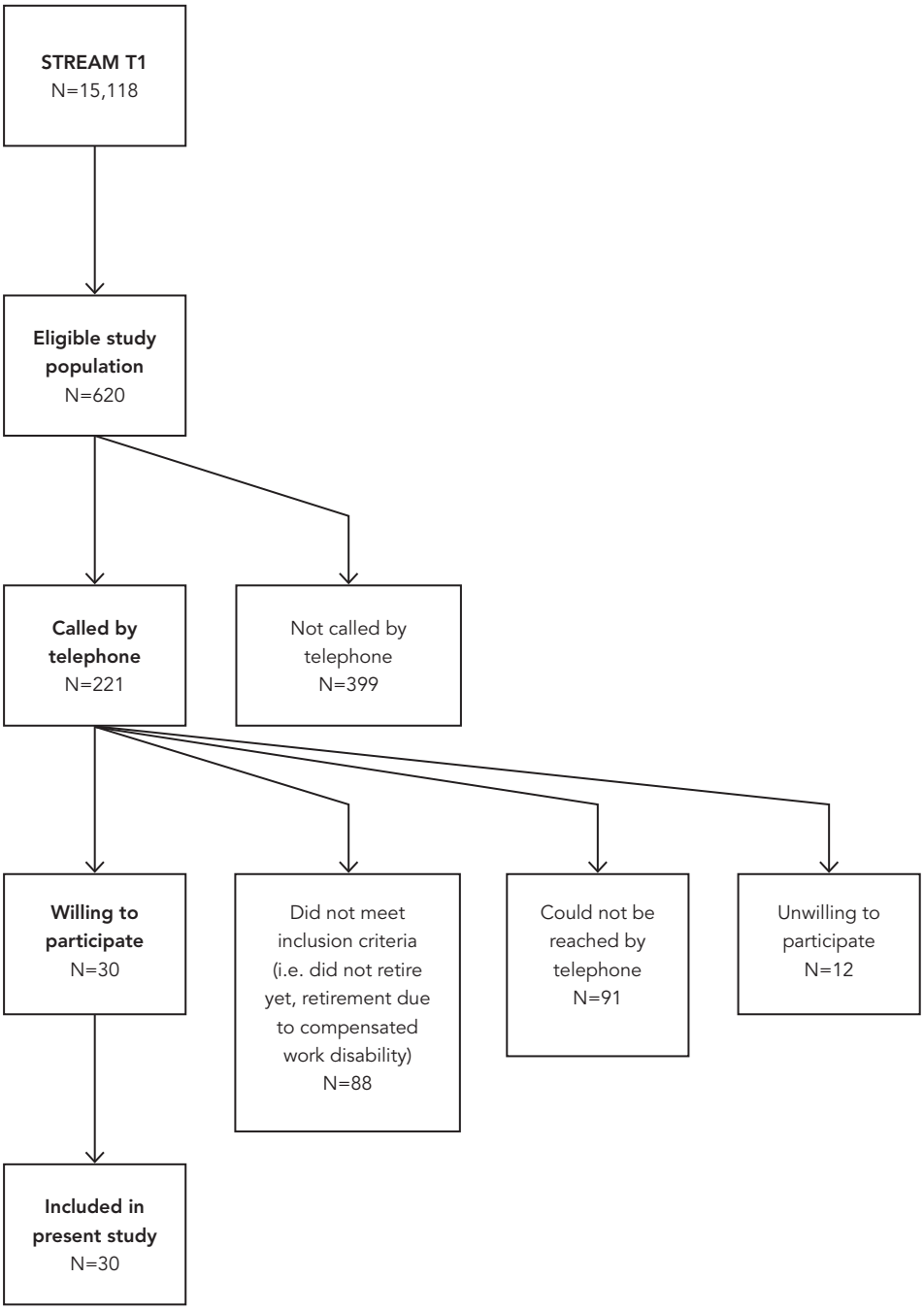

Figure 1. Inclusion of the study participants

Between July 2011 and October 2011, 221 persons were contacted by telephone to check whether they met the inclusion criteria (Figure 1). The aim and content of the interview study was explained and their willingness to participate in a face-to-face interview was checked. Eighty-eight persons did not meet the selection criteria. They either had not retired yet and no formalized arrangements with their employer to do so in the next six months, or went on early retirement due to compensated work disability. In total 91 persons could not be reached by telephone. These persons were called at least once again after one or two weeks. Since telephone calls were made during day time on working days, it could be hypothesized that a substantial proportion of those that could not be reached were still employed. Twelve persons were unwilling to participate. Reasons were personal circumstances (N=4), no time (N=2), unwillingness to talk about work history and early retirement (N=2), and miscellaneous reasons (N=4). The first 30 persons who were eligible and gave permission for an interview were enrolled in this study.

Interview protocol

Prior to the beginning of the study, a comprehensive semi-structured interview guide was created based on the life course perspective [13] and determinants of early retirement according to the literature. The life course perspective considers transitions from work to retirement as a part of the life course. The processes leading to the transition are influenced by someone's individual history and characteristics, and the context of the transition. The life course perspective has previously been used to understand how persons experience (the transition to) retirement [13]. According to the literature, early retirement may be influenced by determinants in the following domains: health, job characteristics, skills and knowledge, social factors, and financial factors [7,14-17]. The interview guide was pilot tested, and minor adjustments were made.

Before the start of the interview, the interviewer introduced herself, and again explained the aim and content of the study and the interview. Subsequently, open-ended questions focused on six topics. The first part was aimed at getting acquainted with the interviewee and focused on the personal situation and home situation. The second part was directed to the person's work history and job-job transitions. Together with the participant, the interviewer created a timeline of the interviewee's work history and other important (positive or negative) events, such as education, marriage, divorce, birth, death of family or friends, and periods of illness. The third part focused on the reasons why

an interviewee had retired early, or had made arrangements to do so. Understanding of the reasons for early retirement was gained through in-depth follow-up questions. For example, if a person mentioned poor health as a reason for early retirement, the interviewer asked *why* poor health was a reason for early retirement, *since when* poor health was a problem, and *how* poor health had caused early retirement. The fourth part focused on the timing of the transition from work to early retirement. The fifth part focused on circumstances under which the interviewee would have prolonged working life. The last part of the interview concentrated on satisfaction with the transition from work to early retirement, the present situation, and the perceived future.

Interview procedure

The interviews were carried out by the first author (AdW). The interviewer was familiar with interview techniques, such as clarification, paraphrasing and summarizing. During most of the interviews, a second interviewer was present who took notes (KR or DR). The interviewers did not have a prior relationship with any of the participants. The interviews were carried out in participants' homes throughout The Netherlands, except for one person, who, upon request, was interviewed at work. Interviews were digitally recorded. All participants agreed to this procedure. On average interviews lasted 80 min (range: 40–156 min). During 9 interviews non-participants were present (spouse (N=7), spouse and daughter (N=1), and granddaughter (N=1)). In one interview the spouse helped the respondent come up with ideas about what was asked. In two interviews the spouse interfered substantially. Issues brought up by these spouses were interpreted with caution in the analysis.

Analysis

Analysis of the interviews took place in four steps. First, the interviews were transcribed fully verbatim. All interviews were listened to at least twice and compared to the transcriptions to check accuracy.

Second, 10 interviews were independently summarized, using transcriptions and field notes, and open-coded by AdW and KR. The aim of this step was to understand why and how the transition from work to early retirement had taken place in these persons. Afterwards, AdW and KR discussed summaries, timelines, codes, and coding trees extensively, and reached consensus.

In the third step, the remaining 20 interviews were summarized, and open-coded by either AdW or KR. Summaries and coded interviews were cross-checked, and AdW and KR regularly met to discuss findings. During these meetings, data saturation was monitored. No new information on reasons of early retirement was derived from the last interviews.

In the fourth step, AdW extracted parts about health from the transcriptions of all interviews. AdW open coded these parts in more detail, and discussed the findings extensively with KR. The aim of this step was to investigate the role of health in the transition from work to early retirement in more detail.

Parallel to the four steps described above, AdW and KR regularly met to compare interviews. Leading questions during these discussions were: (1) what similarities can be identified between the stories of the interviewees, and (2) why did certain processes take place in some persons, but not in others. To enhance robustness of the findings, main results were also discussed with other project members (MW and GG). In order to manage the data of the interviews, the computer package for qualitative analysis Atlas.ti 6 was used.

Ethical considerations

The Medical Ethics Committee of the VU University Medical Center Amsterdam declared that no ethical approval was needed to conduct this study. Informed consent was obtained verbally from all participants during the telephone conversation, in which persons were invited for the interview.

Results

Characteristics of the study participants are shown in Table 1. Twenty-three persons retired in the last 12 months and 7 employees were going to retire in the coming six months. The median of the retirement age was 61 years (range 60–64). In total 15 of the 30 participants mentioned that their own health played a role in early retirement. Health influenced early retirement in various ways. First, physical and mental health problems influenced early retirement. Second, 'good health' emerged as a factor that influenced early retirement.

Table 1. Characteristics of the study participants

Interview	Gender	Age (median=62)	Retirement age (median=61)	Occupation	Educational level	Health played a role (yes / no)
1	Male	61	60	Solution manager IT	High	Yes
2	Male	60	60	Mechanic and chauffeur	Low	Yes
3	Male	60	60	Policeman	Low	Yes
4	Male	62	62	Teacher secondary school - history	High	Yes
5	Female	62	61	Administrative assistant	Low	No
6	Female	61	61	Physiotherapist	High	No
7	Male	61	61	Database administrator	High	No
8	Male	61	60	Service employee in public transport	Low	Yes
9	Male	60	60	Sales engineer	Intermediate	Yes
10	Male	62	62	Security officer	Intermediate	Yes
11	Male	62	61	Stockpile manager	Low	No
12	Male	62	62	Teacher secondary school - economics	High	Yes
13	Male	63	63	Civil servant	High	No
14	Male	62	61	Graphical designer	Intermediate	No
15	Male	63	64	Civil servant	Low	No
16	Female	61	61	Teacher primary school	High	Yes
17	Male	64	63	Teacher secondary school - mathematics	High	No
18	Male	61	60	Financial controller	High	No
19	Male	62	62	Consultant IT	Low	No
20	Male	62	61	Employee personnel department and administrative assistant	High	Yes
21	Male	61	61	Trouble shooter in machine construction	Low	No

Table 1 continued

Interview	Gender	Age (median=62)	Retirement age (median=61)	Occupation	Educational level	Health played a role (yes / no)
22	Male	64	64	Financial controller	High	No
23	Female	63	62	Employee personnel department	Intermediate	Yes
24	Male	62	62	Teacher secondary school - mathematics	High	Yes
25	Male	60	60	Service technician	Low	No
26	Male	63	62	Job coach	High	Yes
27	Male	60	60	Civil servant	Low	Yes
28	Female	64	63	Administrative assistant	Low	No
29	Male	61	60	Mechanical chipper	Low	No
30	Female	60	60	Nurse	High	Yes

Poor health

'Poor health' was (one of) the reason(s) to retire early in 12 of the 30 participants. Most persons who mainly retired early because of 'poor health' experienced a gradual decline in health. Poor health was the main reason to retire in some persons, whereas it was one of a variety of reasons in others. Poor health resulted in early retirement through four different pathways.

First, poor health resulted in early retirement in one employee who felt unable to work at all due to health problems, and felt there was no other possibility but to retire early. This 63-year old woman who had suffered from psychological disorders (ADHD and burnout) for many years had quitted paid employment after being granted a work disability pension four years ago. She explained:

"In 2007, that was the last year, I became sick in June or July. I worked till autumn, although I said 'It's not possible, I am too tired'. The company doctor said 'No you have to'. I said 'I can't do that', however, I started again. In March I completely collapsed. And in May the general practitioner concluded that I was depressed."

However, during re-examination of her work disability pension, her insurance physician approved her for a 16 hour working week. Both this woman and her employer thought she was not able to work anymore, and together they concluded early retirement would be

the best solution. She experienced early retirement as the only possible escape from work.

Second, persons who experienced or expected that physical or mental health problems caused a decline in their (future) ability to work decided to retire early (N=5). Health problems made their work physically or mentally (too) demanding, which resulted in feelings of incapability to accomplish working tasks properly. A 63-year old male job coach in a social workplace with a history of heart disease and cancer explained that he retired early because of health problems. He stated that work had been very important to him. Besides, it offered day structure and social contacts. This man felt he was not able to accomplish working tasks properly and explained:

"I was there to pump people up, to make them feel good, and now I got the feeling that I needed to be pumped up… and I thought that's not good, because then you can't help people in the way that you want to anymore."

This man also felt that he was a burden to his colleagues by being absent on a regularly basis.

"The most important reason for me to stop was that I was sick…the work that you miss burdens your colleagues, because they have to take over."

In some persons, negative events at work or certain working conditions, such as aggression, high work pressure, and conflicts, underlied the influence of poor health on early retirement. For example, a 60-year old policeman explained that a traumatic experience when he just started working had bothered him during the rest of his career. He explained that he had suffered from increasing fears in stressful situations and a declining mental health. This was the main reason for him to retire as soon as possible.

"I worked for the police for a year and a half, and then in a fight at a pub I got beat up so bad I had to go to the hospital. Well, I probably didn't deal with that very well, because six weeks later I was working again. At that time they didn't have a company support group, which luckily they do have now… I really experienced that as a burden during my whole career."

He reported that he did not always perform well due to his traumatic experience:

"Just that in a violent situation, that could escalate I hid behind my colleague, or because of the violence I would intervene too quickly."

Third, poor health influenced early retirement in persons with health problems who were afraid of a further decline in health (N=4). For example, a 60-year old civil servant who had suffered from many health problems during his life (e.g. Crohn's disease, Transient Ischaemic Attack) was afraid to become disabled if he would continue working:
"Look, deciding to stop at 60… that was actually because I didn't want to end up handicapped early. When I got that TIA and the oppression complaints, I said '60 is my limit'. I don't want to think of being 62 or 63 and it going down hill from then on, and I get disabled. Then I'd have no one to blame but myself."

Although this man experienced health problems, these problems did not influence his ability to work:
"Yes, but it didn't limit me in my work. I had problems with walking to my work, or when I needed to walk up a lot of stairs. However, in my work it didn't limit me at all."

Similarly, a 60-year old woman, who worked as a nurse, explained that fear of a further decline in health played a role in her early retirement. She said that she valued her (future) health more than her work:
"Because my back is more important than work. That's how I think about that. I don't want to end up in a wheelchair in two years. So yeah, these things together made me retire."

In the second and third pathway discussed above, the decision to retire early was often triggered by the financial opportunity to do so. Participants either had personal savings, or could claim a special financial arrangement from their employers. The 60-year old civil servant, mentioned above, for example, explained it would be stupid to risk his health by continuing to work.
"And that while I can get a nice arrangement from the age of 60 onwards."

No pressure was felt from the employer or colleagues to retire early. Most persons did not discuss opportunities to (further) adjust the demands of the job to their abilities with their employer. One person reported that she proposed job redesign to extend working life, but according to her employer there were no opportunities within the organization to do so. Although early retirement was experienced to be voluntary, most of these persons originally had not intended to retire (this) early.

Fourth, some employees felt capable of doing their job despite their health problems. Nevertheless, the employer suggested to retire early, sometimes even in a compelling manner (N=2). There was a threat of dismissal, or the employer caused a situation in which the employee felt it was not possible to continue working in an agreeable manner. This often occurred when organizations were restructuring. The push to early retirement by the employer was not directly caused by the health problems, but was related to the work situation that emerged due to these health problems. For example, a 61-year old man who worked for the largest part of his life for one company in various ICT-related jobs explained he retired early due to a complex interplay of "unwanted circumstances". This man explained that work had always been very important to him. The largest part of his working life he worked 50 to 60 hours a week. Three years before he retired, he got a stroke. He recovered, but it took a year before he was able to start working again. His department had been sold to another company and his job did not exist anymore. He explained that he organized his own re-integration by arranging another job, and received little help from his employer:

"I have been out of circulation for a year. When I came back to [company name] there was no work anymore for me. I searched for a job within the organization and found something. I organized my own reintegration. Nobody from the personnel department was concerned about that. It's a pity, but it was just like that."

He was overqualified for this job. The employer was not satisfied with this new situation. They made clear the company wanted to let him go, and proposed a financial arrangement for early retirement. This man was very disappointed in his company. Nevertheless, after tough negotiations, he accepted an adjusted financial arrangement. Although it was a choice to accept the proposed arrangement, it did not feel like a choice to him. The company at least did not create a situation in which this man could have decided to continue working in a pleasant way.

Good health

'Good health' was (one of) the reason(s) to retire early in 5 of the 30 participants. This occurred also in persons who suffered from chronic diseases. These persons reported they wanted to enjoy life while their health still allowed them to do so. In most persons, the awareness of being in 'good health' arose, when they were confronted with the finiteness of life. This was caused for example by illness or death of a family member or friend, or

death of a colleague immediately after retirement. A 62-year old administrative assistant expressed his fear to die or getting a handicap after years of hard working:
"Too often I've noticed this in entrepreneurs: they worked themselves half to death until they are at least 65, sometimes older… and when they retire they just die or they got sick, or they get a handicap and can't do anything anymore. Well, I didn't want that, I want to do things while I still can."

This man also explained he wanted to spend more time with his wife:
"And because my wife didn't work anymore and was also at home. And I said, listen, I'm healthy and there are things that I still want to do together."

Persons were looking forward to having more time and freedom, and wanted to spend more time on hobbies, family and friends, and holidays. A 62-year old math teacher, who was very motivated to work, felt he had worked long enough and wanted to enjoy the time and the freedom of retirement now. About health he said the following:
"But you can also turn it around and say you'd be better off stopping while you're still healthy so that you can still enjoy it."

In these employees, continuing to work did not fit into their perspective of the future. What they wanted to do in life, while still in good health, did not match with what they expected to be able to do while working. These kind of processes occurred both in persons who enjoyed their work and found it important, and in persons who did not enjoy their work and merely did it for a living. Persons did not discuss opportunities to adjust certain job characteristics with their employer, such as working hours and flexibility, to reach a better fit between their job and private lives.

Although 'good health' was reported as a reason to retire early, it was often not a primary reason. Besides, it was always accompanied by the financial opportunity to retire early because of savings or a favorable early retirement scheme. One men, in which good health was an important reason to retire early, explained:
"And the fact that it was possible. Also financially. If it would not have been possible financially, I would have had to continue working."

Discussion

The aim of the present study was to identify through which pathways health influences early retirement. Face-to-face semi-structured interviews with thirty Dutch employees who retired before the age of 65 were conducted. Both poor and good health played a role in early retirement. Poor physical or mental health influenced early retirement through four different pathways, i.e. (a) persons felt unable to work at all due to health problems, (b) poor health resulted in a self-perceived decline in the (future) ability to work, (c) employees were afraid of a further decline in health, (d) or employees with a poor health felt pushed out by their employer, although they themselves did not experience a decline in their ability to work. Good health influenced early retirement, since persons wanted to enjoy life while their health still allowed to do so. The financial opportunity to retire sometimes triggered the influence of poor health on early retirement, and often triggered the influence of good health.

Earlier studies have shown that poor health is a predictor of early retirement [7]. However, it remained largely unclear how poor health influences early retirement. The qualitative nature of the present study allowed us to distinguish different pathways through which poor health influences early retirement. To the knowledge of the authors, the present study is the first study that was able to identify such pathways. Furthermore, the present study identified an additional health-related reason for early retirement, i.e. good health. This is in line with findings from van Solinge and Henkens [18], who showed that employees with a shorter subjective life expectancy more often intended to retire early than those who expected a longer life span. Our finding that good health, in addition to poor health, influenced early retirement, may partially explain why some previous quantitative studies did not find a significant relationship between health and early retirement [16].

In agreement with earlier studies, we found that the financial situation of the household and the opportunity to make use of various retirement schemes or financial arrangements played a role in early retirement [19]. The importance of financial factors differed between the different pathways. The financial opportunity to retire sometimes triggered the influence of poor health on early retirement, and often triggered the influence of good health on early retirement. At the time the interviews were conducted, early retirement schemes were highly accessible in the Netherlands. Leaving the labor market before the statutory retirement age was even described as an offer employees could not refuse [20]. Since these favorable arrangements will disappear in the near future, the financial

opportunities to retire early will decline as well. This might affect the pathways via which health influences early retirement, and the proportion of employees in which it does so. For example, persons who experience they are not able to work due to 'poor health' may no longer retire early, but may receive disability pensions, or, if not eligible for this, may become unemployed. Persons who are afraid of a further decline in health may get more health problems. Furthermore, good health might still be a reason to retire early, but in a smaller proportion of the employees who can financially afford to retire early.

The relationship between health and early retirement seems to be in line with the person-job-fit approach [21]. This approach assumes that there needs to be a 'fit' between a person and his job to feel healthy, to enjoy work and to perform well in the job. Edwards distinguished two types of fit: demands-abilities fit and need-supply fit [22]. Demands-abilities fit exists if the demands of the job match with someone's abilities. Need-supply fit exists if attitude and motivation of an employee match with the work context. Accordingly, in the present study poor health influenced early retirement due to a misfit between the job demands and the (perceived future) ability to perform the working tasks, without worsening health problems. Good health influenced early retirement due to a misfit between what people wanted to do in their lives while being in good health, and what they expected to be able to do while working.

Employers and employees barely discussed the 'person-job-misfit'. This could be illustrated by the fact that employees who retired early due to a self-perceived (future) decline in their ability to work or fear of a further decline in health, did not discuss these perceptions or anxieties with their employer. Similarly, employers who pushed employees with poor health out of work did not discuss their plans from an earlier phase onwards. A dialogue between employees and employers and measures directed to the prevention of (future) misfits might be helpful to prolong working life in good health and with good work ability. The different pathways by which health influences early retirement suggest that these measures need to be tailored to the individual. For example, it could be hypothesized that the 63-year old job coach, who retired early since he experienced a decline in his ability to work, could have continued working if he had received other responsibilities than "to pump people up". Besides, it could be hypothesized that the 62-year old math teacher might have continued working if flexible working hours would have enabled him to enjoy the things he liked outside of work. We recommend future research to investigate why this dialogue between employers and employees is often lacking and what an effective dialogue should include.

A major strength of the present study is the qualitative design, which allowed us to explore *how* health influences early retirement. Another strength of the present study is that we conducted interviews with persons who had retired early, or already formally arranged to do so within six months after the interview, instead of persons who only intended to retire early. Hence, we studied early retirement behavior. Previous studies often investigated the intention to retire early [7,23,24] or continue working [25], but factors that influence the intention to retire early may differ from those that influence actual early retirement [18].

However, this study also has limitations. First, in qualitative studies the researcher is an important instrument, both in data collection and data analysis [26]. This may have influenced our findings. Therefore, analysis of the interviews was predominantly done by two persons. Moreover, to enhance robustness of the findings, main results were discussed with other co-authors as well. Second, during the interviews, persons looked back at their transition from work to early retirement. There is a risk of recall-bias and to transformation of the 'real' story, since persons may not remember facts correctly or may be influenced by psychological processes, such as cognitive dissonance. The interviewer used in-depth follow-up questions to validate the answers of the interviewees. Moreover, to prevent bias of our results we checked for inconsistencies in the stories and interpreted these parts with caution. Third, we only studied the role of health in early retirement in persons who retired early. Hence, we have no insight in the role of health among persons who had the opportunity to retire early, but continued working. To further establish the role of health, we recommend future research to investigate how health influences the prolongation of working life. Furthermore, it should be noted that we only found evidence of five different pathways from health to early retirement in the present study. Future studies should replicate this finding and may reveal additional pathways. Finally, the present study focused on the influence of health on early retirement. It is important to keep in mind that other factors (e.g. financial situation) play an important role in early retirement as well.

Conclusions

Taken together, poor and good health influence early retirement via several different pathways. To prolong working life, a dialogue between employers and employees, from an early phase in the career onwards, and work-related tailored interventions may be helpful.

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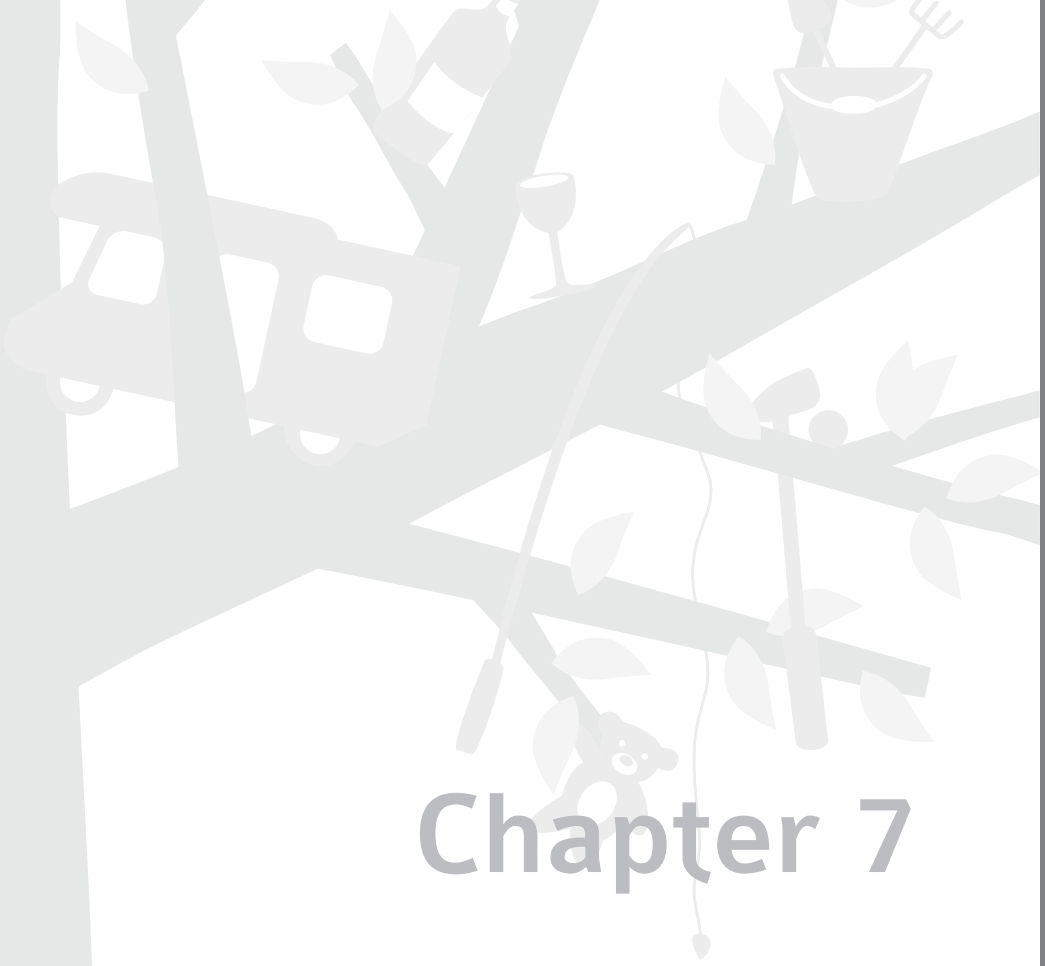

Chapter 7

Mental retirement? – Trajectories of work engagement preceding retirement among older workers

Submitted

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Abstract

Purpose

Before actual retirement, employees may already disconnect themselves from work, which could be referred to as "mental retirement". However, trajectories of work motivation, i.e. work engagement, have not been studied yet. The present study aimed to (1) identify different trajectories of work engagement in older workers approaching the retirement age, and (2) examine their associations with retirement.

Methods

In total 3,171 employees aged 55-62 years, who participated in the Dutch Study on Transitions in Employment, Ability and Motivation were included in this study. Participants filled out a questionnaire in 2010, 2011, 2012, and 2013. Latent class growth mixture modeling was performed to identify groups of employees with similar three-year trajectories in work engagement. Logistic regression analyses were performed to study whether trajectory membership was associated with retirement.

Results

16.2% of the employees made a transition from work to (early) retirement (N=513). Four distinct trajectories of work engagement were identified: steady high (76.3%), steady low (12.7%), decreasing (6.2%), and increasing (4.8%). A steady low work engagement trajectory was associated with retirement (OR=1.46), compared to a steady high work engagement trajectory. Although not statistically significant, an increasing work engagement trajectory seemed to be associated with retirement as well (OR=1.60).

Conclusions

This study did not support the concept of "mental retirement" before actual retirement, i.e. a decrease in work engagement among those facing retirement. As one in eight employees did experience steady low work engagement in the years before retirement, interventions promoting work motivation are recommended to support the employability of these employees.

Introduction

To counter the pressure of the ageing population on the social security system, there is a need for workers to prolong their working lives. In the Netherlands, like in many other European countries, several pension system reforms have been implemented to encourage extended careers and prevent early exit from the workforce, including a gradual increase of the state pension age from 65 in 2012 to 67 in 2021 [1]. In addition, other routes of exit from the work force, i.e. disability pension and unemployment, are becoming more restrictive. In past years, the mean age of leaving employment increased from 60.8 years in 2001 to 64.1 years in 2014 [2]. For employees and employers it is important that workers maintain high work motivation while extending working life. Higher work motivation has been related to the willingness to continue working [3] and a lower intention to retire early [4]. We conceptualize work motivation as work engagement in the present study. Higher work engagement has been associated with higher work ability [5-7], which, in turn, is associated with increased productivity at work [8]. Higher work engagement has also been associated with less sickness absence [9].

However, the prospect of retirement may cause pre-retirement work disengagement [10]. Retirement is considered to be a process, which starts with anticipation of retirement, followed by the retirement act itself, and ends with post-retirement adjustment to the new situation [11]. According to the career stage theory, late careers can be characterized by a period of decline, i.e. a period of "tapering off prior to retirement" [12]. Furthermore, it is suggested that older workers who approach the retirement age develop a "short-timer's attitude", due to accommodation to the upcoming separation from their work, and the upcoming social situation [13]. Taking these theories into account, it is likely that work engagement among older workers declines when they are facing retirement. Henkens and colleagues introduced the concept of "mentally retired" employees, which they described as employees who have already disconnected themselves from their work [14]. On the basis of interviews with managers in the Netherlands, they concluded that every manager knows examples of mentally retired employees in their organization. Damman et al [10] added that older workers are more likely to decrease their work investments and activities, and experience lower motivation when they approach planned retirement.

Although previous research has provided some indications that older workers who approach the retirement age may disconnect from their work, trajectories of work motivation before retirement have not been studied yet. As a result, it remains unclear

whether employees really disconnect themselves with pending retirement and whether employers need to implement interventions that increase the motivation to work in the face of retirement. Therefore, in the present study we zoom in on work motivation, i.e. work engagement, among older workers who approach the retirement age. Our first goal was to identify different trajectories of work engagement in older workers approaching the retirement age. The second goal was to examine their associations with retirement.

Method

Design and study population

The current study is part of the Study on Transitions in Employment, Ability and Motivation (STREAM). STREAM is a Dutch longitudinal study among, at baseline, 15,118 persons including employees (n=12,055), self-employed persons (n=1,029), and persons without paid employment (n=2,034) aged 45 to 64 years. Persons participated in a GfK Intomart internet panel. At baseline, the study population was stratified by employment status and age. STREAM participants yearly filled out an online questionnaire in October / November 2010 (T1), 2011 (T2), 2012 (T3), and 2013 (T4). The study population of STREAM has been extensively described elsewhere [15]. In the present study, we used data from all four waves of STREAM.

Employees were included in the present study if they were aged 55 to 62 years at baseline. 55 years was the lower age limit, since the proportion of employees that had retired (early) after three years of follow-up strongly increased from this age onwards. 62 years was the upper age limit, because after three years of follow-up, these participants had reached the official retirement age of 65 years. Of the employees aged 55 to 62 years we included in this study those who were employee on at least two of the measurements, which was needed to identify the three-year trajectories of work engagement. Since we were interested in trajectories *before* retirement, information on working engagement in the year preceding the event was considered as crucial information; hence persons who retired between T2 and T3 were included if information on work engagement at T2 was available, and persons who retired between T3 and T4 were included if information on work engagement at T3 was available. Finally, persons who indicated they were (partially) work disabled or unemployed at baseline or during follow-up were excluded from the present study. In total, 3,171 participants were included.

Measures

Work engagement

Work engagement was measured with six items on vigor (three items) and dedication (three items) from the Utrecht Work Engagement Scale (UWES) [16], that were combined to form one scale (Cronbach's alpha=0.93). Vigor refers to having a lot of energy at work and mental resilience, feeling strong and fit, and not getting tired from work very fast (e.g. "At my job, I feel strong and vigorous"). Dedication refers to enthusiasm, inspiration, proud, and job satisfaction (e.g. "I am enthusiastic about my job"). Items could be answered on a seven-point scale ranging from "never" to "always" and a higher score reflects a higher work engagement.

(Early) retirement

Information on (early) retirement was derived from one question asking persons to indicate their employment status, with, among others, the following answering options: a paid job or multiple paid jobs as an employee, early retirement, and retirement. In this study, (early) retirement referred to employees who reported that they retired at or before the official retirement age of 65 years at the third or fourth wave. This definition also includes persons who indicated that they had retired (early), but were still also working as an employee or self-employed person.

Covariates

Age, gender and educational level were incorporated in this study as covariates. Educational level was measured using a question on the highest level of education completed with a diploma, and categorized into low (primary school, lower and intermediate secondary education, or lower vocational training), intermediate (higher secondary education, or intermediate vocational training), or high (higher vocational education or university).

Work ability was measured with the following item of the Work Ability Index: "By 'work ability', we mean the degree to which you are able to work, both physically and mentally. If you assign ten points to your work ability in the best period of your life, how many points would you assign to your work ability at this moment?" [17]. The answer scale ranged from 0–10. Trajectories of work ability were obtained in the same manner as trajectories of work engagement.

We constructed a variable on the agreement between intention to retire and actual retirement. The degree to which retirement was planned was assessed by one

question, i.e. "Are you planning to stop working in the next 12 months?", which could be answered on a 5-point Likert scale, ranging from "certainly not" to "certainly". The response categories were dichotomized into "no intention to retire" ("certainly not", "probably not", and "maybe") and "intention to retire" ("probably" and "certainly"). This information was combined with actual employment status into a measure on agreement between intention and actual retirement. Participants were classified into "no intention and no retirement", "no intention, yet retirement", "intention, yet no retirement", and "intention and retirement".

Statistical analyses

The analyses were conducted in the following two steps: (1) identifying groups of employees with similar trajectories in work engagement, and (2) studying whether trajectory membership was associated with (early) retirement (T3/4).

In the first step, we applied latent class growth mixture modeling (LCGMM) to identify latent trajectory groups of work engagement. LCGMM is based on structural equation modeling techniques and assumes that there are latent subgroups in the study population that have unique, and unobserved or latent growth parameters [18-20]. Three time points were included in the trajectory analysis, i.e. T1, T2 and T3. Finding the best-fitting trajectory model was an iterative process, in which a series of trajectory models were estimated, while testing for the optimal number of classes and characteristics of the trajectories (linear, quadratic and free form) [21-24]. We determined the best-fitting trajectory model using the following considerations: (1) Bayesian Information Criterion (BIC), (2) the bootstrap likelihood ratio test (BLRT), (3) posterior probability, and (4) interpretation and theoretical relevance. BIC is a consideration of the fit of the model whilst taking the complexity of the model into account. A difference in the BIC value of at least 10 points between two models indicates that the model with a lower BIC value has a better model fit [23]. A significant BLRT means that the model with k number of classes is significantly different from the previous model with k-1 number of classes. Posterior probability indicates how precisely the subjects are classified into their most likely class. Based on posterior probability, persons were assigned to the trajectory that best matched their work engagement; a probability >0.8 is recommended and a probability closer to 1 indicates a better classification. Finally, interpretation and theoretical relevance were used to decide on the best-fitting trajectory model. In addition, we performed a sensitivity analysis to check whether the trajectory model was robust for missing information about

work engagement after one year of follow-up. Analyses in this first step were performed using Mplus Version 7.11.

In the second step, we determined whether trajectory membership was associated with (early) retirement (T3/4) by performing logistic regression analyses. Odds ratios (OR) and 95% confidence intervals (95% CI) were calculated to express the likelihood of (early) retirement as compared to remaining in employment (reference). We started with univariate analyses to calculate the associations between trajectory membership of work engagement (as a categorical variable) and covariates with (early) retirement separately (model 1). After the univariate analyses, we performed a multivariate analysis, in which trajectory membership and age, gender, and educational level were simultaneously included in the model (model 2). In addition, we conducted two different sensitivity analyses. First, we performed a multivariate analysis in which we also included trajectories of work ability in the regression model on retirement. Work ability is related to both work engagement [5-7] and (early) retirement [25, 26], and in the present study we were primarily interested in the motivational process. Second, a multivariate analysis was performed only including persons in which there was agreement between intention to retire and actual retirement ("no intention and no retirement" or "intention and retirement"). Analyses in this second step were performed using SPSS Statistics Version 22.

Ethical issues

The Medical Ethical Committee of the VU University Medical Center Amsterdam declared that the Medical Research Involving Human Subjects Act does not apply to STREAM. The Medical Ethical Committee had no objection to the execution of this study. In the information for participants that accompanied the online questionnaire, it was emphasized that the privacy of participants was guaranteed, all answers to the questions were treated confidentially, and all data were stored in secured computer systems.

Results

Trajectories of work engagement

Table 1 shows baseline characteristics and employment status at follow-up of the total study population. In total, 16.2% of the employees made a transition from work to (early) retirement (N=513).

Table 1. Individual characteristics and employment status (T3/4) among the total sample of employees aged 55 to 62 years at baseline and divided by trajectory of work engagement (N=3,171)

Characteristic	Total study population	Steady high	Steady low	Decreasing	Increasing
	100 (3,171)	76.3 (2,499)	12.7 (378)	6.2 (164)	4.8 (130)
Age (55-62 years)	58.2	58.2	58.0	58.0	58.2
Gender	-	-	-	-	-
Women	41.7 (1,323)	42.2(1,055)	37.0 (140)	47.0 (77)	39.2 (51)
Men	58.3 (1,848)	57.8(1,444)	63.0 (238)	53.0 (87)	60.8 (79)
Educational level	-	-	-	-	-
Low	27.7 (878)	26.7 (667)	31.2 (118)	31.1 (51)	32.3 (42)
Medium	35.3 (1,120)	35.2 (880)	32.5 (123)	37.8 (62)	42.3 (55)
High	37.0 (1,173)	38.1 (952)	36.2 (137)	31.1 (51)	25.4 (33)
Employment status T3/4	-	-	-	-	-
Employee	83.8 (2,658)	84.1 (2,101)	82.0 (310)	88.4 (145)	78.5 (102)
(Early) retiree	16.2 (513)	15.9 (398)	18.0 (68)	11.6 (19)	21.5 (28)

Note: For age values are medians, for the other factors values are % (N).

To identify trajectories of work engagement, one-, two-, three-, four-, and five-class models were inspected (Table 2). From the one-class model, the BIC continued to decrease more than 10 points with the addition of each class. The BLRT was the same for every model, and posterior probabilities remained above 0.80 in every model. Table 2 shows that the one-, two-, three-, and four-class models were inferior to the five-class model on the basis of the BIC value. However, trajectory groups in the five-class model became relatively small, which made interpretation difficult. Therefore, the four-class model was selected. As can be seen in Figure 1, the four-class model consisted of a large steady high work engagement group (76.3%), a steady low work engagement group (12.7%), a decreasing work engagement group (6.2%), and an increasing work engagement group (4.8%). Sensitivity analyses with complete information on work engagement at baseline, and after one and two years of follow-up showed that the four-class model was robust for missing information. Table 1 shows that (early) retirees more often followed a steady low (18.0%) or increasing (21.5%) trajectory of work engagement, as compared to the other trajectory groups.

Work engagement trajectories prior to (early) retirement

In the univariate logistic regression analysis, the trajectory of work engagement was not significantly associated with (early) retirement (Table 3). After adjustment for age, gender, and educational level, persons who followed a steady low work engagement

trajectory were significantly more likely to retire (early) compared to those who followed a steady high work engagement trajectory (OR=1.46). Adding the demographics separately, showed that the association between trajectory of work engagement and (early) retirement became statistically significant after adjustment for age. Although not statistically significant at the p=0.05 level, an increasing trajectory of work engagement seemed to be associated with (early) retirement (OR=1.60, p=0.07). Older (OR=2.19) and male employees (OR=1.56) were also more likely to retire (early) than younger and female employees, respectively.

Table 2. Fit indices for the one- to five-class models of work engagement among the total sample of employees aged 55 to 62 years at baseline (N=3,171)

Number of classes	BIC	BLRT	Mean posterior probability of trajectory classes	Number of participants in each trajectory class				
				1	2	3	4	5
1	24239.292	NA	1	3171				
2	23828.425	<0.001	0.9045	2658	513			
3	23608.484	<0.001	0.8807	2611	495	65		
4*	23341.081	<0.001	0.8533	2499	378	164	130	
5	23227.442	<0.001	0.8356	2485	382	166	91	47

Note: BIC=Bayesian Information Criterion, lower BIC means better model fit; BLRT=bootstrap likelihood ratio test, significant BLRT means that model with k number of classes is significantly better than model with k-1 number of classes; mean posterior probability of trajectory classes >0.80 is satisfactory. *Selected for further analyses.

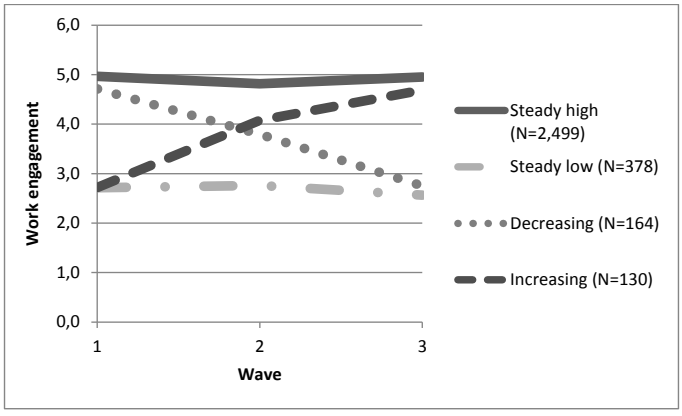

Figure 1. Trajectories of work engagement among the total sample of employees aged 55 to 62 years at baseline obtained by means of latent class growth mixture modeling (N=3,171).

Table 3. Predictors of (early) retirement T3/4 among the total sample of employees aged 55 to 62 years at baseline (N=3,171). Note: OR=odds ratio; 95% CI=95% confidence interval

	OR	95% CI	OR	95% CI
	Univariate		Multivariate	
Trajectory of work engagement				
Steady high	1.00	-	1.00	-
Steady low	1.16	0.87-1.54	1.46 a	1.05-2.04
Decreasing	0.69	0.42-1.13	0.79	0.46-1.37
Increasing	1.45	0.94-2.23	1.60	0.96-2.67
Age (55 to 62 years)	2.14a	2.00-2.29	2.19 a	2.04-2.35
Gender				
Women	1.00	-	1.00	-
Men	1.21	0.68-1.00	1.56 a	0.51-0.81
Educational level				
Low	1.00	-	1.00	-
Medium	1.05	0.83-1.34	1.18	0.89-1.56
High	1.12	0.88-1.42	1.24	0.94-1.64

a P-value<0.05

Sensitivity analyses

When adding the trajectories of work ability to the multivariate regression model, the association between the trajectories of work engagement and (early) retirement did not change. ORs changed maximally 2.5%. Secondly, we performed a sensitivity analysis only including persons for whom there was agreement between intention to retire and actual retirement. The association between the trajectory of work engagement and (early) retirement only marginally changed in the multivariate model, but was no longer statistically significant (OR steady low work engagement trajectory: 1.44, p=0.07).

Discussion

This study aimed to identify whether different trajectories of work engagement can be identified in older workers who approach the retirement age, and to examine which of these trajectories were associated with actual (early) retirement. Four trajectories of work engagement were identified, i.e. steady high (76.3%), steady low (12.7%), decreasing (6.2%), and increasing (4.8%). Persons who followed a steady low work engagement trajectory were more likely to retire (early) than persons who followed a steady high work

engagement trajectory. Although not statistically significant, persons who followed an increasing trajectory of work engagement were also more likely to retire (early) than those with a steady high work engagement trajectory.

Previous research suggested that older workers may "clock out" from work due to the prospect of retirement [10, 14], which could be referred to as "mental retirement". The present study was the first study to longitudinally describe trajectories of work engagement in the years before retirement. In line with the concept of "mental retirement", we expected that anticipation of retirement [11] would be reflected in a declining trajectory of work engagement. However, our findings did not support the existence of such a process. It should be noted that differences in findings between our study and previous research may be due to differences in the study population, i.e. employees versus employers [14], and differences in the operationalization of "mental retirement", i.e. work engagement versus a combined measure for work investments, activities, and motivation reflecting pre-retirement work disengagement [10].

Our study showed that persons who followed a steady low trajectory of work engagement were more likely to retire (early) than those with steady high work engagement. This may be part of a more general pattern of low work engagement throughout the career or a reflection of a "clocking out" process that took place more than three years before actual retirement. It is of interest to discover whether reasons for low work engagement are the same for older workers who approach the retirement age and younger workers. This may give insight in the role of career phase in relation to work engagement. In addition, as opposed to what we expected, our findings also suggest that persons who followed an increasing trajectory of work engagement were more likely to retire (early) than those with steady high work engagement. This may be due to increased appreciation of work, i.e. "second thoughts", because employees realize how their life will change after retirement. Previous qualitative research among academic physicians showed that retirement may be seen as a threat to one's identity, i.e. "a potential loss of a significant source of meaning in one's life" [27]. In daily life older workers may not always be aware of the meaning of work to their lives, but that may arise when they approach retirement (28). Another explanation of the finding that an increasing trajectory of work engagement preceded (early) retirement may be that employees take a "final sprint" to finish their work tasks as good as possible, resulting in fulfillment and increasing work engagement. The previously mentioned study of Onyura and colleagues showed for example that older workers feel responsible for "continuity and succession" of work, i.e.

by facilitating that others within their organization or community could continue working [27]. Future research should investigate what determines that older workers end up in an increasing trajectory of work engagement and which underlying mechanisms play a role.

It is remarkable that work engagement was very stable in our study population; in total, 89% of the persons within our study population followed a steady high or a steady low trajectory of work engagement. This may indicate that work engagement is a "trait" rather than a "state". It would be of interest to measure work engagement more frequently, i.e. momentary work engagement, with, for example, a state version of the Utrecht Work Engagement Scale including a timeframe, i.e. "last week" [29].

A strength of the present study is that we used longitudinal data to investigate trajectories of work engagement in older workers approaching the retirement age. This enabled us to see differences in work engagement over time. Moreover, we had low drop-out in the present study; 66% of the participants of interest at the first wave also participated at the second, third and fourth wave, which can be considered as a high response in longitudinal research.

However, this study also has limitations. A first limitation is that we only captured three-year trajectories of work engagement. Although the concept of "mental retirement" does not give indications about the relevant time window, it assumes proximity of retirement. We expected it to start a few years before actual retirement, but it might be that our follow-up period was too short to capture the phenomena of "mental retirement". More years of data on work engagement are needed to discover whether declining work engagement starts more than three years before actual retirement. A related point is that persons who remained employed during follow-up may retire (early) within a short period after the follow-up period of the present study. This may have resulted in misclassification regarding the outcome, i.e. (early) retirement. Second, work engagement may be a too limited operationalization of the motivation to work. We suggest that future research also pays attention to changes in the meaning of work during the life course, and especially in the phase near retirement. Related to this, it might be that pre-retirement anticipation is not characterized by changes in the motivation to work, but rather by changes in the motivation *not* to work, i.e. to do things outside of work, such as enjoyable activities with a non-working spouse, or informal care for grandchildren, and family members or friends with health problems [30]. This also calls for further research. Third, although we included several potential confounders (age, gender and educational level) to determine the association between trajectory of work engagement and (early) retirement, previous

research showed that factors in the domains health and work, are also related to both work engagement and early retirement (26). We did not adjust for these factors in our analyses. However, in a sensitivity analysis we adjusted for the trajectory of work ability, which captures aspects of both work and health. Results from this analysis were similar to the results of the main analysis.

In conclusion, this study did not support the concept of "mental retirement". Instead, retirement was more likely to be preceded by steady low work engagement (at least the two years before the transition from work to retirement). Hence, interventions promoting work motivation are recommended to support the employability of these employees. In addition, the results may suggest that employees who approach their retirement develop second thoughts regarding their work or take a "final sprint" in the face of retirement. This finding could be used as a starting point for a dialogue between employers and employees to discuss possibilities to prolong working life.

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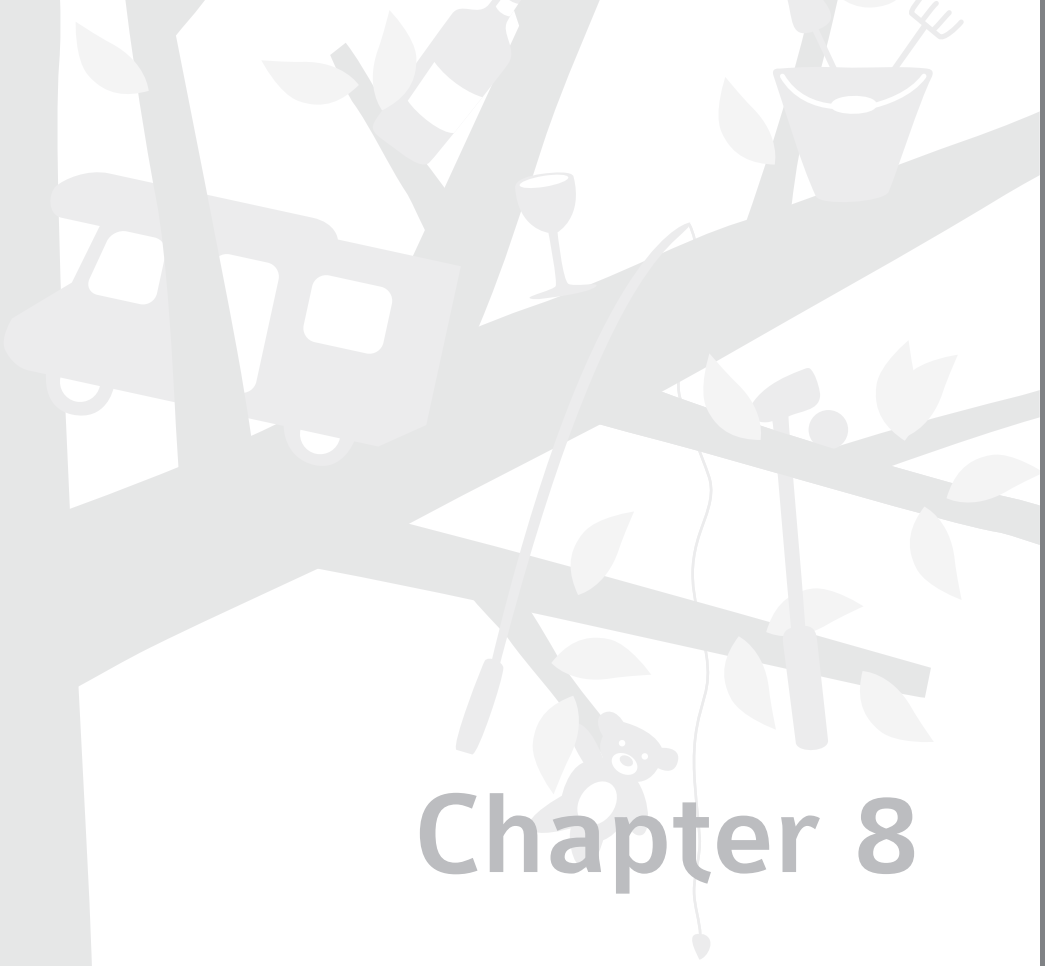

Chapter 8

A life course perspective on working beyond retirement – Results from a longitudinal study in the Netherlands

Under review

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Blatter BM
van der Beek AJ

Abstract

Background

There is a societal need that workers prolong their working lives. By adopting a life course perspective, this study aimed to investigate the influence of work motives and motivation, health, job characteristics, skills, and financial and social situation on working beyond retirement, and differences between "on time" and "off time" retirees (retirement age 65 and <65 years, respectively).

Methods

Retirees aged 57 to 67 years (N=1,054) who participated in the Dutch Study on Transitions in Employment, Ability and Motivation were included in this study. Participants filled out a questionnaire in 2010, 2011, 2012, and 2013. Predictors of working beyond retirement were identified using logistic regression analyses, and stratified analyses were performed to investigate differences between "off time" and "on time" retirees.

Results

High work engagement (OR=1.3), good physical health (OR=1.8), poor financial situation (OR=2.4), and voluntary work (OR=1.5) predicted working beyond retirement. For "off time" retirees, no financial possibility to retire early (OR=1.8) and not having a partner (OR=1.9) predicted working beyond retirement. "On time" retirees reporting more support at work (OR=0.7) and without the financial possibility to retire early (OR=0.5), worked beyond retirement less often.

Conclusions

The results indicated that especially the motivation to work, physical health and the financial situation were the most relevant aspects with regard to working beyond retirement, which supports the idea that the principle of "human agency" of the life course perspective is useful to understand factors that impact working beyond retirement. Most aspects of the life course principles of "linked lives" and "timing" seemed to be less relevant.

Background

To encounter the pressure of population ageing on the social security system and the expected shortage of workers in the next decades in many developed countries [1], there is a societal need for workers to prolong their working life. Many European governments responded to this need by increasing the statutory retirement age and discouraging early exit from the workforce. Working beyond retirement may also provide in the need for prolonged working lives. Although previous research has identified a variety of factors that influence early exit from the labor market, still little is known about the factors that impact working beyond retirement.

Retirement does not necessarily mean a final farewell to the labor market. In the Netherlands, a growing number of retirees engage in work activities between the end of their career employment and complete labor force withdrawal, which is often referred to as bridge employment. The percentage of people in the age group 65 to 70 years that works for at least 12 hours per week, increased from 3.4% in 2001 to 8.6% in 2014 [2]. In comparison, these numbers are much higher in the United States where 30.8% of the age group 65 to 69 worked at least 35 hours per week, in 2010 [3].

Although previous research has shown that health, job characteristics, skills and knowledge, and financial and social factors may push or pull workers from work to (non-disability) early retirement [4-10], still little is known about the factors that impact working beyond retirement. It is unclear whether this is just predicted by a beneficial status of factors that influence early retirement, or whether also additional factors play a role. Second, it is unclear whether different factors predict working beyond retirement among retirees who retire "on time" compared to retirees who retire early. Third, occupational epidemiologists often focus on health, work ability and physical job demands in relation to work force participation, whereas psychologists focus on motivational processes and psychosocial job demands, and economists focus on financial factors. To understand the complexity of working beyond retirement a broader perspective is needed.

Theoretical background

The life course perspective provides the opportunity to get a better understanding of the different factors that influence working beyond retirement. According to this perspective, it is expected that transitions, i.e. changes related to entering or exiting roles, such as the transition from work to retirement and vice versa, are embedded within multiple

interdependent trajectories, i.e. within the life spheres health, work, family and leisure [11]. Working beyond retirement cannot be fully understood in isolation of a person's health, work and motivation to work, skills and knowledge, and financial and social situation (i.e. family and other forms of social participation). In the present study we will use the life course perspective as a framework to understand determinants of working beyond retirement by focusing on the life course principles "human agency", "linked lives", and "timing" [11].

"Human agency" implies that individuals actively create their own lives and choices, but that this is done within a set of opportunities and constraints that come with one's history or that exist in one's environment. Previous research showed that work motivation and motives are important predictors of early retirement intention and working beyond retirement, respectively [12,13]. A study showed that the most important reason to work beyond retirement, is that someone enjoys working [13]. Health problems can be considered as a constraint to continue working, since it predicts early retirement [10,14]. Job characteristics, such as physical work demands and high work pressure, may also hinder continued working [8,15]. On the other hand, psychosocial job characteristics, such as appreciation at work, could facilitate continued working [5]. Financial factors can also be considered as a constraint or an opportunity to stop working. Previous research showed that the financial possibility to retire early strongly contributed to early retirement [5].

The life course perspective also emphasizes the social embeddedness of transitions, by pointing to the principle of "linked lives". This principle refers to the interdependence of lives and it states that the lives of individuals are bound to the lives of others [11]. Transitions from work to early retirement are shaped to a large extent by social relationships, i.e. within the family and at work. Previous research showed that having a partner increased the likelihood of early retirement [8]. Also support of the partner to continue working or to retire early predicted retirement at older age and early retirement [5,16].

Another principle within the life course perspective is "timing", which refers to the age at which an experience occurs and how it is experienced [11]. Transitions can occur "on time" or "off time". Transitions that occur off time ensure that persons do not have the chance to go through anticipatory socialization, and that they lack peers to provide social support and to share experiences regarding the transition [11]. Therefore, off time transitions might be experienced as involuntary. In recent decades, there has been a strong 'early exit culture' in the Netherlands [17]. However, several pension system

reforms have been implemented, such as the increase of the statutory retirement age from 65 years in 2012 to 67 in 2023 [18], and fiscal measures that made early retirement schemes by the employer or sector financially less attractive [19]. In addition, there is an extensive public debate on the need to prolong working life, and hence, the social norm may have become more favorable with respect to prolonged careers. Retiring at the statutory retirement age can be considered as "on time" retirement, and retiring before the statutory retirement age can be considered as "off time" retirement. Although early retirement is often considered as one of the more 'voluntary' pathways of early exit from the workforce, especially as compared to disability pension and unemployment, a recent qualitative study showed that early retirement is not always experienced in this way [20]. In this study employees with poor health sometimes retired early because they felt pushed out by their employer, although they themselves did not experience a reduced ability to work. In addition, such involuntary transitions from work to early retirement may have negative financial consequences, in situations where there was actually a financial need to continue working until the statutory retirement age.

Research questions and hypotheses

In the present study we investigate which factors influence working beyond retirement from a life course perspective. We aim to gain insight in how the timing of retirement could define subgroups of retirees regarding influential factors. Our first research question is: What is the influence of individual characteristics, work motives and motivation, health, job characteristics, skills and knowledge, and the financial and social situation on working beyond retirement? Our second research question is: Are there differences in the factors which influence working beyond retirement between those retirees who reached the statutory retirement age of 65 years, and thus retired "on time", and those who did not yet reach the statutory retirement age, and thus retired "off time" (early)? In line with the principle "timing" of the life course perspective, we expect that "on time" retirees are intrinsically motivated to work beyond retirement, e.g. because they enjoy working, find their work meaningful or interesting, or think it offers opportunities for learning and development, whereas "off time" retirees are extrinsically motivated to work beyond retirement, e.g. for financial reasons or because others expect them to do so.

Methods

Design and study population

The current study is part of the Study on Transitions in Employment, Ability and Motivation (STREAM) [21]. STREAM is a Dutch longitudinal study among 15,118 persons including employees (N=12,055), self-employed persons (N=1,029), and persons without paid employment (N=2,034) aged 45 to 64 years [21]. Persons participated in the GfK Intomart online panel and yearly filled out an online questionnaire in October / November 2010 (T1), 2011 (T2), 2012 (T3), and 2013 (T4). Participants come into the internet panel in various ways: via national representative research carried out by GfK Intomart (33%), via contacts of persons already included in the panel (23%), via newsletters (26%), via banners (2%), or because they applied for the internet panel themselves (16%). They were paid to complete a questionnaire, i.e. participants of the internet panel have a savings balance which was increased by about €3.00 for every completed questionnaire. Approaching participants for the follow-up questionnaires took place in the same way as for the baseline questionnaire. The study population of STREAM, including the way of approaching participants, was previously extensively described elsewhere [21]. In the present study, we used data of all waves of STREAM.

The study population of the present study consisted of persons who were employee at baseline (T1), who retired ("on time" or "off time") at one of the follow-up measurements (T2/T3/T4) and who were aged 56 to 64 years at baseline (T1). We chose 56 years as a lower age limit, since the proportion of employees that had retired (early) after one, two or three years of follow-up strongly increased from this age onwards. 64 years was the upper age limit, because this is the maximum age of persons included in STREAM at baseline. Persons who retired (early) at baseline were excluded, since we were interested in job characteristics as one of the domains of determinants in the present study. Also persons who lacked information on one of the determinants or the outcome variable were excluded from the present study. In total, 1,054 persons were included (Figure 1). To determine whether loss to follow-up was selective, we compared baseline characteristics of non-responders and responders using independent t-test. At baseline persons lost to follow-up (i) were more often women (47% versus 38%), (ii) had more often low or medium educational level (low in 35% versus 29%, medium in 36% versus 33%, and high in 28% versus 37%), and (iii) reported a slightly lower focus on development of knowledge and skills (3.7 versus 3.8).

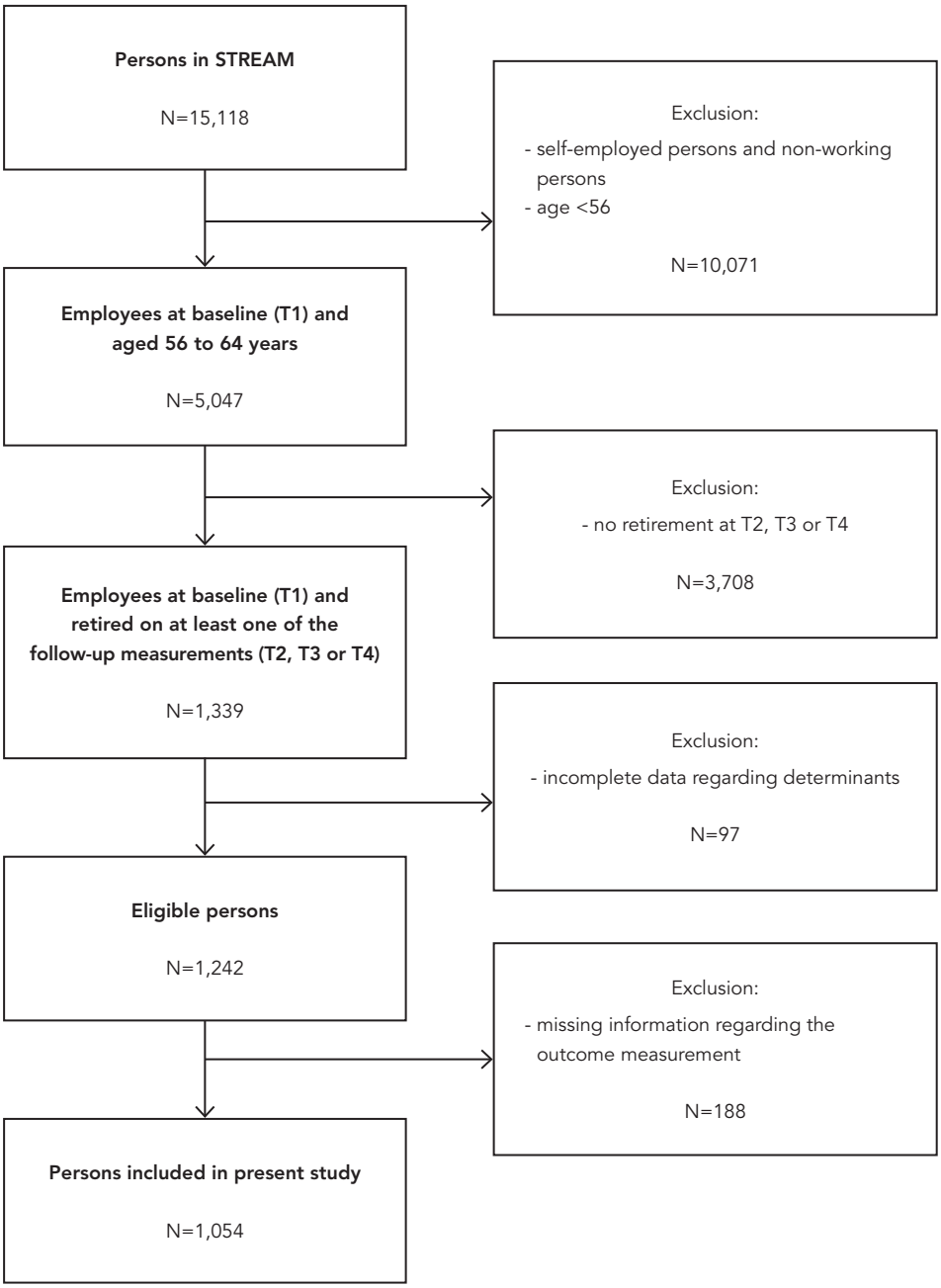

Figure 1. Flow of the study population

Measurements

All independent variables were derived from the baseline questionnaire and the outcome variable, i.e. working beyond retirement, was derived from the follow-up questionnaires.

Working beyond retirement

The outcome measure of the present study was working beyond retirement on one of the follow-up measurements. Working beyond retirement referred to working as an employee or self-employed person, while also receiving some form of retirement pension (old age pension or pension via an early retirement scheme). Those who work while also receiving a pension were compared with those who do not work and receive a pension.

Information on work and retirement was derived from one question asking persons to indicate their employment status with, among others, the following answering options: a paid job or multiple paid jobs as an employee, self-employed, early retirement and retirement. The Dutch pension system consists of three pillars: the state old-age pension, supplementary pension schemes by virtue of the employer or sector (about 90% of all employees), and private savings. The statutory retirement age at which persons receive their state old-age pension was raised from 65 years in 2012 to 67 in 2021. In this study retirement referred to persons who indicated that they retired, and were aged 65 years or older. Early retirement referred to those who reported that they retired early and those who reported that they retired, but were still under the age of 65 years.

Persons with and without an interruption of not working immediately after retirement fall within this definition. We do not know the percentages of persons who continued working without an interruption and who started working after an interruption of not working, but in a subsample of persons who worked beyond retirement and who participated in all four measurements, the percentages were 61%, and 39% respectively.

Individual characteristics

Educational level was measured using a question on the highest level of education completed with a diploma, and categorized into low (primary school, lower and intermediate secondary education, or lower vocational training), intermediate (higher secondary education, or intermediate vocational training) or high (higher vocational education or university).

Mastery was measured using the Pearlin Mastery Scale, which reflects the degree to which persons feel they are in control of matters that affect their lives [22]. This scale

consists of seven items with a 5-point answering scale ranging from "totally disagree" to "totally agree" (Cronbach's alpha 0.84). A higher score reflects a higher degree of mastery. Mastery was analyzed as a continuous scale.

Work motives and motivation

The following work motives were measured: working because someone likes to work, working because someone finds work meaningful, working for financial reasons, and working because others expect them to do so. Working because someone likes to work was measured using a scale consisting of three items (Cronbach's alpha 0.72). Working because someone finds work meaningful was measured using a scale consisting of two items (Cronbach's alpha 0.81). Working for financial reasons was measured using one item: "I work to earn money". Working because others expect them to do so was measured with one item: "I work because people in my environment think it is important". All items on work motives could be answered on a 5-point answering scale ranging from "totally disagree" to "totally agree". Due to the skewed distribution of the two scales and the two separate items on work motives, the variables were dichotomized.

Work engagement was measured using the dimensions vigor (three items) and dedication (three items) of the Utrecht Work Engagement Scale (UWES) [23]. Vigor refers to having a lot of energy at work and mental resilience, feeling strong and fit, and not getting tired from work very fast. Dedication refers to enthusiasm, inspiration, proud, and job satisfaction. The dimensions vigor and dedication were combined to one scale for work engagement (Cronbach's alpha=0.93). Items could be answered on a 7-point scale ('never' to 'always') and a higher score reflects a higher work engagement. In the analyses we considered work engagement as a continuous variable.

Health

The Short Form-12 Health Survey was used to measure both perceived physical and mental health [24]. Perceived physical health was measured using the physical component summary scale (PCS) and perceived mental health using the mental component summary scale (MCS) (24). The scales range from 0-100 (0=worst and 100=best possible health status). An example of a PCS item: "Does your health now limit you in climbing several flights of stairs?". An example of a MCS item is: "Have you felt downhearted and blue?". Due to the skewed distribution of both scales, the interquartile range (25th–75th percentile) was used to distinguish between poor, moderate, and good health.

Job characteristics

Physical demands were measured using a scale consisting of six items on regular use of force, the use of vibrating tools, awkward postures, prolonged standing, and prolonged squatting based on the Netherlands Working Conditions Survey 2009 [25] and the Dutch Musculoskeletal Questionnaire (Cronbach's alpha 0.86) [26]. A 5-point answer scale was used ranging from "always" to "(almost) never". Due to the skewed distribution, the interquartile range was used to distinguish between high, moderate, and low physical demands.

Job demands and job autonomy were measured using four and five items, respectively, all derived from the Job Content Questionnaire (Cronbach's alpha 0.87 and 0.78, respectively) [27,28]. A 5-point scale was used ranging from "always" to "(almost) never". An example of a job demands item is "Do you have to work very fast?". An example of an autonomy item is "Are you able to decide for yourself how to do your work?". Higher scores reflect higher job demands and higher job autonomy. Job demands and job autonomy were analyzed as continuous scales.

Furthermore, employees indicated on a 4-point scale whether the following aspects are present at work: appreciation, interesting work, and opportunities for learning and development [29]. The answers "not present at all" and "somewhat present" were classified into "not present" and "rather present" and "highly present" were classified into "present".

In addition, social support of colleagues and supervisor was measured using a 4-item scale derived from the Copenhagen Psychosocial Questionnaire (COPSOQ) (Cronbach's alpha 0.81) [30]. Employees indicated how often their colleagues or their supervisor helped or supported them and how often they were willing to listen to their work-related problems. A 5-point answer scale was used ranging from "always" to "almost never". Lower scores reflect higher social support from colleagues and supervisor. Social support of colleagues and supervisor was analyzed as a continuous scale.

Skills and knowledge

Developmental proactivity was measured using a 4-item scale derived from Van Veldhoven and Dorenbosch [31]. This scale reflects the extent to which persons (i) actively search for activities in their job that allow them to expand knowledge and skills and (ii) adapt their knowledge and skills to (future) changes in their jobs. Items could be answered on a 5-point scale ("totally disagree" to "totally agree" and Cronbach's alpha was 0.81). A higher score means a higher focus on development of skills and knowledge. Developmental proactivity was analyzed as a continuous scale.

Financial situation

In the domain of financial situation, the financial situation of the household was measured using the following item: 'What is the financial situation of your household now?'. Answering categories were "very short of money", "somewhat short of money", "just adequate", "some money left" and "a lot of money left". The categories were classified into "money left", "just adequate", or "short of money". Furthermore, the financial possibility to stop working before age 65 was measured. Employees were asked: "Could you financially afford to stop working before the official retirement age?" This question could be answered with "yes", "no", or "don't know".

Social situation

Participants provided information on their household composition. In the analyses we distinguished between persons with and without a partner. Also, employment status of a partner was assessed. In the analyses we distinguished between non-working and working. In addition, participation in informal care and voluntary work were assessed.

Analysis

Regarding the first research question predictors of working beyond retirement (no / yes) were studied by logistic regression analyses. Odds ratios (OR) and 95% confidence intervals (95% CI) were calculated to express the probability of working beyond retirement. In the first step of the analyses, univariate associations between individual characteristics, work motives and motivation, health, job characteristics, skills and knowledge, and financial and social situation at T1 with working beyond retirement on one of the follow-up measurements (T2 / T3 / T4) were established. Second, multivariate analyses were performed for all variables in the univariate analyses with $p<0.20$, using stepwise backward elimination. Variables with $p<0.05$ were retained in the final multivariate model. Age and gender were included in all analyses by default.

To answer the second research question about differences in determinants of working beyond retirement between persons who retired "off time" and persons who retired "on time" we performed stratified analyses for these groups. We followed the same procedure as for the whole group. Groups were defined on the basis of timing of their retirement: "off time" retirement for persons who retired before the age of 65 or "on time" retirement for persons who were 65 when they retired. All statistical analyses were carried out using SPSS Statistics 22.

Ethical issues

The Medical Ethical Committee of the VU University Medical Center Amsterdam declared that the Medical Research Involving Human Subjects Act (abbreviation in Dutch: WMO) did not apply to STREAM. The Medical Ethical Committee had no objection to the execution of this study. In the information for participants that accompanied the online questionnaire, it was emphasized that the privacy of participants was guaranteed, that all answers to the questions were treated confidentially, and that all data were stored in secured computer systems.

Results

Table 1 shows the characteristics of the study population (N=1,054). In total, 25% of the employees at T1 that retired at T2, T3 or T4, worked beyond retirement (N=264). 137 persons worked beyond "off time" retirement and 127 persons worked beyond "on time" retirement.

Table 1. Characteristics of the study population (N=1,054)

Characteristics		**Frequency (%)**	**Mean**	**IQR**
Individual characteristics				
Age	56-64 years	-	61.3	60.0-63.0
Gender	Male	61.6	-	-
Educational level	Low	29.1	-	-
	Intermediate	33.5	-	-
	High	37.4	-	-
Mastery	1-5	-	3.8	3.4-4.1
Work motives and motivation				
Working because someone likes to work	Yes	28.9	-	-
Working because someone finds work meaningful	Yes	26.9	-	-
Working for financial reasons	Yes	41.4	-	-
Working because others expect them to do so	Yes	23.9	-	-
Work engagement	1-7	-	4.4	3.7-5.3
Health				
Physical health	Poor	25.2	-	-
	Moderate	46.5	-	-
	Good	28.3	-	-
Mental health	Poor	25.3	-	-
	Moderate	49.8	-	-
	Good	24.9	-	-

Table 1 continued

Characteristics		Frequency (%)	Mean	IQR
Job characteristics				
Physical demands	High	22.1	-	-
	Medium	38.3	-	-
	Low	39.6	-	-
Job demands	1-5	-	3.0	2.5-3.5
Autonomy	1-5	-	3.9	3.4-4.4
Social support	1-5	-	3.5	3.0-4.0
Appreciation	Present	56.5	-	-
Interesting work	Present	22.6	-	-
Opportunities for learning and development	Present	7.2	-	-
Skills and knowledge				
Developmental proactivity (1-5)		-	3.8	3.5-4.0
Financial situation				
Financial situation of the household	Money left	66.6	-	-
	Just adequate	22.7	-	-
	Short of money	10.7	-	-
Financial possibility to stop working before age 65	Yes	62.9	-	-
	No	29.2	-	-
	Don't know	7.9	-	-
Social situation				
Partner	No	22.5	-	-
Employment status partner	Not working	39.0	-	-
	Working	38.5		
	No partner	22.5		
Informal care	Yes	19.9	-	-
Voluntary work	Yes	41.0	-	-
Outcome				
Working beyond retirement	Yes	25.0	-	-

*Interquartile range (25^{th}-75^{th} percentile)

Determinants of working beyond retirement

In the univariate logistic regression analyses, older persons, those who work because they like to work, and those with higher degrees of work engagement, appreciation at work and interesting work, those with good physical health, those with a high focus on development of skills and knowledge (i.e. developmental proactivity), those who participate in voluntary work and those who have a poor financial situation, worked beyond retirement more often (Table 2). In the multivariate analyses, older age (OR=1.1), being male (OR=1.1), high work engagement (OR=1.3), good physical health (OR=1.8), participating in voluntary work (OR=1.5) and a poor financial situation (OR=2.4), predicted working beyond retirement.

Table 2. Longitudinal associations between determinants and working beyond retirement in logistic regression analyses (N=1,054)

Characteristics		Univariate		Multivariate	
		OR	95% CI	OR	95% CI
Individual characteristics					
Age	56-64 years	1.1**	1.0-1.2	1.1**	1.0-1.2
Gender	Male	1.3*	0.9-1.7	1.4**	1.0-1.9
Educational level	Low	1.0			
	Intermediate	1.1	0.8-1.6		
	High	1.2	0.9-1.7		
Mastery	1-5	1.2*	1.0-1.6		
Work motives and motivation					
Working because someone likes to work	Yes	1.4**	1.1-2.0		
Working because someone finds work meaningful	Yes	1.1	0.8-1.5		
Working for financial reasons	Yes	1.0	0.7-1.3		
Working because others expect them to do so	Yes	1.1	0.8-1.5		
Work engagement	1-7	1.4**	1.2-1.5	1.3**	1.1-1.5
Health					
Physical health	Poor	1.0		1.0	
	Moderate	1.2	0.8-1.7	1.1	0.7-1.6
	Good	2.1**	1.4-3.1	1.8**	1.2-2.8
Mental health	Poor	1.0			
	Moderate	1.4*	1.0-2.0		
	Good	1.5*	1.0-2.2		
Job characteristics					
Physical demands	High	1.0			
	Medium	1.4*	0.9-2.0		
	Low	1.3*	0.9-1.9		
Job demands (1-5)		1.0	0.8-1.2		
Autonomy (1-5)		1.0	0.9-1.3		
Social support (1-5)		0.9	0.8-1.1		
Appreciation	Present	1.4**	1.1-1.9		
Interesting work	Present	1.7**	1.3-2.4		
Opportunities for learning and development	Present	1.3	0.8-2.2		
Skills and knowledge					
Developmental proactivity (1-5)		1.5**	1.2-1.9		
Financial situation					
Financial situation of the household	Money left	1.0			
	Just adequate	0.8	0.6-1.2	1.0	0.7-1.4
	Short of money	2.0**	1.3-3.0	2.4**	1.5-3.7
Financial possibility to stop working before age 65	Yes	1.0			
	No	1.1	0.8-1.5		
	Don't know	0.9	0.5-1.6		

Table 2 continued

Characteristics		Univariate		Multivariate	
		OR	95% CI	OR	95% CI
Social situation					
Partner	No	1.1	0.8-1.6		
Employment status partner	Not working	1.0			
	Working	1.1	0.8-1.6		
	No partner	1.2	0.8-1.8		
Informal care	Yes	0.8	0.5-1.1		
Voluntary work	Yes	1.4**	1.1-1.9	1.5**	1.1-2.0

*p value<0.20, **p value<0.05

Determinants of working beyond "off time" and "on time" retirement

In the multivariate analyses within the group of persons that retired "off time", being male (OR=2.1), high work engagement (OR=1.3), good physical health (OR=2.1), participating in voluntary work (OR=1.5) and a poor financial situation (OR=2.0) predicted working beyond retirement (Table 3). The ORs were comparable to the ORs of the total group of retirees. In addition, not having a partner (in comparison with a non-working partner) (OR=1.9) and not having the financial possibility to retire before the age of 65 (OR=1.8) predicted working beyond retirement.

In the multivariate analyses within the group of persons that retired "on time", older age (OR=1.3), high work engagement (OR=1.5), a poor financial situation (OR=2.2) predicted working beyond retirement (Table 3). The ORs were comparable to those of the total group of retirees. In addition, persons who experienced more social support from colleagues and supervisor (OR=0.7) and persons who did not have the financial possibility (OR=0.5) or did not know whether they had the financial possibility (OR=0.5) to retire before the age of 65 worked beyond retirement less often.

Table 3. Longitudinal associations between determinants and working beyond "off time" (N=638) and "on time" retirement (N=416) in logistic regression analyses

Characteristics		"Off time" retirement				"On time" retirement			
		Univariate		Multivariate		Univariate		Multivariate	
		OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
Individual characteristics									
Age (56-64)		1.0	0.9-1.1	1.0	0.8-1.1	1.3**	1.1-1.7	1.3**	1.0-1.6
Gender	Male	2.0**	1.3-3.0	2.1**	1.3-3.3	0.9	0.6-1.4	0.9	0.6-1.4
Educational level	Low	1.0				1.0			
	Intermediate	1.4	0.8-2.3			0.9	0.6-1.6		
	High	1.4*	0.9-2.3			1.2	0.7-2.0		
Mastery (1-5)		1.1	0.8-1.5			1.5**	1.0-2.1		
Work motives and motivation									
Working because someone likes to work	Yes	1.6*	1.0-2.4			1.2	0.8-1.8		
Working because someone finds work meaningful	Yes	1.0	0.6-1.6			1.2	0.7-1.8		
Working for financial reasons	Yes	1.1	0.8-1.6			0.8	0.5-1.2		
Working because others expect them to do so	Yes	1.5*	1.0-2.2			0.8	0.5-1.3		
Work engagement (1-7)		1.2**	1.0-1.4	1.3**	1.1-1.5	1.5**	1.2-1.8	1.5**	1.2-1.9
Health									
Physical health	Poor	1.0		1.0		1.0			
	Moderate	1.2	0.7-2.0	1.2	0.7-2.0	1.1	0.6-1.9		
	Good	2.0**	1.2-3.4	2.1**	1.2-3.8	2.2**	1.2-3.8		
Mental health	Poor	1.0				1.0			
	Moderate	1.2	0.8-1.9			1.8*	1.0-3.2		
	Good	1.0	0.6-1.7			2.3**	1.2-4.2		
Job characteristics									
Physical demands	High	1.0				1.0			
	Medium	1.4*	0.9-2.4			1.2	0.6-2.1		
	Low	1.4	0.8-2.3			1.0	0.6-1.9		

Table 3 continued

Characteristics		"Off time" retirement				"On time" retirement			
		Univariate		Multivariate		Univariate		Multivariate	
		OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
Job characteristics									
Job demands (1-5)		1.2	0.9-1.5			0.9	0.7-1.1		
Autonomy (1-5)		1.3*	1.0-1.7			0.9	0.7-1.1		
Appreciation	Present	1.3*	0.9-2.0			1.5*	1.0-2.3		
Interesting work	Present	1.6**	1.0-2.5			1.8**	1.1-2.8		
Opportunities for learning and development	Present	1.9*	1.0-3.6			0.8	0.4-1.9		
Social support (1-5)		1.0	0.8-1.3			0.8*	0.6-1.0	0.7**	0.6-0.9
Skills and knowledge									
Developmental proactivity (1-5)		1.4**	1.0-2.0			1.5**	1.1-2.1		
Financial situation									
Financial situation of the household	Money left	1.0				1.0		1.0	
	Just adequate	0.8	0.5-1.3	0.9	0.5-1.5	0.8	0.5-1.4	1.0	0.5-1.7
	Short of money	2.2**	1.2-3.9	2.0**	1.0-4.0	1.7*	0.9-3.0	2.2**	1.1-4.4
Financial possibility to stop working before age 65	Yes	1.0		1.0		1.0		1.0	
	No	1.7**	1.1-2.8	1.8**	1.1-3.2	0.6**	0.4-0.9	0.5**	0.3-0.8
	Don't know	1.2	0.6-2.4	1.5	0.8-3.1	0.5*	0.2-1.3	0.4*	0.1-1.1
Social situation									
Partner	No	1.3	0.8-2.1			0.8	0.5-1.3		
Employment status partner	Not working	1.0		1.0		1.0			
	Working	1.3*	0.9-2.1	1.3	0.8-2.1	1.0	0.6-1.7		
	No partner	1.6*	0.9-2.7	1.9**	1.1-3.4	0.9	0.5-1.4		
Informal care	Yes	0.8	0.5-1.2			0.9	0.5-1.5		
Voluntary work	Yes	1.6**	1.1-2.4	1.5**	1.0-2.2	1.3*	0.9-2.1		

*p value<0.20, **p value<0.05

Discussion and conclusion

This study aimed to gain insight in the influence of individual characteristics, work motives and motivation, health, job characteristics, skills and knowledge, and the financial and social situation on working beyond retirement and to investigate whether there are differences between "on time" and "off time" retirees.

Regarding the first research question, our study showed that work motivation, health, and the financial situation influence working beyond retirement. This is in line with the principle "human agency" of the life course perspective and with previous studies on predictors of early retirement [5,6,9,10,12]. The results showed that persons who were highly engaged in their work were more likely to work beyond retirement, which confirms findings from a previous study that showed that intrinsic motivation was related to the willingness to continue working [32], and a study that showed that a lower motivation to work was associated with intention to retire early [12]. Previous research showed that self-perceived poor health predicts early retirement, but that specifically mental health problems are not related to early retirement [10]. Indeed, the opposite seems true with regard to working beyond retirement; good physical health predicts working beyond retirement and good mental health does not. Hence, even though our study population probably is a selection of the more healthy employees, since the unhealthy ones partly have left the workforce through disability benefits in previous years ('healthy worker effect' [33]), physical health predicts working beyond retirement. Contrary to what we expected, work motives, job characteristics, and skills and knowledge did not predict working beyond retirement multivariately, whereas the enjoyment motive, appreciation at work, interesting work and developmental proactivity predicted working beyond retirement in the univariate analyses. This may be explained by work engagement, which was moderately interrelated with these variables (Pearson's correlations 0.36, 0.30, 0.34, and 0.40, respectively).

In line with the principle "linked lives" of the life course perspective, we expected that having a partner, and employment status of the partner are related to working beyond retirement. However, our study found no effect. This contradicts previous research that showed that having a partner increased the likelihood of early retirement [8], and that the attitude and support of the partner about continuing to work or early retirement predicted retirement at older age and early retirement, respectively [5,16]. However, persons who participated in voluntary work were more likely to work beyond retirement, which is an

indication that working beyond retirement is embedded in someone's social situation to a certain degree, and that it cannot be seen in isolation from other social relationships.

Regarding the second research question, our study showed that determinants of working beyond "off time" retirement and working beyond "on time" retirement were largely comparable. However, two remarkable differences should be mentioned; in the group of "off time" retirees, not having the financial possibility to retire early predicted working beyond retirement, whereas in the group of "on time" retirees persons who did not have the financial possibility to retire early were less likely to work beyond retirement. This partially supports our hypothesis that "off time" retirees are extrinsically motivated to work beyond retirement to a larger extent than "on time" retirees. This might indicate that the group of "off time" retirees partly consisted of persons who experienced their transition from work to early retirement as involuntary, for example because they felt pushed out by their employer, whereas they actually wanted to continue working or could not financially afford to retire early, and therefore started to work beyond retirement. Unfortunately we did not have information on voluntariness of the transition. Future research might investigate whether the retirement context, i.e. the reason for retirement and voluntariness of retirement could be important characteristics to define subgroups of retirees with regard to working beyond retirement.

Persons who were highly engaged in their work, were more likely to work beyond retirement, both in the group of "off time" retirees and the group of "on time" retirees. This is contrary to our hypothesis that "on time" retirees would be intrinsically motivated to a larger extent than "off time" retirees. Although timing of retirement could partially define subgroups of retirees, the pattern regarding intrinsic and extrinsic motivation is not as clear as we would have expected based on the timing principle of the life course perspective. This may indicate that there are also other characteristics that could define subgroups of retirees, such as educational level. It may be that within our study population, educational level explains why we found that both intrinsic factors and extrinsic factors predicted working beyond retirement. We tested this possibility by post-hoc analyses stratified by educational level (data not shown). The results indicated that within persons with a higher educational level, having the financial possibility to retire early predicted working beyond retirement, whereas within persons with a lower educational level having the financial possibility was not related to working beyond retirement. However, the role of work engagement was comparable for persons with a low educational level and those with a high educational level. Hence, also educational level could only partially explain which

factors predicted working beyond retirement. This may imply that either there are no clear subgroups of retirees regarding working beyond retirement, or that other characteristics, which were not incorporated in the present study, play a role. Although our study involved a broad range of variables in a diversity of domains, we did not consider different 'types' of retirement. We were not able to distinguish between retirement schemes, e.g. an early retirement scheme via employer or sector, retirement because someone reached a job-specific retirement age, part-time, or full-time retirement. Especially the degree to which working beyond retirement is financially attractive might differ between different retirement schemes. Future research might further investigate whether education and 'type' of retirement are relevant characteristics to define subgroups of retirees.

Strengths of the present study are the longitudinal character of the large dataset, and the fact that variables frequently studied in different areas of expertise, i.e. work motives and motivation, health, job characteristics, skills and knowledge, and the financial and social situation, were all included in this study. Moreover, we had low drop-out in the present study; 79% of the participants of interest at T1 also participated at T2, T3, and T4, which can be considered as a high response in longitudinal research. However, this study also has limitations. First, all data relied on self-reports. A drawback of measuring employment status relying on self-report is that it is dependent on the interpretation of the participant and it is thus not defined by, for example, the main source of income as registered by a tax institution or the government. A second limitation is the relatively short follow-up period of three years, which concerns only a small part of the whole life course. From a life course perspective one might expect that also experiences earlier in life impact decisions regarding work and retirement. This was supported by a study of Damman et al. that showed that mid-life experiences, i.e. educational investments, job changes, late transitions into parenthood, and late divorces, are associated with weaker retirement intentions, whereas mid-life health problems are associated with stronger retirement intentions [4]. In addition, this study showed that later labour market entry and late transitions into parenthood were associated with a lower likelihood of early retirement, and that part-time work before the age of 50 years resulted in a higher likelihood of early retirement. Third, selection bias may have occurred as a result of selective entry in the internet panel. Certain groups of persons, i.e. without internet access, illiterate persons and persons who do not master the Dutch language, may be underexposed in an internet panel. The findings of the present study may not be generalizable to these groups. Selection bias may also have occurred as a result of selective non-response at follow-

up. However, the response of the study was high, i.e. 79%, and differences between respondents and non-respondents on baseline characteristics were small.

As previously described, future research is needed to investigate the role of the retirement context, i.e. the reason for retirement and voluntariness of retirement, as well as differences in educational level and 'type' of retirement with regard to working beyond retirement. Besides, we used the statutory retirement age of 65 years to distinguish between "on time" and "off time" retirement. Since not only institutional but also cultural and individual norms determine the 'right' time of a transition, future research is needed to determine where the line should be drawn. Furthermore, future research should explore further possibilities of using the life course perspective to understand factors that influence working beyond retirement. There is still little understanding on how different determinants influence working beyond retirement and why persons work beyond retirement. Especially the group of persons who works beyond early retirement is of interest, since an alternative career path for these persons may have been to retire at later age. Finally, it is unclear whether working beyond retirement mostly occurs in an employment contract with same employers and occupations or different employers and occupations, and whether it can be seen as a sustainable way of prolonging working life. We recommend future research to give more insight in these characteristics of working beyond retirement.

In conclusion, our results indicated that especially the motivation to work, physical health, the financial situation of the household, and participation in voluntary work played an important role in working beyond retirement. This supports the idea that the human agency principle of the life course perspective is useful to understand factors that impact working beyond retirement. Since social situation did not play a role, except for voluntary work, less evidence was found for the linked lives principle. Also timing seemed to be less relevant, since hardly any differences between "off time" and "on time" retirees were found.

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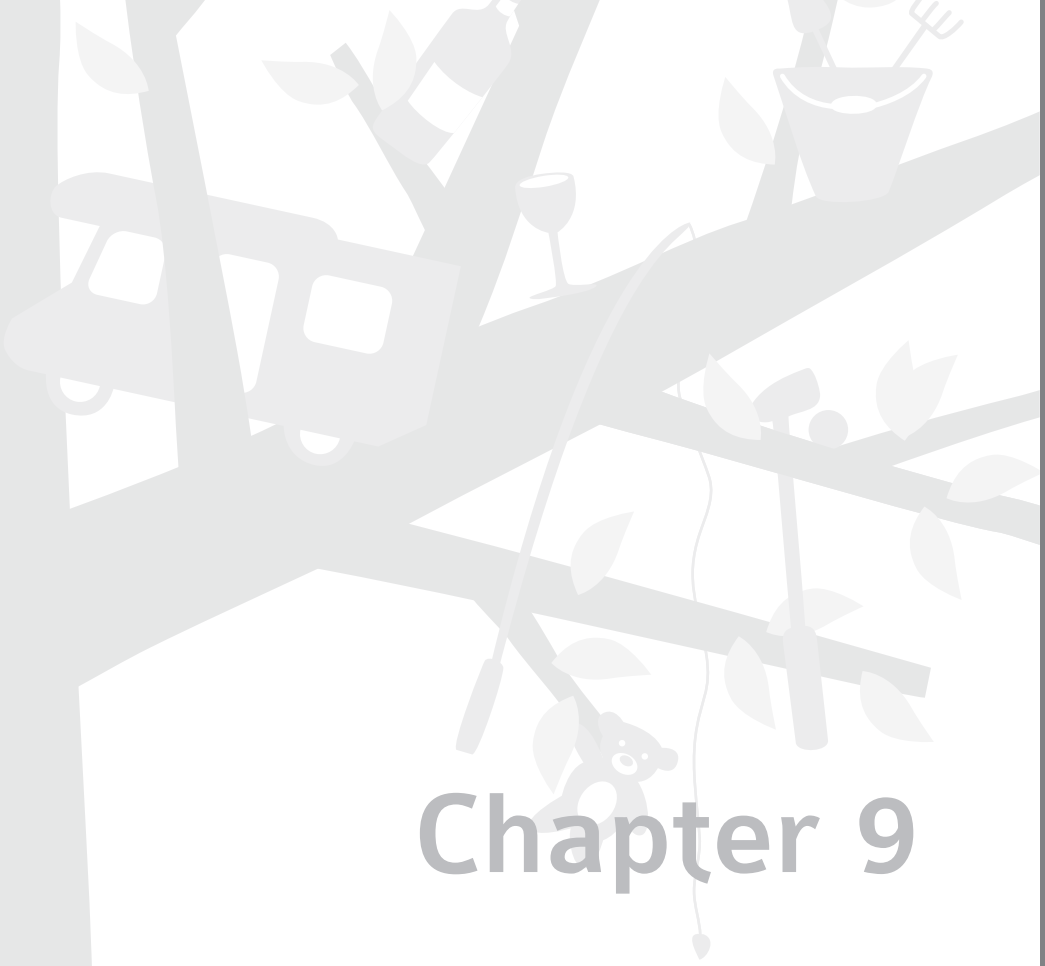

Chapter 9

General discussion

In this final chapter, the main findings of this thesis are summarized and methodological considerations are discussed. Subsequently, the findings are placed in the context of three important future trends, i.e. the increase in older workers with chronic diseases, the increasing demand on older workers to provide informal care, and the increasing flexibility of the labor market. This chapter concludes with recommendations for future research and practice.

Main findings

The central aim of this thesis is to gain insight in determinants of, and mechanisms underlying early retirement and working beyond retirement. It takes a multidisciplinary perspective, meaning that factors frequently studied in different areas of research, i.e. health, job characteristics, skills and knowledge, social and financial factors, and the ability, motivation and opportunity to work are all addressed. In addition, this thesis zooms in on the role of health in the transition from work to early retirement.

Determinants of early retirement and working beyond retirement

This thesis shows that the transition from work to early retirement is influenced by various domains, e.g. health, job characteristics, skills and knowledge, and social and financial factors. Although specific factors differ between individuals, for most employees a combination of factors plays a role in the process towards early retirement.

More specifically, poor perceived health influenced early retirement. Further analyses conceptualizing health more narrowly, i.e. as having a chronic disease or not, showed that psychological and musculoskeletal health problems more often resulted in early retirement, whereas other chronic diseases did not. Several job characteristics influenced early retirement. Both quantitative and qualitative analyses revealed that the social climate at work influenced early retirement (e.g. appreciation, conflicts). Our qualitative study suggested that physically demanding work, high work pressure and organizational changes also influenced the transition from work to early retirement, although this was not supported or addressed in our quantitative studies. Furthermore, employees who were highly focused on development of their skills and knowledge were less likely to retire early. Regarding social factors, those with a partner who has a positive attitude about stopping to work retired early more often. The qualitative study added that the wish to do enjoyable things with a non-working or older spouse, to spend more time with

grandchildren, and to take care of family members or friends were reasons to retire early. Finally, the financial opportunity to stop working was a determinant of early retirement. At a population level, the financial opportunity to stop working before the age of 65 years contributed most to early retirement, followed by the attitude of the partner with respect to stopping to work, and appreciation at work.

In line with early retirement, working beyond retirement was more likely among employees with better perceived health, higher work engagement and a poor financial situation of the household. In addition, persons participating in voluntary work more often continued working. No evidence was found that job characteristics and skills influenced working beyond retirement.

Underlying mechanisms

Determinants in the domains health, job characteristics, skills and knowledge, and social and financial factors influenced the transition from work to early retirement via lower work ability, lower work motivation, and less opportunity to work. To illustrate, poor physical and mental health were related to a lower work ability, which in turn related to a higher likelihood of early retirement. A poor social climate at work influenced early retirement via a lower motivation to work. A lower focus on development of skills and knowledge resulted in early retirement via a lower opportunity to work as offered by the employer.

Zooming in on health revealed that poor physical and mental health influenced early retirement via four different pathways, i.e. (a) persons felt unable to work at all due to health problems, (b) poor health resulted in a self-perceived decline in the (future) ability to work, (c) employees were afraid of a further decline in health, and (d) employees with a poor health felt pushed out by their employer, although they themselves did not experience a decline in their ability to work. Besides poor health, also good health influenced early retirement. Persons wanted to enjoy life while their health still allowed them to do so. The awareness of being in 'good health' arose, when persons were confronted with the finiteness of life. Health could influence early retirement via several pathways at the same time.

To better understand underlying mechanisms, this thesis also zoomed in on the motivation to work, hereby addressing the notion of "mental retirement", i.e. the idea that employees disconnect from work, before their actual retirement. Analyses showed that (early) retirement is likely to be preceded by steady low work motivation, as compared to steady high work motivation. Although previous research suggested that older workers may "mentally retire" from work due to the prospect of retirement, this thesis did not

find support for such a "clock out" process, i.e. (early) retirement was not likely to be preceded by declining work motivation.

Methodological considerations

When interpreting the findings of this thesis, several methodological considerations need to be taken into account that relate to the study sample, the data, and the qualitative analyses.

Study sample

In this thesis, data of the Study on Transitions in Employment, Ability and Motivation (STREAM) were used. STREAM is a prospective cohort study among 12,055 employees, 1,029 self-employed persons, and 2,034 non-working persons, all aged 45 to 64 years at baseline. Due to stratification by age, this large dataset included relatively many persons who were eligible for early retirement during follow-up.

Persons included in STREAM participate in an internet panel of GfK. An internet panel was chosen as STREAM primarily aimed to investigate longitudinal relations. In general, loss to follow-up in internet panels is lower than in random samples from population registries, which is especially important in longitudinal studies. However, using an internet panel may have introduced selection bias due to selective entry in the internet panel. Certain groups of persons may be overrepresented in an internet panel, e.g. persons who are used to work with computers, such as white-collar workers, whereas other groups of persons may be underrepresented, e.g. persons without access to internet, illiterate persons, and persons who do not master the Dutch language. Although the study population was representative of the Dutch population with respect to gender and educational level within different age groups, we do not know to what extent the use of an internet panel influenced the data and the findings of this thesis.

Although the response rate at follow-up in STREAM was high, i.e. ranging from 83% in a study with one year of follow-up to 66% in a study with three years of follow-up, *selective loss to follow-up* cannot be ruled out. Persons lost to follow-up were slightly younger, reported a slightly poorer mental health and a slightly higher focus on development on knowledge and skills, and more often had no partner and a worse financial situation of the household. However, the differences between those who participated at follow-up and those who did not were small, and were considered as not relevant.

Self-reported data

One dataset, i.e. STREAM, was used for all quantitative studies within this thesis. A drawback of STREAM is that it concerns questionnaire data, and hence both dependent and independent variables relied on *self-report*. Therefore, information bias may have played a role. To our knowledge, no previous study investigated the validity of self-reported employment status. It is possible that persons with several employment statuses (e.g. employee and retiree) report their status differently (employee, or retiree, or both). It is unclear whether and how this influenced our findings. In future studies registry data, e.g. source of income as registered by Statistics Netherlands, could be used as additional information to assess employment status. Self-report may also bias the results if there are systematic differences in answering questions on determinants by the outcome measure. For example, persons may rate their health more negatively to justify that they are going to retire early, and as a consequence the risk estimates of the influence of health on early retirement would be overestimated. We do not know to what extent differential misclassification influenced the data and the findings of this thesis.

Longitudinal data

The analyses within this thesis relied on longitudinal data, which allowed us to relate independent and dependent variables assessed at different moments in time, and to identify groups of employees that followed similar trajectories over time.

By using follow-up periods varying from one to three years, only a relatively small part of a person's working life was captured. A study of Damman et al showed that the preretirement opportunity structure was more important to predict early retirement than life experiences earlier in life, i.e. in the educational, work, health and family domain [1]. However, factors earlier in life, such as low job satisfaction throughout the working career or continuous health problems over the life course might be of influence as well, which would require longer follow-up periods.

In addition, the strength of the association between predictors and early retirement may depend on the time window used. Whereas some factors may be of great importance one year before early retirement, for example sudden deterioration in health or a life event, other factors may be relevant earlier in working life, for example high physical workload. Besides, previous research showed that the prospect of retirement may result in a reduction of work activities [2]. Future research could give insight in the relevant time window of determinants, by studying within one dataset how the strength of the

association between different determinants and early retirement depends on the period of time between the assessment of these variables.

Qualitative research

In addition to the quantitative analyses, thirty early retirees who participated in STREAM were interviewed about their reasons for early retirement in a qualitative study. Combining quantitative with qualitative analyses allowed us to gain a better understanding of underlying mechanisms. For example, the quantitative studies showed that poor health influenced early retirement via lower work ability, and in the qualitative study also other pathways in which health influenced early retirement were mentioned. In addition, our finding from the qualitative study that persons with good health explicitly mentioned their good health as a reason for early retirement, may partially explain why some previous quantitative research did not find a significant relationship between health and early retirement [3].

In line with the aforementioned information bias in the quantitative analyses, qualitative studies have a risk of information bias as well. Persons looked back at their transition from work to early retirement. They may not have remembered their reasons for early retirement correctly, and they may have attributed reasons to this 'event'. The 'real' story may be influenced by psychological processes, such as cognitive dissonance. In-depth follow-up questions were used to validate the stories of the interviewees.

Findings in the light of future trends

In the past years several policy reforms that discourage early exit from the workforce and stimulate prolonged working lives were introduced. Due to the increasing life expectancy, it is expected that state pension age will be beyond the age of 71.5 years in 2060 [4] and people will prolong their working lives further. At the same time, tomorrow's older workers will have to cope with the following three trends in our society:

1. Older workers will more often suffer from chronic diseases
2. Older workers will combine paid work with informal care more often
3. Older workers will need to cope with a more flexible labor market

These trends may impact retirement and prolonged working lives in the future. In the following, these trends are described and linked to the findings of this thesis.

Trend 1: Older workers will more often suffer from chronic diseases

The prevalence of chronic diseases increases with age, i.e. 66.2% of the population aged 55 to 65 years reports at least one chronic disease, as opposed to 58.0% of the population aged 50 to 55 years [5]. Among persons older than 65 years the prevalence is even higher; 72.7% of the population aged 65-75 years is having at least one chronic disease. Since it is expected that the mean age of leaving employment will further increase within the coming years, the proportion of workers with a chronic disease is likely to increase as well. This raises questions on the consequences of prolonged working lives for persons with poor perceived health and/or chronic diseases.

The findings of the current thesis revealed that several chronic diseases increased the risk of early exit from the workforce (chapter 3). Employees with severe headache or migraines, diabetes mellitus, and musculoskeletal, respiratory, digestive and psychological health problems, had an increased risk of receiving disability benefits. Employees with psychological and circulatory health problems also had an increased risk of unemployment, and those with psychological and musculoskeletal health problems more often retired early. Although not all chronic diseases increased the risk of early retirement, poor perceived health was a determinant of early retirement in several studies (chapter 2 and 4) and good perceived health was a determinant of working beyond retirement (chapter 8). The finding that perceived health is a stronger predictor of early retirement than having a chronic disease is in line with a recent literature review [6]. Our findings are also in agreement with the conclusion of Baanders et al that common consequences of chronic diseases, i.e. perceived health, pain, fatigue, and functional limitations, are more important to predict participation in paid work than specific diagnoses [7].

Having a chronic disease is not always accompanied by poor perceived health. In STREAM 33% of the persons with a chronic disease reported poor perceived health, and hence 67% of the persons with a chronic disease had good perceived health. On the other hand, only 1% of the persons who reported poor perceived health had no chronic disease. Since perceived health is a stronger predictor of early retirement than having a chronic disease, persons with a chronic disease and good perceived health may not always be at risk for early retirement. Taking into account the trend that older workers will more often suffer from chronic diseases, this is good news. However, the question remains what the consequences of prolonged working lives are for persons with poor perceived health.

Exit routes act as communicating vessels

In future, persons with poor perceived health who can financially afford to stop working due to personal savings or other sources of income, may still 'retire early' irrespective of the statutory retirement age. However, those who cannot afford this, may leave the workforce via other exit routes, i.e. disability pension or unemployment. Previous research showed that different exit routes act as communicating vessels [8-10]. Schils showed that early retirement and social insurance, i.e. disability pension and unemployment, acted as communicating vessels in the Netherlands in the period 1990-2001 [9]. Lindeboom et al added that especially in the older age groups, i.e. as soon as workers become eligible for an early retirement scheme, early retirement can be considered a substitute of disability pension [10]. It might be that early retirement developed itself as an easier, less bureaucratic way of leaving the workforce for older workers with poor health than disability pension, both for employees and their employers.

Our qualitative study in chapter 6 also illustrated that early retirement can be an alternative route for disability pension. A 63-year old woman had suffered from psychological health problems (ADHD and burnout) for many years and quitted paid employment after being granted a work disability pension. During re-examination of her work disability pension, her insurance physician assessed her as being able to work 16 hours per week. This woman and her employer together concluded early retirement would be the best solution. The woman felt it was impossible for her to work, and experienced early retirement as the only possible escape from work. Hence, both macro-economic studies and qualitative studies at the level of the individual employee suggest that various exit routes from the workforce act as communicating vessels.

By limiting the financial possibility to retire early, persons with poor perceived health, or those with psychological or musculoskeletal health problems that would have retired early under the present financial conditions, may leave the workforce via other exit routes in the future. Since the accessibility of disability pension has strongly been decreased as well, they may start to receive unemployment benefits more often and afterwards the minimum basic financial support in the Netherlands.

Health-related consequences of prolonged working lives

Older workers may also continue working in spite of poor health. Although this may have a favorable effect on their post-retirement income level, it may also influence their health. Health relates to quality of life at the individual level, but also to health care costs

at the societal level. The qualitative study within this thesis showed that some employees with health problems were afraid of a further decline in health when they would have continued working. Therefore they chose to retire early (chapter 5). This is illustrated by the following quote: *"Look, deciding to stop at 60… that was actually because I didn't want to end up handicapped early. When I got that TIA and the oppression complaints, I said '60 is my limit'. I don't want to think of being 62 or 63 and it going down hill from then on, and I get disabled. Then I'd have no one to blame but myself."* For now, it is largely unclear whether these worries about future health decline are justified.

In general, (re-)employment is good for health [11,12]. However, health-related consequences of prolonged working lives, especially among persons with poor health have not been described yet. Previous research that addressed the impact of retirement on health were done within the general population, and these findings are inconclusive. To illustrate, in a recent review it was concluded that retirement can have both beneficial as well as adverse health effects [13]. Health trajectory analyses showed that retirement was associated with a substantial improvement in self-rated health [14] and fatigue [15]. No decrease of the incidence of chronic diseases [15] and myocardial infarction [16] after retirement was found. A recent study of Schuring el al added that poor health preceded early retirement and becoming economically inactive, but these exit routes prevented further deterioration of health among low-educated workers [17]. Early retirement had an adverse effect on self-rated health among high educated workers. The previously mentioned study of Westerlund et al focused on the influence of retirement on the course of health among persons with a depression, musculoskeletal health problems, and physical illness. It was found that these health problems before retirement were associated with a steeper increase in the prevalence of poor health while still in work, and that persons with these health problems benefited more from retirement than those who did not have these health problems [14]. In addition, a poor work environment, that is characterized by a low occupational grade, high physical and psychological demands, and low job satisfaction, was associated with a steeper increase in the prevalence of poor health before retirement, and a greater retirement-related improvement.

Hence, early retirement may have favorable consequences on health among workers with health problems, a lower educational level, and a poor working environment. Future research is recommended to carefully monitor the effects of later retirement on health before, during and after retirement, especially among these vulnerable groups of workers. On a macro level, it seems important to monitor the trade-off between the societal gains of prolonged working lives and the potentially increasing societal costs due to health care.

A work environment that facilitates prolonged working despite poor health

The work environment offers opportunities to support prolonged working lives among employees with chronic diseases. A study of Boot et al suggested that older workers with chronic diseases have special needs as opposed to workers without chronic diseases; this study indicated that having more psychosocial resources is predictive for having paid work in workers with chronic disease and not in workers without chronic disease [18]. In this thesis we showed that especially high autonomy buffered the adverse influence of chronic disease on receiving disability benefits (chapter 3). Although not statistically significant, this study furthermore suggested that higher social support and lower psychological job demands buffered this relation as well. Another study confirmed the importance of a favorable work environment by showing that lower autonomy and higher job demands increased the association of several chronic diseases with sickness absence [19]. A qualitative study showed that the influence of health on productivity depends on the balance between demands and the resources [20]. The authors recommended to tune work adjustments to the unique imbalance. However, work-related interventions that stimulate prolonged working among persons with poor health are rare [21]. Hence, it is recommended to study whether work-related interventions could modify job characteristics, such as autonomy and job demands, and whether this indeed results in prolonged working lives.

Trend 2: Older workers will combine paid work with informal care more often

People are not only stimulated to participate longer in paid work, there is also an increasing appeal on people to take a more active role in unpaid work, e.g. voluntary work and informal care. As King Willem Alexander expressed in his first King's speech, the Netherlands changes currently from a social welfare state towards a participation society [22]. This is reflected, among other things, in an increasing appeal on citizens to provide informal care for (older) family members and important others. Persons who need care are encouraged to stay in their own homes with the help of family or friends, next to the help of professionals [23]. Informal care should help health care costs to be maintained within certain limits. In 2012, 19.1% of the population aged 55 to 65 years provided informal care in the Netherlands [24]. At the same time, workforce participation of the groups that traditionally provided informal care, i.e. women and older persons, has increased in previous years. Providing informal care is most common among persons aged 45 to 65 years, and, in general, women provide more informal care than men [25].

The growing demand for informal care combined with the need for prolonged working lives will result in more workers combining paid work with informal care in the near future [23]. This raises the question of whether this is a viable combination with regard to health and the prolongation of working life.

The qualitative study within this thesis showed that the social life, including taking care of family members or friends, contributed to early retirement (chapter 5). However, quantitative analyses within this thesis also showed that participation in informal care did not statistically significantly influence working beyond retirement (chapter 8). Hence, within this thesis, findings regarding the relation between informal care and workforce participation are inconclusive.

The Netherlands Institute for Social Research empirically addressed the question of whether the aims of prolonged working lives and providing informal care are compatible [23]. Findings showed that persons who worked more than 28 hours per week less often started to provide informal care than persons who worked less than 28 hours per week and non-working persons. Unless there was a combination of intensive informal care and a large job, starting to provide informal care did not result in structurally fewer contract hours. It was suggested that persons sacrifice their leisure time to combine paid work with informal care. Starting to provide intensive informal care resulted in lower perceived health and a higher risk of long term sickness absence. A recent study of Plaisier et al showed that a heavy care burden impeded the successful combination of paid work and informal care. However, caregivers who felt supported by colleagues and supervisors, and who worked in supportive organizations more often had a good perceived balance between work and care and less need for job adaptations, such as adjusting work schedules, reducing working hours, leaving the job or changing jobs [26].

Taking into account the increasing appeal on citizens to combine prolonged working lives with informal care it is worth to monitor health- and work-related consequences. In addition, future research should investigate how policy and work organizations could support the combination of paid work and informal care. An example may be to enhance opportunities of flexible working hours, that allow persons to provide care when it is needed (e.g. accompanying hospital visits). A dialogue between employee and employer and a tailored approach seem crucial.

Trend 3: Older workers will need to cope with a more flexible labor market

The careers of persons studied in this thesis were characterized, to a large extent, by life time employment for one single employer. The labor market is becoming increasingly flexible and workers will change jobs more often in the future. In the Netherlands, the proportion of people with a flexible employment contract, i.e. an employment contract of limited duration, or without a fixed amount of hours per time unit, has increased from 15% in 2004 to 22% in 2014. In addition, the proportion of freelancers has increased from 8% to 12% in the same period [27]. It should be noted that workers under flexible work arrangements have less opportunities for learning and development compared to those with fixed contracts [28]. Recent adjustments in the Work and Security Act aim to strengthen the position of workers under flexible arrangements. Under the new act persons qualify for a fixed contract after 2 years [29]. However, a flexible shell has several benefits for employers, e.g. to respond rapidly to changes, and hence, in the coming years it will become clear whether this new act indeed results in a larger proportion of fixed contracts. Next to the increasing flexibility of the labor market, the nature of work is changing rapidly due to technological and organizational changes.

Opportunities to work in a more flexible labor market

Naturally, in a more flexible labor market it is increasingly important for older persons that there are sufficient opportunities to work. The qualitative study within this thesis showed that when persons lose a job at older age they experience few opportunities to find a new job (chapter 5). The following quote illustrates that older workers experience lack of perspective on the labor market: *"Well, there was no perspective anymore. As of July 1st the department I worked in was closed."* This was confirmed in the literature. This thesis furthermore showed that several determinants in the domains health, job characteristics, skills and knowledge, and social factors influenced early retirement via a lower support of colleagues and supervisor with regard to working until the age of 65 years. Previous research showed that in 2012, only 27% of employers in the Netherlands reported it is important for staffing that employees continue working until the statutory retirement age [30]. Compared to employers in, for example, Denmark, Germany, and Italy, Dutch employers do relatively little to recruit and keep older workers [31]. Hence, current opportunities in the labor market for older workers are limited, and it is unclear how this will develop in the future.

Up to date skills and knowledge

Next to the opportunity to work, skills and knowledge may also play a key role in a more flexible labor market. The nature of work is changing rapidly due to technological and organizational changes, which requires continuous updating of knowledge and skills. This is important for employers to be able to get along with the competition, and for employees to get and keep a job. This thesis pointed to the importance of skills and knowledge. Persons with a higher focus on development of skills and knowledge, had a higher work engagement and work ability, and their colleagues and supervisor more often had a positive attitude about working until the age of 65 years (chapter 4). Employees who report a higher focus on development of skills and knowledge (i.e. developmental proactivity) were less likely to retire early (chapter 2). Hence, developmental proactivity played a central role in the transition from work to early retirement, and may even be more important to remain employed in a more flexible labor market.

Recommendations for research

Throughout this general discussion several recommendations that specifically related to the trends within our society, i.e. the increase in older workers with chronic diseases, the increasing demand on older workers to provide informal care, and the increasing flexibility of the labor market, were made. In the following, three general recommendations for research within the field of work, health and retirement are described.

Broad perspective using a multi- and interdisciplinary approach and corresponding data

To study the prolongation of working lives, a broad perspective using a multi- and interdisciplinary perspective, incorporating insights as well as data from different disciplines is needed.

Throughout this thesis a multidisciplinary perspective was used to gain insight in determinants of, and mechanisms underlying early retirement by incorporating factors that are frequently studied within different disciplines, such as health sciences, social sciences and economics (chapter 2, 4, 5 and 8). It was shown that the transition from work to early retirement is influenced by various domains, i.e. health, job characteristics, skills and knowledge, and social and financial factors. Although conclusions about single determinants were in agreement with conclusions drawn from monodisciplinary studies, gaining insight in the relative importance of the different domains is of added value. This

information is helpful to determine which interventions or regulations would potentially have the greatest impact on the prolongation of working life.

Next to a multidisciplinary perspective, an interdisciplinary perspective may be needed when the interaction between two or more domains is addressed. By taking into account interacting instead of parallel domains interdisciplinary research goes a step further than multidisciplinary research. An interdisciplinary perspective may for example be helpful to study the interplay between health and financial factors in the retirement process. To illustrate, it is of interest whether financial incentives to prolong working lives have a different influence on work participation in workers with and without health problems. An interdisciplinary perspective may be helpful to gain deeper understanding in why certain factors have a different role for different groups of workers.

When adopting a multi- or interdisciplinary perspective it is important to use corresponding data from the involved disciplines. Although this thesis took a broad perspective, one dataset that consisted of self-reported questionnaire data, was used to assess all domains that were considered to be relevant. Different experts were involved in the design of the questionnaires, but it was not possible to involve experts from all relevant disciplines. For example, economists were not involved, which may have resulted in suboptimal information on financial factors. As linking different data sources could strengthen a multidisciplinary perspective, it is worth to investigate whether already existing registry data could add relevant information to existing questionnaire data. For example, data on consumption of health care could be used in addition to self-reported questionnaire data about perceived health. Home ownership, assets and income could be used to gain insight in a person's financial situation. Furthermore, data drawn from collective employment agreements may provide information on working conditions. Among others, Murdoch and Detsky (2013) pointed to the potential of 'big data', i.e. the vast and expanding amount of data being collected and stored, by proclaiming the inevitable application of big data to health care [32]. It is worth to explore opportunities of big data to support a multi- and interdisciplinary approach within the field of prolonged working lives.

The employer's perspective and influence of company policies

The employer's perspective and its company policies are recommended to be studied in relation to the employee.

The employer plays a key role in recruiting, hiring and keeping older workers. Throughout this thesis only employee data were used. All information on the employer was asked via the employee, e.g. 'Does your supervisor think it is important that you continue working until the official retirement age?'. However, to fully understand what determines the prolongation of working lives, information from both the employee and the employer is needed.

More specifically, more insight is needed in the impact of company policies aiming at sustainable employability and prolonged working lives. In the Netherlands, 37% of the employers provide company policies aiming at prolonged working lives [30]. Especially policies aimed at sparing older workers are frequently provided, e.g. extra days off, working fewer hours per week and alleviation of strenuous working tasks. Stimulating policies, e.g. education and training, job enlargement and rotation, and workplace health promotion, are provided less often [30]. Studies that systematically evaluate the effectiveness of work-related interventions and human resource instruments on sustainable employability are rare. The randomized controlled trial may not be the most appropriate design to evaluate policies within organizations, but the stepped-wedge randomized trial, the propensity scores method, and the multiple baseline design seem promising alternatives [33]. Furthermore, it is recommended to investigate whether current company policies incorporate factors that this thesis found to be important, i.e. the social climate at work, developmental proactivity and perceived physical health. If not, it could be studied how these factors could best be included.

Evaluation of national reforms in the retirement system

The effects of the current pension reforms on health, exit from the workforce via other pathways than retirement, and determinants of workforce participation is recommended to be evaluated in natural experiments.

Currently the old-age pension age is being increased; from 65 years in 2012 to 67 years in 2021. Given the trend in previous years, it is expected that the mean age of actual leaving employment will further increase. Insight is needed in different side-effects of the pension reforms, for example on health, work productivity, work ability, and work motivation. In addition, it is of interest whether older workers will leave the workforce via different exit routes in the future, e.g. unemployment, or that new innovative ways to finance an early

exit will be found. Furthermore, it is of interest whether and how the relative importance of factors from the domains health, work, skills, and the social and financial situation will change as retirement policies change. Natural experiments may be a method to evaluate the effect of the current national reforms, as was previously shown in studies of De Grip et al [34] and Hernaes et al [35]. Also international comparisons may contribute to our understanding of the effects of different retirement systems on prolonged working next to the potential side-effects of reforms in the retirement systems on health and work productivity.

Recommendations for practice

Create favorable work environments

To prolong working lives, it is recommended to promote favorable work environments that are characterized by a positive social climate and that support health and work motivation.

This thesis showed that persons who feel appreciated at work were less likely to retire early (chapter 2), whereas conflict at work was one of the reasons to retire early (chapter 5). The social climate at work did not only directly influence early retirement, but it also influenced early retirement via the motivation to work (chapter 4). Moreover, a steady low work engagement preceded early retirement (chapter 7), and persons with high work motivation were more likely to prolong their working life, even beyond retirement (chapter 8). This thesis also pointed to the importance of health with regard to workforce participation (chapter 2-4, 6 and 8), as well as the potential of the work environment to modify the adverse relation between health and early exit from the workforce (chapter 3). Hence, a work environment in which older workers feel appreciated and that supports health and work motivation should be strived for.

Until now, it has not been studied whether the work environment is modifiable in such a way that it increases health and work motivation and in turn contributes to prolonged working lives. Previous reviews have shown that disease management programs as well as workplace health promotion may positively affect health and work-related outcomes, including absenteeism and presenteeism [36,37]. Work-related interventions addressing work engagement seemed not to have an effect in previous research [38-40], but it has been suggested that targeting work engagement via characteristics of the job, in addition to the individual, may be a fruitful approach [41].

Invest in skills and knowledge

It is important that both employees and employers invest in development of skills and knowledge through formal and informal learning.

Taking into account the rapidly changing nature of work in combination with the increasing flexibility of the labor market, it becomes increasingly important to keep skills and knowledge up to date. This thesis showed that employees who were highly focused on development of skills and knowledge were less likely to retire early (chapter 2). Although this may be a trait to some extent, developmental proactivity may also be influenced by the learning climate at work.

No previous research investigated whether work-related interventions focusing on development of skills and knowledge contributes to prolonged working lives. However, the present thesis and a recent study of Montizaan et al [42] underline it is worth to investigate such interventions. The study by Montizaan et al showed that training policies were positively related to the expected retirement age of employees, irrespective of whether employees actually participate in training.

Traditionally, development of skills and knowledge was pursued through formal training, but recent studies pointed to the importance of informal learning, which could be defined as the acquisition of skills through learning by doing as well as by watching other workers, taking instructions, and receiving supervision or feedback from supervisors or co-workers [43]. A recent Dutch study showed that workers learn most from participating in new and challenging activities and from cooperating with more experienced colleagues [44]. This indicates that job rotation and working in teams have the potential to contribute to learning on the job [43].

Dialogue between employer and employee

Employers and employees are encouraged to conduct a continuous dialogue about sustainable employability resulting in individualized tailored interventions that support the prolongation of working lives.

As described above, a work environment characterized by a good social climate that supports health, lifelong learning, and work motivation may positively contribute to the continuation of working life. In addition to these general measures, individualized tailored interventions seem to be needed. Qualitative data within this thesis showed that specific factors that influence early retirement differ between individuals (chapter 5 and 6). Early retirement was often the result of an individual misfit between a person and the job.

For example, poor health influenced early retirement due to a misfit between the job demands and the ability to perform the working tasks. Another example is that taking care of family members or friends made people decide to retire early, partly because their job provided insufficient opportunities to provide this care. Hence, a 'one-size-fits-all' solution is unlikely to solve all possible misfits and tailored interventions seem a crucial part of the measures supporting prolonged working lives.

For interventions tailored to the individual worker and the job, a continuous dialogue between employer and employee from early in careers onwards may be useful. However, the qualitative studies in this thesis revealed that employers and employees barely discussed (future) person-job misfits (chapter 5 and 6). For now, it is not yet clear whether such a dialogue could indeed positively contribute to prolonged working lives, and which elements should be included in this dialogue. Research on idiosyncratic deals between employers and employees, so-called 'i-deals', suggests that especially 'i-deals' that related to flexibility positively affect the motivation to continue working beyond retirement [45]. Individualized solutions may for example involve more autonomy in where and when to work, workplace adjustments, a gradual reduction of work, participation in training, and changes in working tasks. A good relationship between employee and employer and a focus on human relations instead of human resources seems essential to conduct the dialogue. It is recommended to further explore how a good dialogue could be conducted, e.g. in terms of relevant topics and frequency.

Although findings of this thesis support the potential of an individualized approach in all older workers, vulnerable groups such as persons with poor health or chronic diseases and those who need to combine paid work and informal care, might benefit from tailored interventions even more.

Conclusion

The central aim of this thesis was to investigate determinants of, and mechanisms underlying early retirement and working beyond retirement. A multidisciplinary perspective was used. Early retirement and working beyond retirement were influenced by various domains, i.e. health, work, skills, and the social and financial situation. More specifically, poor perceived health, a poor social climate at work, a low focus on development of skills and knowledge, support of the partner and the financial opportunity to stop working

stimulated early retirement. Further analysis of health by conceptualizing it as having a chronic disease showed that persons with musculoskeletal and psychological health problems more often retired early, whereas other chronic diseases were not related to early retirement. Determinants influenced early retirement through lower work ability, lower work motivation and less opportunity to work. Working beyond retirement was more likely among employees with better perceived health and higher work engagement, who participated in voluntary work, and with a poor financial situation of the household.

Currently early retirement schemes are phasing out, and the old-age pension age will probably continue to increase in the next decades. At the same time, older workers will more often suffer from chronic diseases, they will more often need to combine paid work with informal care, and they will need to cope with a more flexible labor market. In the context of these trends, it is recommended to create favorable work environments that keep workers healthy, skilled and motivated from early in their career onwards, and to stimulate a dialogue on sustainable employability between employer and employee.

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Summary

Introduction

Many developed countries are confronted with ageing populations, due to the increase in life expectancy and long-term decline in fertility rates. As a consequence, the ratio of the retired elderly to the active working population increases. This puts a pressure on the social security system, and causes tension in the solidarity between generations. Many governments respond to the ageing of the population by increasing the statutory retirement age and discouraging early exit from the workforce. However, many workers leave the workforce before the statutory retirement age. The average age of leaving employment was 64.1 years in 2014 in the Netherlands. This is still far away from the statutory retirement age of 67 in 2021. According to a forecast of Statistics Netherlands statutory retirement age will even be beyond the age of 71.5 years in 2060. Hence, the prolongation of working lives is an ongoing challenge.

The central aim of this thesis was to gain insight in determinants of, and mechanisms underlying early retirement and working beyond retirement. Throughout this thesis a broad perspective was chosen, meaning that factors frequently studied in different areas of research, i.e. health, job characteristics, skills and knowledge, social and financial factors, and the ability, motivation and opportunity to work were all addressed. In addition, this thesis zoomed in on the role of health in the transition from work to early retirement.

To address the central aim of this thesis data of the Study on Transitions in Employment, Ability and Motivation (STREAM) were used. STREAM is a prospective cohort study among 12,055 employees, 1,029 self-employed persons, and 2,034 non-working persons, all aged 45-64 years at baseline. Persons included in STREAM participated in an internet panel and filled out yearly online questionnaires in the period from 2010 to 2013. In addition to the yearly questionnaires, qualitative in-depth information was collected by means of face-to-face interviews.

Determinants of early retirement

In *chapter 2* the relative contribution of health, job characteristics, skills and knowledge, and social and financial factors to the transition from work to early retirement was studied, using the first two waves of STREAM. The study population consisted of 2,317 employees aged 59-63 years. The results showed that older age (odds ratio (OR)=1.79), poor physical health (OR=1.78), a positive attitude of the partner with respect to early

retirement (OR=3.85), and the financial possibility to stop working before the age of 65 years (OR=10.2) predicted the transition to early retirement. Employees that reported high appreciation at work (OR=0.58) and a higher focus on development of skills and knowledge (i.e. developmental proactivity) (OR=0.54) were less likely to retire early. To estimate the relative contribution of these predictors, population attributable fractions (PAF) were calculated. PAFs were 0.75 for the financial possibility to stop working, 0.43 for a positive attitude of the partner with respect to early retirement, 0.27 for low appreciation at work, 0.23 for a low focus on development, and 0.21 for poor health. It was concluded that the financial possibility to stop working before the age of 65 years contributed most to early retirement, followed by support of an eventual partner, appreciation at work, developmental proactivity, and health.

Chapter 3 zoomed in on the role of health. Using all four STREAM waves the aim was to investigate whether seven chronic health problems, i.e. severe headache or migraines, diabetes mellitus, and musculoskeletal, circulatory, respiratory, digestive and psychological health problems, predicted the transition from work to disability benefits, unemployment, and early retirement. Secondly, it was investigated whether job characteristics modified these associations. The study population consisted of 8,149 employees aged 45-64 years. The findings revealed that all health problems (except for circulatory health problems) affected disability benefits to a similar extent (hazard ratio (HR) range 1.78-2.79). Only circulatory (HR=1.35) and psychological health problems (HR=2.58) predicted unemployment, and musculoskeletal (HR=1.23) and psychological health problems (HR=1.57) predicted early retirement. Job characteristics did not modify the influence of health problems on unemployment or early retirement, whereas especially autonomy buffered the influence of health problems on the transition from work to disability benefits.

Mechanisms underlying early retirement

In *chapter 4* it was investigated how determinants influence early retirement. The Early Retirement Model was presented, which is based on the research framework of STREAM. This model assumes that determinants in the domains health, job characteristics, skills and knowledge, and social and financial factors influence early retirement via the ability, motivation, and opportunity to work. This chapter aimed to investigate whether data of the first three waves of STREAM supported the model and how it could be improved. The study population consisted of 1,862 employees aged 58-62 years. The Early Retirement Model was largely supported by the data. Health, job characteristics, skills, and social

and financial factors were related to the ability, motivation and/or opportunity to work (significant βrange: 0.05–0.31). Lower work ability (β= -0.13) and less opportunity to work (attitude colleagues and supervisor about working until age 65: β= -0.24) predicted early retirement, whereas the motivation to work (work engagement) did not. Based on these findings, it was concluded that health, job characteristics, skills and knowledge, and social factors influenced early retirement via the ability and opportunity to work.

In *chapter 5* qualitative data derived from 30 interviews with STREAM participants who retired early were used. The study aimed to investigate which non-health related factors influence early retirement, and why and how these factors influence early retirement. For most employees, a combination of factors appeared to play a role in the transition from work to early retirement. The specific factors involved differed between individuals. Participants reported various factors that pushed towards early retirement ("push factors"), including organizational changes at work, conflicts at work, high work pressure, high physical job demands, and insufficient use of their skills and knowledge by others in the organization. Factors attracting towards early retirement ("pull factors") included the wish to do other things outside of work, enjoy life, have more flexibility, spend more time with a spouse or grandchildren, and care for others. In addition, the financial opportunity to retire early played an important role. The so-called "push" and "pull" factors influenced early retirement via changes in the ability, motivation and opportunity to continue working or retire early.

The study in *chapter 6* used the same qualitative data as the study in chapter 5. This study focussed on health, and aimed to identify in which ways health influences early retirement. Health played a role in the transition from work to early retirement in half of the interviewees. Physical and mental health problems influenced early retirement via four different pathways: (1) employees felt unable to work at all due to health problems, (2) health problems resulted in a self-perceived (future) decline in the ability to work, and employees chose to retire early, (3) employees with health problems were afraid of a further decline in health, and chose to retire early, and (4) employees with poor health retired early because they felt pushed out by their employer, although they themselves did not experience a reduced work ability. In addition, good health emerged as a factor that influenced the decision to retire early. These employees retired early because they wanted to enjoy life while their health still allowed them to do so.

In *chapter 7* focus was on the motivational process that precedes retirement. The study addressed the concept of "mental retirement", i.e. the idea that employees disconnect

from work, before their actual retirement. Using all four STREAM waves, the aim was to identify different trajectories of work engagement in older workers approaching the retirement age, and to examine their associations with retirement. The study population consisted of 3,171 employees aged 55-62 years. Four distinct trajectories of work engagement were identified, i.e. steady high (76.3%), steady low (12.7%), decreasing (6.2%), and increasing (4.8%). A steady low work engagement trajectory was associated with retirement (OR=1.46), compared to a steady high work engagement trajectory. Hence, steady low work engagement precedes retirement, but no evidence was found for a decrease in work engagement in the face of retirement, i.e. "mental retirement".

Working beyond retirement

Chapter 8 adopted a life course perspective, a theoretical framework derived from sociology. The life course perspective assumes that changes related to entering or exiting roles, such as the transition from work to retirement and vice versa, are embedded within multiple interdependent trajectories within several life spheres, such as health, work, family and leisure. The aim of the study was to investigate the influence of health, job characteristics, skills, the financial and social situation, and work motives and motivation on working beyond retirement. Besides, differences between persons who retired "on time" (retirement age 65 years) and those who retired "off time" (retirement age <65 years, mentioned "early retirement" elsewhere in this thesis) were addressed. The study population consisted of 1,054 retirees aged 57-67 years and all four STREAM waves were used. Good physical health (OR=1.8), a poor financial situation (OR=2.4), voluntary work (OR=1.5), and high work engagement (OR=1.3) predicted working beyond retirement. For "off time" retirees, no financial possibility to retire early (OR=1.8) and not having a partner (OR=1.9) predicted working beyond retirement. For "on time" retirees, less support at work (OR=0.7) and the financial possibility to retire early (OR=0.5) predicted working beyond retirement.

Conclusions and discussion

In *chapter 9*, the main findings of this thesis were summarized and discussed in the light of several methodological considerations and three important future trends, i.e. the increase in older workers with chronic diseases, the increasing demand on older workers to provide informal care, and the increasing flexibility of the labor market. This chapter concluded with several recommendations for research and practice.

This thesis showed that the transition from work to early retirement is influenced by various domains, i.e. health, job characteristics, skills and knowledge, and social and financial factors. These domains influenced early retirement through lower work ability, lower work motivation and less opportunity to work.

With respect to future research, it was recommended to apply a broad perspective using a multi- and interdisciplinary approach, to study the role of the employer and company policies, and to study the effects of national reforms of retirement systems. In the light of future developments within the society it was recommended to create favorable work environments that keep workers healthy, skilled, and motivated from early in their career onwards. In addition, employers and employees are recommended to search for ways in which a dialogue that contributes to sustainable employability and prolonged working lives can be conducted.

Samenvatting

In veel ontwikkelde landen vergrijst de bevolking door de toegenomen levensverwachting en de daling van het geboortecijfer. De ratio van gepensioneerde ouderen ten opzichte van de actieve arbeidspopulatie neemt hierdoor toe. Dit zet het sociale zekerheidsstelsel en de solidariteit tussen generaties onder druk. Veel overheden reageren op de vergrijzing door de pensioenleeftijd te verhogen en vervroegde uittreding van de arbeidsmarkt te ontmoedigen. Niettemin verlaten nog steeds veel mensen de arbeidsmarkt voor de pensioengerechtigde leeftijd. In 2014 was de gemiddelde leeftijd waarop mensen in Nederland de arbeidsmarkt verlieten 64,1 jaar. Die leeftijd ligt nog relatief ver onder de AOW-gerechtigde leeftijd van 67 jaar in 2021. Volgens een voorspelling van het CBS zal de AOW-gerechtigde leeftijd in 2060 hoger liggen dan 71,5 jaar. Langer doorwerken is dus een blijvende uitdaging.

Het doel van dit proefschrift was om inzicht te krijgen in de determinanten van en mechanismes onderliggend aan vroegpensioen en werken na pensioen. Er is in het onderzoek gekozen voor een breed perspectief. Dit betekent dat factoren die eerder onafhankelijk van elkaar bestudeerd werden in verschillende onderzoekgebieden, namelijk gezondheid, werk, kennis en vaardigheden, sociale en financiële factoren, en werkvermogen, werkmotivatie en de gelegenheid om te werken, allen aan bod komen. Daarnaast focust dit proefschrift op de rol van gezondheid bij de transitie van werk naar vroegpensioen.

In dit proefschrift zijn gegevens van de Study on Transitions in Employment, Ability and Motivation (STREAM) gebruikt. STREAM is een prospectieve cohortstudie onder 12.055 werknemers, 1.029 zelfstandigen en 2.034 mensen zonder betaald werk bij aanvang van de studie. Deelnemers van STREAM participeerden in een internetpanel en vulden van 2010 tot 2013 jaarlijks een online vragenlijst in. Naast deze jaarlijkse vragenlijst is bij een selectie van de deelnemers kwalitatieve verdiepende informatie verzameld door middel van individuele interviews.

Determinanten van vroegpensioen

In *hoofdstuk 2* is het relatieve belang van gezondheid, werk, kennis en vaardigheden en sociale en financiële factoren voor de transitie van werk naar vroegpensioen onderzocht. Hiervoor is gebruik gemaakt van de eerste twee metingen van STREAM. De studiepopulatie bestond uit 2.317 werknemers van 59-63 jaar. De transitie van werk naar

vroegpensioen werd voorspeld door een hogere leeftijd (odds ratio (OR)=1,79), slechte fysieke gezondheid (OR=1,78), een positieve houding van de partner ten aanzien van vroegpensioen (OR=3,85) en de financiële mogelijkheid om te stoppen met werken voor de leeftijd van 65 jaar (OR=10,2). Werknemers die veel waardering op het werk ervaarden (OR=0,58) en meer georiënteerd waren op de ontwikkeling van hun kennis en vaardigheden (OR=0,54) gingen minder vaak met vroegpensioen. Om het relatieve belang van deze voorspellers te schatten zijn "population attributable fractions" (PAF) berekend. De PAFs waren 0,75 voor de financiële mogelijkheid om te stoppen met werken, 0,43 voor een positieve attitude van de partner ten aanzien van vroegpensioen, 0,27 voor weinig waardering op het werk, 0,23 voor een lage focus op ontwikkeling en 0,21 voor een slechte fysieke gezondheid. De conclusie luidde dat de financiële mogelijkheid om te stoppen met werken voor de leeftijd van 65 jaar het meeste bijdroeg aan vroegpensioen, gevolgd door steun van een eventuele partner, waardering op het werk, leeroriëntatie en gezondheid.

Hoofdstuk 3 zoomde in op de rol van gezondheid. Het doel was om te onderzoeken of zeven verschillende chronische gezondheidsproblemen (ernstige hoofdpijn of migraine, diabetes mellitus, bewegingsapparaatklachten, hart- en vaatziekten, aandoeningen aan de luchtwegen, maag- en darmklachten en psychische gezondheidsproblemen) de transitie van werk naar arbeidsongeschiktheid, werkloosheid en vroegpensioen voorspelden. Het tweede doel was te onderzoeken of werkkenmerken deze associaties beïnvloedden. Voor het onderzoek is gebruik gemaakt van vier STREAM metingen en de studiepopulatie bestond uit 8.149 werknemers van 45-64 jaar. Uit de analyses bleek dat alle gezondheidsproblemen (behalve hart- en vaatziekten) in vergelijkbare mate samenhingen met arbeidsongeschiktheid (hazard ratio (HR) range 1,78-2,79). Werkloosheid werd voorspeld door hart- en vaatziekten (HR=1,35) en psychische gezondheidsproblemen (HR=2,58), en vroegpensioen door bewegingsapparaatklachten (HR=1,23) en psychische gezondheidsproblemen (HR=1,57). Werkkenmerken hadden geen invloed op de relatie tussen gezondheidsproblemen enerzijds en werkloosheid en vroegpensioen anderzijds, terwijl in het bijzonder autonomie de invloed van gezondheidsproblemen op de transitie van werk naar arbeidsongeschiktheid bufferden.

Mechanismes onderliggend aan vroegpensioen

In *hoofdstuk 4* is onderzocht *hoe* determinanten vroegpensioen beïnvloeden. Het Vroegpensioen Model, gebaseerd op het theoretisch kader van STREAM, werd gepresenteerd.

Volgens dit model beïnvloeden determinanten in de domeinen gezondheid, werk, kennis en vaardigheden en sociale en financiële factoren vroegpensioen via het werkvermogen, de werkmotivatie en de gelegenheid om te werken. In hoofdstuk 4 is onderzocht of de data van de eerste drie STREAM metingen het model ondersteunen en hoe het model verbeterd kan worden. De studiepopulatie bestond uit 1.862 werknemers van 58-62 jaar. Het Vroegpensioen Model werd grotendeels ondersteund door de data. Gezondheid, werk, kennis en vaardigheden en sociale en financiële factoren waren gerelateerd aan het werkvermogen, de werkmotivatie en/of de gelegenheid om te werken (significante β range 0,05-0,31). Een lager werkvermogen (β=-0,13) en minder gelegenheid om te werken (attitude collega's en leidinggevenden over werken tot 65 jaar) (β=-0,24) voorspelden vroegpensioen, terwijl werkmotivatie (werkbevlogenheid) niet samenhing met vroegpensioen. De conclusie luidde dat gezondheid, werk, kennis en vaardigheden en sociale factoren vroegpensioen beïnvloedden via het werkvermogen en de gelegenheid om te werken.

In h*oofdstuk 5* is gebruik gemaakt van kwalitatieve data van 30 werknemers die deelnamen aan STREAM en met vroegpensioen gingen. Het doel van de studie was om te onderzoeken welke factoren vroegpensioen beïnvloeden en waarom en hoe deze factoren vroegpensioen beïnvloeden. Aangezien hoofdstuk 6 inzoomt op de rol van gezondheid is gezondheid in hoofdstuk 5 buiten beschouwing gelaten. Bij de meeste werknemers speelde een combinatie van factoren een rol bij de transitie van werk naar vroegpensioen. De specifieke factoren verschilden tussen individuen. Werknemers benoemden verschillende factoren die hen uit het werk duwden, zogenaamde "push factoren", waaronder organisatieveranderingen op het werk, conflicten op het werk, hoge werkdruk, hoge fysieke taakeisen en onvoldoende gebruik van hun kennis en vaardigheden door anderen in de organisatie. Factoren die mensen naar vroegpensioen lokten, zogenaamde "pull factoren", waren onder meer de wens om andere dingen buiten werk te doen, te genieten van het leven, meer flexibiliteit te hebben, en meer tijd te kunnen besteden met een partner en kleinkinderen of het verlenen van mantelzorg. Naast "push" en "pull" factoren speelde ook de financiële mogelijkheid om met vroegpensioen te gaan een belangrijke rol. "Push" en "pull" factoren beïnvloedden vroegpensioen via veranderingen in het werkvermogen, de werkmotivatie en de gelegenheid om te werken.

De studie in *hoofdstuk 6* maakte gebruik van dezelfde gegevens als de studie in hoofdstuk 5. De studie focuste op de rol van gezondheid. Het doel was om te identificeren op welke manieren gezondheid vroegpensioen beïnvloedt. Gezondheid speelde een

rol bij de helft van de werknemers die met vroegpensioen gingen. Fysieke en mentale gezondheidsproblemen beïnvloedden vroegpensioen op vier verschillende manieren: (1) werknemers voelden zich niet in staat om te werken vanwege gezondheidsproblemen, (2) gezondheidsproblemen resulteerden in een door de werknemer zelf ervaren (toekomstige) afname in het vermogen om te werken en werknemers kozen er voor om met vroegpensioen te gaan, (3) werknemers met gezondheidsproblemen waren bang voor een verdere achteruitgang van hun gezondheid en kozen er voor om met vroegpensioen te gaan, en (4) werknemers met een slechte gezondheid gingen met vroegpensioen omdat hun werkgever hier op aanstuurde, hoewel zij zelf geen afname in hun vermogen om te werken ervaarden. Naast een slechte gezondheid bleek ook een goede gezondheid de beslissing om met vroegpensioen te gaan te beïnvloeden. Werknemers gingen met vroegpensioen omdat ze wilden genieten van het leven zolang hun gezondheid dat toestond.

In *hoofdstuk 7* is ingegaan op het motivationele proces dat voorafgaat aan pensioen. De studie adresseerde het concept "mentaal pensioen", het idee dat werknemers zich mentaal "loskoppelen" van hun werk voordat ze daadwerkelijk met pensioen gaan. Het doel van de studie was om de verschillende trajecten van werkbevlogenheid in kaart te brengen bij werknemers die de pensioenleeftijd benaderden en de associaties tussen deze trajecten en (vroeg)pensioen te onderzoeken. Er werd gebruik gemaakt van vier STREAM metingen en de studiepopulatie bestond uit 3.171 werknemers van 55-62 jaar. Vier verschillende trajecten van werkbevlogenheid werden geïdentificeerd, namelijk stabiel hoog (76,3%), stabiel laag (12,7%), dalend (6,2%) en stijgend (4,8%). Bij werknemers met een stabiel lage werkbevlogenheid kwam pensioen vaker voor dan bij werknemers met een stabiel hoge werkbevlogenheid (OR=1,46). Een stabiel lage werkbevlogenheid gaat dus vooraf aan pensioen. Er werd geen bewijs gevonden voor een afname in werkbevlogenheid met het vooruitzicht op pensioen, zoals verondersteld op basis van het concept "mentaal pensioen".

Werken na pensioen

De studie in *hoofdstuk 8* ging uit van het levensloop perspectief, een theoretisch kader afkomstig uit de sociologie. Dit perspectief veronderstelt dat veranderingen gerelateerd aan intrede en uittrede van rollen, zoals de transitie van werk naar pensioen en vice versa, zijn ingebed in meerdere onderling afhankelijke trajecten binnen verschillende levensdomeinen, zoals gezondheid, werk, familie en vrije tijd. Het doel van de studie

was om de invloed van gezondheid, werk, kennis en vaardigheden, de financiële en sociale situatie, en werkmotieven en motivatie op werken na (vroeg)pensioen te onderzoeken. Daarnaast werden verschillen tussen mensen die "op tijd" (pensioenleeftijd 65 jaar) en mensen die "te vroeg" (pensioenleeftijd <65 jaar, elders in dit proefschrift "vroegpensioen" genoemd) met pensioen gingen onderzocht. De studiepopulatie bestond uit 1.054 gepensioneerden in de leeftijd 57-67 jaar en er werden vier STREAM metingen gebruikt. Een goede fysieke gezondheid (OR=1,8), een slechte financiële situatie van het huishouden (OR=2,4), vrijwilligerswerk (OR=1,5) en een hoge werkbevlogenheid (OR=1,3) voorspelden werken na pensioen. Onder de werknemers die "te vroeg" met pensioen gingen werkten degenen die niet de financiële mogelijkheid hadden om met vroegpensioen te gaan (OR=1,8) en alleenstaanden vaker door. Onder werknemers die "op tijd" met pensioen gingen voorspelden minder steun op het werk (OR=0,7) en de financiële mogelijkheid om met vroegpensioen te gaan (OR=0,5) werken na pensioen.

Conclusies en discussie

In *hoofdstuk 9* zijn de bevindingen van dit proefschrift samengevat en bediscussieerd in het licht van methodologische kanttekeningen en drie belangrijke toekomstige trends. Deze trends waren de toename van oudere werknemers met chronische gezondheidsproblemen, het toenemende beroep dat op oudere werknemers wordt gedaan om mantelzorg te verlenen, en de toenemende flexibilisering van de arbeidsmarkt. Het hoofdstuk sloot af met aanbevelingen voor onderzoek en praktijk.

Dit proefschrift liet zien dat de transitie van werk naar vroegpensioen wordt beïnvloed door verschillende factoren, namelijk gezondheid, werk, kennis en vaardigheden en sociale en financiële factoren. Deze factoren beïnvloeden vroegpensioen via een lager werkvermogen, lagere werkmotivatie en minder gelegenheid om te werken.

Met oog op toekomstig onderzoek wordt aanbevolen om een breed perspectief te hanteren (multi- en interdisciplinair). Toekomstig onderzoek zal zich moeten richten op de rol van de werkgever en bedrijfsbeleid, alsmede het effect van nationale hervormingen in het pensioenstelsel. Met oog op de praktijk wordt aanbevolen om een werkomgeving te creëren die werknemers gezond, vaardig en gemotiveerd houdt vanaf het begin van hun carrière. Daarnaast worden werkgevers en werknemers aangemoedigd om te zoeken naar manieren waarop zij de dialoog over duurzame inzetbaarheid en langer doorwerken het beste kunnen voeren.

About the author

Astrid de Wind was born on May 30th, 1984 in Leiden. She completed her secondary education at Stedelijk Gymnasium Leiden in 2002.

In 2003 Astrid started studying Psychology at the Erasmus University Rotterdam, where she obtained a master's degree in Industrial- and Organizational Psychology in 2008. After earning this degree she followed the Advanced Research Program at the Faculty of Social Sciences of the Erasmus University Rotterdam in 2009-2010.

In 2011 Astrid started her PhD project at the Department of Public and Occupational Health of the VU University Medical Center and the Department Work, Health and Care of the Netherlands Organisation for Applied Scientific Research TNO. During her PhD project she followed the Postgraduate Epidemiology Program at EpidM, VU University Medical Center, where she obtained a master's degree in Epidemiology in 2014. In addition, Astrid followed the University Teaching Programme at the VU University, where she obtained a University Teaching Qualification in 2015. During her PhD project Astrid gave several guest lectures at the master course Work and Health (Work and Organizational Psychology, VU University) and the bachelor course Health@Work (Health Sciences, VU University). In 2014 Astrid visited the National Research Centre for the Working Environment in Copenhagen several times to work on a study about work, health and retirement.

As of September 2015 Astrid works as a postdoctoral researcher at the VU University Medical Center within the Department of Public and Occupational Health. Her research focuses on the relation between health and work participation.

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Dankwoord

Velen hebben bijgedragen aan het tot stand komen van dit proefschrift en daarmee aan een fantastische start van mijn loopbaan. Hiervoor wil ik een aantal mensen in het bijzonder bedanken.

Steun en begeleiding op het werk

Allard, Paulien en Goedele, dank voor de begeleiding die jullie mij hebben gegeven bij het schrijven van mijn proefschrift. Allard, ik heb veel van je geleerd en hoop als postdoc nog veel meer van je te leren. Ik bewonder je om de manier waarop jij de grote lijn bewaakt alsof het niks is. Met het oog op de mens achter de promovendus, heb je daarnaast altijd de praktische haalbaarheid hoog in het vaandel. Paulien, dankjewel voor het meedenken over de implicaties van de onderzoeksbevindingen voor de praktijk. Goedele, het was fijn om jou als copromotor en dagelijks begeleider te hebben. Ik bewonder je om de scherpheid waarmee je mijn stukken las en je onuitputtelijke "brainpower". Allard, Paulien en Goedele, bedankt voor de prettige samenwerking, de inspirerende overleggen en de vrijheid die jullie mij gaven om mijn eigen weg te vinden binnen de epidemiologie van arbeid, gezondheid en pensionering.

Inspirerende samenwerking

Fenna, het was enorm leuk om tegelijkertijd met jou aan mijn promotieonderzoek te werken. Ik heb veel van je geleerd en het was fijn om met je te brainstormen. Onze gezamenlijke papers zijn in mijn ogen het resultaat van een vruchtbare samenwerking. Swenneke, je bent een fijne collega. Ik waardeer je betrokkenheid bij mijn promotie-onderzoek zeer. Jan Fekke, ik heb veel van je geleerd toen we intensief samenwerkten aan één van mijn eerste proefschriftartikelen. Lex, hartelijk dank voor je inhoudelijke betrokkenheid bij diverse artikelen van mijn proefschrift. Kerstin, jouw sollicitatie voor een stage kwam als geroepen. Het was leuk en leerzaam om je te begeleiden en ik ben trots dat het ons allebei een artikel voor ons proefschrift opleverde.

Ook andere co-auteurs, Trynke Hoekstra, Suzan van der Pas, Birgitte Blatter en Marjan Westerman, stuk voor stuk leverden jullie een belangrijke inhoudelijke bijdrage aan mijn proefschrift, waarvoor veel dank. Dear Reiner Rugulies and Hermann Burr, thank you for welcoming me in Copenhagen and Berlin. I appreciate our ongoing research collaboration.

Beste leden van de leescommissie, hartelijk dank voor de tijd en aandacht die jullie hebben besteed aan mijn proefschrift en voor jullie aanwezigheid bij mijn verdediging.

Een prettig sociaal klimaat

Mensen gedijen beter op werk wanneer het sociale klimaat goed is. Dit proefschrift benadrukte het belang van een prettig sociaal klimaat om langer doorwerken mogelijk te maken. Zelf heb ik in de afgelopen jaren ervaren hoe fijn het is om te werken in een omgeving waar je je gewaardeerd voelt en waar een goede onderlinge werksfeer is. Het heeft bijgedragen aan het feit dat ik met zoveel plezier aan mijn proefschrift heb gewerkt. Bedankt leuke collega's, te veel om op te noemen! TNO collega's (Karen, Roos, Marloes, Seth, Maartje, Laudry en vele anderen) en VUmc collega's (Alwin, Myrthe, Esther, Magdalena, Judith, Jennifer, Bo, Micky, Ranu en alle anderen van de G/H0-gang), het was leuk om in jullie midden te verkeren. Bedankt voor de gezelligheid en betrokkenheid en de informele adviezen bij de koffieautomaat.

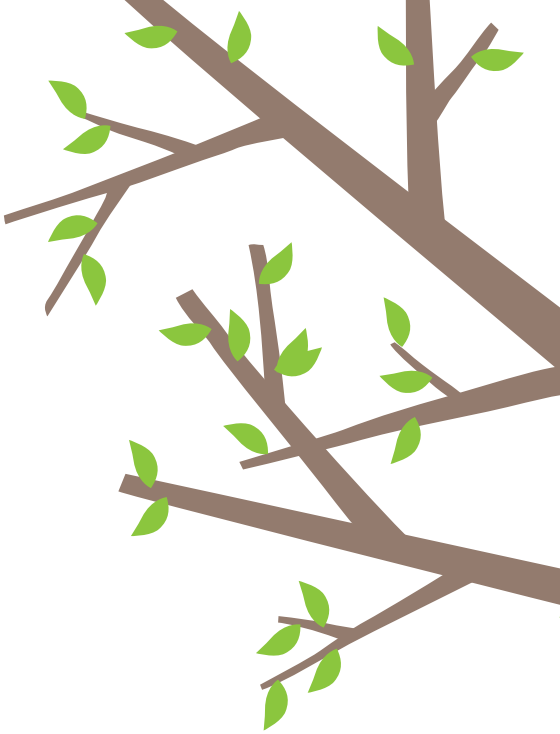
Fijne vrienden en familie

Maar gelukkig is er zoveel meer dan werken alleen. Beste vrienden, bedankt voor de gezellige borrels, etentjes en uitjes. Het deed mij keer op keer mijn werk vergeten en zorgde voor een goede balans tussen werk en privé. Anne en Loes, jullie wil ik in het bijzonder noemen. Ik vind het heel speciaal om met jullie op het podium te staan. Het feit dat jullie mijn paranimfen zijn vind ik een prachtige bekroning op onze vriendschap.

Joop en Tinie, ik ben jullie dankbaar voor de wekelijkse extra handen met de kinderen die het mogelijk maken dat ik mijn dromen kan najagen. Papa, mama en Joris, jullie zijn mijn "heimat". Pap, jij leerde me van jongs af aan zelf het antwoord te zoeken op vragen, één van je wijze lessen waar ik nog dagelijks plezier van heb. Mam, jij bent altijd zo trots op je kinderen. Voor jou heeft altijd voorop gestaan dat ik plezier in mijn werk zou hebben. Dat is me gelukt!

Tot slot Abel, bedankt voor de gezelligheid en bedrijvigheid thuis. Wat leuk om samen, nu ook met IJsbrand en Isolde de reis door het leven te maken. Op naar het volgende avontuur!

Astrid de Wind, 9 februari 2016



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