

# Chapter 10

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General discussion



Sustainable employability is one of the major challenges for industrialised countries over the coming decades. Because of a shrinking and ageing working population, it is important that more workers prolong their working life in a healthy and productive way.<sup>1</sup> The challenge to extend working lives is the most eminent in industries with high physical work demands. Workers with physically demanding jobs run an increased risk of a lower health status<sup>2</sup> and lower work ability<sup>3</sup>. Moreover, blue-collar workers report a lower ability and willingness to continue working until the age of 65 than do white-collar workers.<sup>4</sup> Currently, these workers are retiring far below the official retirement age. Prolonging working lives is not only a matter of raising the retirement age in collective agreements, but also a matter of improving the ability and the willingness of workers to continue working until the retirement age. Therefore, policies and intervention programmes are needed for blue-collar workers to promote their health and work ability, and thereby prolong a healthy and productive working life.

The main objectives of this thesis are to identify factors that influence the ability and the willingness to continue working until the age of 65 years in the general population of employees aged 45-64 years and in the specific population of construction workers, and to develop and evaluate a tailored prevention programme to promote the work ability and health of construction workers. This chapter presents the main findings in light of these objectives, discusses research issues, and presents recommendations and opportunities for future directions in research and practice.

## Overview of the findings

### *Factors influencing the ability and the willingness to continue working*

According to previous studies on actual early retirement<sup>5,6</sup>, and on the ability and willingness to continue working<sup>7</sup>, health played an important role in prolonging working lives among older employees (Chapter 2). Specifically, emotional exhaustion predicted a lower likelihood to be able and willing to continue working until the age of 65, whereas a work handicap was negatively related to the ability to continue working. Moreover, lower support from the supervisor and emotional demands were negatively related to the ability to continue working, whereas inappropriate behaviour by colleagues/supervisor predicted a lower likelihood to be willing to

do so. In line with a previous study<sup>7</sup>, older employees with high physical demands were less often able to continue working until the age of 65.

While physical job demands also played a significant role in a lower ability to continue working in construction workers, these demands were also associated with a lower willingness to continue working in these workers as well (Chapter 3). Moreover, several psychosocial work factors, such as lower supervisor support and lower skill discretion, were associated with a lower ability and willingness to continue working. In contrast, lower social support from colleagues was associated with a higher willingness to continue working. The role of physical job demands is in line with previous studies investigating early retirement among blue-collar workers, whereas these studies showed different results on the influence of psychosocial factors.<sup>5,8,9</sup> Additionally, health was an important factor associated with a lower ability and willingness to continue working in construction workers. In particular, the occurrence of musculoskeletal symptoms was associated with both a lower ability and willingness to continue working, whereas emotional exhaustion was only associated with a lower ability to continue working.

In conclusion, poor health was related to a lower ability and willingness to continue working until the age of 65 among older employees in general and among construction workers. In addition, physical and psychosocial job demands were related to a lower ability in both groups, whereas these demands were only associated with a lower willingness to continue working in construction workers. Relatively few work-related factors predicted the willingness to continue working in older employees.

#### *Development of a prevention programme to prolong a healthy working life*

Following the principles of the Intervention Mapping protocol<sup>10</sup>, an intervention at construction worksites was developed in which evidence from the literature was systematically combined with data from stakeholders (i.e., construction workers, managers, trainers, and researchers; Chapter 4). The first step in the Intervention Mapping protocol resulted in two programme objectives for the intervention: (i) construction workers improve their balance between physical workload and need for recovery, and (ii) construction workers improve their range of influence at the worksite. For each programme objective, intervention materials were developed and combined into a prevention programme for

construction workers. In the end, the intervention programme consisted of the following components: two individual training sessions at the worksite performed by a physical therapist, a Rest-Break tool to raise awareness about reducing fatigue by taking flexible rest breaks, and two interactive group training sessions by an empowerment trainer. The programme was delivered at the worksite during working hours, and within the existing education system in the Dutch construction industry. This prevention programme was evaluated in a cluster randomised controlled trial (RCT) among construction workers (n=293) employed at six construction companies (Chapter 5).

#### *Evaluation of the programme at construction worksites*

The prevention programme was largely implemented as intended, and most construction workers were willing to participate in the prevention programme in general and in the specific training sessions (Chapter 6). The satisfaction of the construction workers towards these training sessions was moderate. The Rest-Break tool was, however, highly criticised and not used by the workers. Yet, 64% of the workers recommended the overall programme for future implementation; the training sessions of the physical therapists were even recommended by 79% of them. Furthermore, contextual factors influenced the implementation of the intervention. More specifically, working in a smaller company (<100 employees), experiencing no direct consequences of the economic crisis and having a higher management engagement towards the programme positively influenced several aspects of the implementation process.

Despite the fact that the construction workers were rather positive about the intervention, the prevention programme neither improved social support and work engagement, nor reduced the physical workload and need for recovery among construction workers in the intervention group (Chapter 7). In addition, work ability and health status were not affected by the intervention either (Chapter 8). Yet, a statistically non-significant trend was found in the reduction of the prevalence of musculoskeletal symptoms and long-term sick leave in favour of the intervention group. As no significant effects were found for work ability and health, the intervention cannot be regarded as cost-effective from an employer's perspective. However, it appeared that the intervention was cost-saving for the employer due to a reduction in sick leave days. Specifically, for each euro invested in the intervention group, €6.4 was gained (Chapter 9).

## Issues in the research context

In this paragraph, I will interpret the results found in this thesis in the light of methodological issues, programme failure and theory failure. First, I will discuss the general methodological issues in relation to the included surveys to measure the ability and willingness to continue working (Chapters 2 and 3), the study population, the study design, and the outcome measures of the trial (Chapters 4-9). Second, the causes for the lack of significant effects of the prevention programme will be explained by programme failure and theory failure.

### Methodological issues

#### *Measurement of the surveys*

The factors influencing the ability and willingness to continue working until the age of 65 were investigated using two surveys, one among older employees in a longitudinal design (the Netherlands Working Conditions Cohort Survey), and one among construction workers in a cross-sectional study (the Netherlands Working Conditions Survey). Both surveys are unique as they are large and representative of the Dutch employee population. As participation in both surveys was voluntary, bias due to non-response could not be ruled out in either study. In the Netherlands, the response to surveys is usually low, and the response at baseline of about 32% was considered to be satisfactory. Because no information was available on the non-respondents, I do not know whether selective non-response influenced the findings. Bias due to selective loss to follow-up is a larger issue than selection bias due to non-response in longitudinal studies. In the current study, persons lost to follow-up in the longitudinal study were less often able to continue working until the age of 65. Therefore, it is assumed that a relatively large number of these workers stopped working during the follow-up period. Although this may have resulted in an underestimation of the number of employees being unable to continue working, it remains unclear to what extent selective response influenced the findings.

The second methodological issue of both surveys concerns the measurement of the ability and willingness to continue working. Both concepts were measured using single-item questions, and one could question the reliability of these items. A previous report among older employees, in which the same group of workers was described as in Chapter 2, showed that the willingness and ability to continue working until the age of 65 were predictive for early

retirement.<sup>11</sup> However, it needs to be argued whether this relation will remain for younger workers as well. Younger workers may be less aware of the possibilities and capabilities needed to prolong their working life since the retirement age is a long-term issue for them.

### *Study population*

The target population in the intervention proposal consisted of construction workers aged 45 and older. However, the participatory approach during the Intervention Mapping protocol led to new insights regarding the target population (Chapter 4). It was not only the workers and human resource managers who mentioned age-discrimination as an important obstacle for successful implementation; the researchers themselves also came to an advancing insight that prolonging healthy and productive working lives needs to start as early as possible. In addition, as the programme aimed to target the work environment, the trainers were concerned that including only older workers would hinder implementation (Chapter 4). Taking the opinions of all stakeholders into account, workers of all ages were invited to participate in the programme. However, as only older workers participated in the focus groups during the development phase, the question remains to what extent the intervention fits the younger workers as well. In my opinion, including younger workers in the development phase may have led to other designed intervention materials rather than to other programme objectives. This is in line with the results, which showed no differences between the two age groups in the different aspects of the process evaluation (Chapter 6), nor was an effect modification found for age in any of the outcomes (Chapters 7 and 8).

With regard to the recruitment of companies and workers, the research team faced immense difficulties in recruiting companies, as only six of the 234 approached companies committed themselves to the programme (Chapter 6). In line with previous studies<sup>12,13</sup>, the unknown content and requested additional time and costs were reasons for the low interest of directors and management of the companies to participate. This was particularly the case for construction companies who were aware of their insecure situation in times of financial recession. Those six companies that finally volunteered to participate in this trial could be considered as early adopters when it comes to health and safety.<sup>14</sup> Consequently, workers at these companies probably have more understanding of the importance of health and safety issues, and

might have more sympathy towards the programme, which led to the high willingness among the workers to participate in the trial (84%). This reach is higher than has generally been found in interventions among blue-collar workers.<sup>15,16</sup> The attendance rate of the workers that followed at least three training sessions (61%) was in line with other worksite programmes.<sup>15,17,18</sup> The high reach and attendance rates confirmed the value of the recruitment and implementation strategy for workers as presented in this thesis. A recruitment strategy should include the involvement of the workers during the development phase<sup>10</sup>, commitment from management<sup>19</sup>, and a personal invitation. Implementing the intervention at worksites during working hours<sup>19</sup>, and within the existing education system are key elements for future implementation strategies. However, the low reach among companies suggests that different recruitment strategies are needed for them. A higher reach among companies could be obtained by recruiting companies through their sector organisation, and providing them with the preconditions in terms of time and costs (e.g., number of hours spent during working time, and intervention costs).

### *Study design*

For evaluation purposes, a randomised controlled trial is a strong and transparent prospective research design as it offers the opportunity to control for several factors, such as confounding and selection bias. To minimise contamination among construction workers who are working at worksites that are temporary and mobile, cluster randomisation is recommended. Cluster randomisation in the current trial took place at the level of departments within companies instead of the company level. Randomisation at department level appeared of significance as the consequences of the financial recession were different across the participating construction companies. By clustering workers at department level within each company, the results presented in this thesis are not distorted by company factors such as economic status. To correct for the clustering within the dependency of observations (clustering of workers within departments and companies, and repeated measurements within one worker), multilevel analyses were used in the effectiveness studies (Chapter 7 and 8). Clustering of observations was, however, ignored in the analyses of the economic evaluation. Methods that address clustering in both effects and costs, and are adjusted for covariates are not yet fully developed nor does consensus exist about the best method.<sup>20</sup> Nevertheless, leaving

clustering out of the economic evaluation did not change our conclusion as the results in Chapter 8 (with clustering) and 9 (without clustering) were both statistically non-significant.

### *Outcome measures*

Work ability and health status were selected as primary outcomes since both are contributors to sustainable employability. To measure these outcomes, standardised international questionnaires were used. The Work Ability Index (WAI)<sup>21</sup> is the most widely used questionnaire to measure the concept of work ability, and has been developed to monitor work ability at working population level<sup>3</sup>. Health status was measured using the short-term SF-12, which is a shortened version of the SF-36, and has been recommended to be of value in a setting where a short general health measure is required<sup>22</sup>, and within patient populations<sup>23</sup>. It was unknown whether both questionnaires (i.e., WAI and SF-12) were adequate to measure changes over time within working populations. In line with previous intervention studies among blue-collar workers including work ability<sup>24-26</sup>, and mental and physical health status<sup>27</sup>, the current trial did not detect statistically significant changes (Chapter 8). A reason for this ineffectiveness may be that the mean scores of work ability, and physical and mental health were already good at baseline, implying that a relatively healthy group of workers was included in the current trial (i.e., ceiling effect). Therefore, I hypothesise that both primary outcome measures might be insufficiently sensitive to change among a group of relatively healthy workers within a follow-up period of 12 months.

The second methodological concern is to what extent productivity loss was measured and valued in a reliable and valid way (Chapter 9). Productivity loss at work was defined as sickness absence and presenteeism (i.e., being present at work but working at a reduced capacity due to sickness; Chapter 9). Data on sickness absence of the construction workers were obtained from the registration systems of the companies, meaning that information and recall bias were eliminated. However, how presenteeism should be measured and monetised in a valid and reliable way is still an ongoing discussion.<sup>28-30</sup> In the current trial, presenteeism was measured subjectively with a single question<sup>31,32</sup> in which the work performance of the previous four weeks was examined at baseline, and at three, six and 12 months follow-up. A recent review, however, recommends a shorter recall period (i.e., one week) because



a longer period reduces accuracy.<sup>33</sup> According to this recommendation, more frequent follow-ups are needed, but this gain in accuracy should outweigh the increase in participant burden. Although it is not recommended to increase the frequency of follow-ups, the one-week recall period might still be recommended because of the higher accuracy. Not only measuring presenteeism, but also monetising presenteeism varies widely.<sup>28,34</sup> For example, studies differ with regard to taking compensation mechanisms into account or not. To illustrate this, if a worker has a reduced capacity, it might be that the remaining workers sacrifice their rest breaks or work harder, or that employers cancel non-urgent work, or replace a sick worker. Compensation mechanisms were not taken into account in the current economic evaluation. As no consensus exists about presenteeism<sup>34,35</sup>, presenteeism costs were only included in one sensitivity analyses in the current trial. However, as both costs (i.e., absenteeism and presenteeism) are important in terms of benefits for the employer, it is necessary to reach consensus and to include them in the main analyses in future research.

### Programme and theory failure

Besides methodological issues, the small and non-significant effects of the prevention programme need to be further discussed in light of possible programme and theory failure.<sup>36</sup> Programme failure indicates that a poorly implemented intervention resulted in no improvement in the study outcomes, whereas theory failure implies that the rationale behind the intervention was not entirely correct.

Programme failure may be indicated by three factors. Firstly, not all of physical therapist's training sessions were delivered individually because this was not always feasible within the dynamic setting of construction worksites<sup>37</sup>. This means that the rationale behind the intervention protocol was not entirely followed by the trainers. Secondly, even though the training sessions were incorporated into an existing education system and implemented during working hours at the worksite, 39% of the workers still attended less than three training sessions (Chapter 6). This moderate compliance might have dimmed the effectiveness of the intervention. However, the per-protocol analyses on the number of training sessions showed no differences between workers with low or high compliance (Chapter 7). Thirdly, it could be hypothesised that the intervention was less effective because of the financial recession. Companies

and their workers might have felt obliged to only focus on activities that obviously and directly contribute to their productivity. Moreover, the workers may not have committed themselves to the programme when they faced the fear of losing their jobs at the same time. The implementation of the intervention was indeed hampered by the financial recession, as this negatively influenced the dose delivered and the satisfaction of the workers towards the programme (Chapter 6).

Besides the programme failure, several signs of theory failure were also detected. First, the number of training sessions (i.e., four) might be too small to have significant effects. Possibly, a longer duration or higher frequency of the training sessions from the physical therapists is needed in order to achieve a behavioural change with regard to working techniques, and consequently a decline in musculoskeletal symptoms. The workers themselves also mentioned that a higher frequency would be valuable to achieve long-term effects in reducing physical workload and the prevalence of musculoskeletal symptoms (Chapter 6). Regarding the training sessions by the empowerment trainer, a higher frequency of these sessions would probably not lead to favourable effects. During the sessions, the responsibilities for specific issues, such as social support, communication and work engagement, were addressed at the individual level. However, involvement of supervisors and management might be valuable to achieve a change at organisational level, and needs therefore to be incorporated in the topics discussed in the empowerment training sessions. Furthermore, even though fatigue is a risk factor for reduced employability among construction workers, they showed little interest in the application of the Rest-Break tool to improve their need for recovery. Workers experienced difficulties filling in their weekly fatigue status, and they mentioned that the advice was not always feasible in daily practice. As the frequency and duration of rest breaks are recorded in policies at worksite or company level, involvement of supervisors and management is essential. Therefore, more qualitative research by means of interviews with workers, supervisors and management is needed to explore which solutions might be more appropriate to reduce fatigue.

Thus, besides the earlier mentioned methodological issues such as the insensitivity of the outcome measures, the absence of effects on the primary

and secondary outcomes of the interventions need to be explained by programme failure as well as theory failure as both have taken place in the present intervention study.

## Implications for research

The current thesis contributes to the knowledge about determinants of sustainable employability, and interventions to support sustainable employability among construction workers. In the following paragraphs, I will discuss where more knowledge is needed and which future directions in research should be taken.

### *More insight into the ability, willingness and opportunity to continue working*

While the current thesis has gained relevant knowledge on the ability and willingness to continue working in the current profession until the age of 65, a broader view is also needed when following the definition of sustainable employability.<sup>38</sup> In short, sustainable employability is defined as workers having the capabilities, the opportunities, and the necessary conditions that allow them to achieve valuable work function in current and future work.<sup>38</sup> This definition implies that workers might need to change job or profession to extend their working career. Thus, in addition to the current questions that were asked in our survey and longitudinal study, future epidemiological research should also focus on workers' ability and willingness to remain in the labour force, even when this asks for a career transition.

Additionally, the current thesis has contributed valuable knowledge about the impact of health and physical and psychosocial work-related factors on the ability and willingness to continue working until the age of 65. Besides these factors, more longitudinal studies are needed to gain insight into the influence of other factors as well. First, researchers should shift their focus towards promoting factors. While cross-sectional and qualitative studies on early retirement and work disability pensions among blue-collar workers have mainly focused on risk factors<sup>8,9,39</sup>, it is plausible that promoting factors, such as an appropriate effort-reward balance and challenging work<sup>40,41</sup>, will facilitate the ability and the willingness to continue working. Second, financial factors, such as financial stimuli<sup>40</sup> and the financial situation of a worker<sup>41</sup>, might influence whether workers retire or not. Moreover, previous qualitative and cross-sectional studies showed that social factors, such as support from

the partner<sup>41</sup>, and other factors, such as lifestyle aspects<sup>42</sup> and subjective life-expectancy<sup>43</sup>, also played a role in extending working lives. Third, according to the definition of sustainable employability<sup>38</sup>, it is also recommended to include factors about the working career, such as to what extent a worker's knowledge and capacities fit the current job, and the willingness for a career transition. This supplementary knowledge from longitudinal studies will contribute to the development of policies and intervention programmes to prolong workers' working lives in a healthy and productive way.

Finally, in addition to the ability and willingness to continue working until the retirement age, the workers must also have the opportunity to actually extend their working lives. Therefore, it is interesting to know which determinants at the organisational level play a role in the opportunity to continue working (e.g., the company). A Dutch report showed that dissatisfaction about older employees and stereotyping these workers impede sustainable employability.<sup>44</sup> Scientific research is needed to determine which specific factors (e.g., company characteristics and policies) play a role in the opportunity to continue working, and whether these factors differ among industries and target populations. Insight into these factors is important to develop policies and intervention programmes at the organisational level.

#### *Implications for future evaluations of interventions at worksites*

Conventionally, the scientific success or failure of an intervention is mainly derived from the effects on health and productivity-related outcomes within an RCT. Following this, the current prevention programme has failed as it showed no significant positive effects on either primary or secondary outcomes. At the same time, the workers mentioned that they were moderately satisfied with the overall programme, and the financial return was positive for employers. This raises the question as to whether the intervention was indeed not proven to be effective or that the success or failure of the intervention could not be concluded on the predetermined outcomes alone. In other words, simply focusing on the effects of primary outcomes such as health and productivity may be inappropriate in RCTs when it comes to interventions implemented at worksites, which are complex and continuously changing.

In case of interventions at individual level, RCTs are considered as the most robust research design for establishing a cause-effect relationship between an

intervention and an outcome, while controlling for all biases and confounders.<sup>45</sup> Because individual randomisation is often either not possible or inappropriate in worksite interventions, randomisation of groups might be preferred (i.e., cluster RCT). However, as the number of clusters is often limited, controlling for all factors and conditions of dynamic worksites between the intervention and control groups is almost impossible.<sup>46</sup> This is even more the case in the construction industry where worksites are temporary and mobile, meaning that workers move from one worksite to another bringing ideas, knowledge and experiences from the previous worksite<sup>47</sup>. To anticipate this, the so-called 'pragmatic trial' has been developed which allows variations of the intervention to be incorporated at different worksites.<sup>48</sup> This has already been used to some extent in the current thesis as the intervention slightly differed among the construction worksites. Following this line of reasoning, as interventions at different worksites are never exact copies of the original prescribed intervention in pragmatic trials<sup>49</sup>, a detailed reporting of the process is essential<sup>50</sup>. A process evaluation is helpful to determine which part of the intervention is effective for whom and under which circumstances.<sup>51</sup> The current thesis described the process of the intervention, and linked this to the outcomes.<sup>52</sup> However, even more in-depth process evaluations are needed in which all key actors at individual and organisational level are involved. Additionally, a qualitative approach in these evaluations is valuable to provide an insight into the underlying thoughts and attitudes of the participants, and to describe and analyse the context. Hence, in interpreting the success or failure of future worksite interventions, process evaluations including a qualitative approach and economic evaluations from the employer's perspective need to be considered in addition to effect evaluations.

These comprehensive threefold evaluations are costly and time-consuming. Researchers have therefore to consider whether evaluation by the most rigid and robust design, such as an (cluster) RCT, is appropriate for newly designed interventions. In my opinion, new interventions definitely need to be tested and evaluated in an experimental setting. Within this experimental setting, a full pilot can be conducted in which not only can initial shortcomings in materials and tools be corrected, but also the feasibility of the intervention can be improved by gaining an insight into the context and culture of the target population.

If the worksite intervention has potential in the experimental setting, then it can still be evaluated in a more robust research design. As described previously, controlling for all factors and conditions at worksites is difficult within a cluster RCT. Therefore, researchers have to search for additional approaches to evaluate worksite interventions. First, alternative approaches that retain some elements of randomisation have already received increased attention in occupational health settings in recent years. One example of these quasi-experimental designs is the stepped-wedge design in which the intervention is sequentially rolled out to all clusters.<sup>53,54</sup> Additionally, I would suggest that the interventions are qualitatively evaluated in each cluster. By doing this, the intervention can be adjusted on the lessons learned, and an improved intervention can be implemented in the next cluster. Second, another example of an alternative approach is found in the econometric domain, in which models estimate the effectiveness of an intervention using observational data.<sup>55,56</sup> This modelling technique allows researchers to adjust for differences in covariates, and thereby eliminating biases.<sup>57</sup> For example, data from a cohort of workers within occupational health services can be collected in which participation in prevention programmes is recorded. Based on the cohort data and the workers' participation rates, an econometric model estimates the average causal effect of the intervention on the workers who received the programme compared to those who did not receive the intervention. It should be noticed that large numbers of workers are needed for these econometric models to eliminate indication bias. Nevertheless, these two examples showed that promising additional approaches are available, but researchers need to accept these new designs, and have to learn how to apply them for their purposes.

## Implications for practice: towards healthy prolonged working lives for physically demanding jobs

During the course of this thesis, sustainable employability has been gaining an increasingly prominent place in political and public debates. At the start of this project in 2008, a Dutch commission had already advised the government to raise the retirement age in order to increase labour force participation.<sup>58</sup> During the years spent preparing this thesis, the majority of the political parties in the Netherlands realised that keeping workers employed for a longer period is essential from an economic point of view. However, their opinions differed on when and to what level the retirement age should be increased.

In the end, the Dutch government decided to raise the retirement age to counteract the expected shrinking working population in the near future. In July 2012, members of the Senate approved the bill to raise the retirement age stepwise from 65 in 2012 to 67 in 2023. During the political and public debates, a recurring concern was raised as to how workers in physically demanding jobs can extend their working life in a healthy and productive way. As described in Chapter 1, blue-collar workers nowadays leave the labour force at the age of 62, which is long before their official retirement age.<sup>59</sup>

Based on the current thesis, new scientific knowledge can be added to support sustainable employability among workers with physically demanding jobs, and in particular among construction workers. In the following paragraphs, I will discuss which future directions in practice are needed in order to keep workers with physically demanding jobs healthy and productive during their working career.

#### *Key role for employers to promote (sustainable) employability*

Even though policymakers raised the retirement age to finance the longer lives of all citizens, workers and employers are ultimately responsible for putting this into practice. While construction workers need to be able and willing to extend their working careers, whether they get the opportunity mainly depends on the employer's decisions. Nowadays, a slight positive tendency is noticeable in construction workers' ability and willingness to continue working<sup>4</sup>, and in their actual retirement age (from 60.5 years in 2002 to 62.2 years in 2011)<sup>59</sup> due to amendments to the law and growing attention in the media. However, even though employers admit that enabling workers to continue working is important from a societal perspective, the majority of them are not convinced of the importance of keeping older construction workers within their own organisation.<sup>60</sup>

First, the negative attitudes of employers towards sustainable employability within their own organisation could be explained by the severe economic recession and accompanying increased unemployment of construction workers. As a consequence, construction companies are less concerned with long-term issues such as the shift in the workforce.<sup>60</sup> Second, employers generalise older workers as being more loyal, experienced and committed to their company than younger workers, but also as less skilled and having lower

mental and physical capacities.<sup>61,62</sup> Stereotyping older construction workers in this way could give rise to age discrimination.<sup>62</sup> Third, employers' reluctance to support later retirement could also be explained by the fear that the increasing gap between productivity and labour costs of an ageing workforce is a burden for their company.<sup>63,64</sup> Even though it is expected that the productivity of an ageing workforce only slightly decreases, the increase in labour costs (i.e., high salaries) eventually leads to a growing productivity-labour costs gap.<sup>60</sup>

As employers play a key role in bridging the gap between the aims at the political level and the actual retirement age of workers, informing and convincing employers to let workers extend their working career is essential. Additionally, employers need to design policies and actions that enhance sustainable employability. Based on the current thesis, I suggest that these policies should not only focus on older workers, but should be designed for all workers at the worksite in order to limit age discrimination. These policies and actions to keep construction workers healthy and productive during their working career need to focus on reducing the physical and psychosocial workload (e.g., reducing physical workload, improving the range of influence and the social climate) or on improving the capacity of the workers (e.g., reducing fatigue) as described in the current thesis. Additionally, investing in human capital through lifelong learning during the whole working career seems necessary. By means of formal training programmes and informal ways, such as social media and platforms, construction workers learn to adjust their competences, skills and knowledge to the current and future work situation in order to improve their productivity and quality of work. Besides, these policies and actions are not only needed to prevent older construction workers from leaving the labour market early, but also to attract students to start their working careers in these jobs.

#### *Embedding psychosocial factors into traditional OSH policies*

Currently, occupational safety and health (OSH) policies in the construction industry are still primarily aimed at topics such as physical workload and safety. Of course, reducing physical workload is important as workers with high physical work demands are well documented to be at an increased risk of an impaired work ability<sup>65</sup>, musculoskeletal symptoms<sup>66,67</sup>, and sickness absence<sup>68,69</sup>. Improving safety is incorporated in the current policies because poor safety and associated (non-)fatal injuries are, in addition to the human suffering, a financial burden for construction companies.<sup>70,71</sup>



While these traditional OSH policies in the construction industry focus on preventing risks, they also need to pay attention to other topics when focusing on sustainable employability. The current thesis has shown that psychosocial factors (e.g. skill discretion and low supervisor support) are related to the ability and willingness to continue working. Additionally, during the focus groups, construction workers mentioned that time pressure and low social support from the supervisor hampered work ability and sustainable employability. Thus, in order to keep workers healthy and productive in the construction industry, psychosocial factors need to be incorporated in OSH policies at both sector and corporate level.

Embedding psychosocial factors in OSH policies at sector level is relatively easy to realise within the existing procedures and guidelines. Nowadays, psychosocial factors, such as time pressure and job control, are minimally incorporated in the periodic health examinations, which are obligatory offered to all Dutch construction workers. Not only should better constructs be added to these examinations, but sector organisations, the Health and Safety Institute (in Dutch: Arbouw), and occupational health services also need to offer preventive actions. Additionally, Occupational Health and Safety Catalogues (in Dutch: Arbocatalogi) and the Safety, Health and Environment Checklist Contracts (in Dutch: VCA aannemers checklist) should pay attention to psychosocial factors.

At corporate level, employers have to realise that psychosocial factors are of importance, in particular due to the changing building processes. Building processes are more often outsourced towards subcontractors and self-employed workers. These processes lead to an increased need for communication, higher work pace, and lower job autonomy among construction workers in paid employment. However, embedding psychosocial factors into OSH policies at the corporate level is difficult. First, the Health and Safety Institute, sector organisations and trade unions have to make sure that employers and their workers are well informed about the role of physical and psychosocial factors in sustainable employability. This may be achieved within the existing education system in the construction industry. This education system consists of at least 10 health and safety training sessions at the worksite for workers, which have to be organised yearly by construction companies to obtain an official Health and Safety Certificate.

Currently, training sessions that focus on psychosocial factors are not yet provided, which underlines the need for developing these training sessions. However, as the culture at construction worksites could be characterised as conservative and macho, the current intervention has already shown that it is quite difficult to interest workers in relatively new topics such as communication, social climate and need for recovery in the traditional style of the training sessions (e.g., factsheets, and oral presentation). Therefore, sector organisations, the Health and Safety Institute and companies have to search for other ways of incorporating these topics in the training sessions. An example is the use of new training techniques such as gamification in which game techniques and mechanics are used to enhance non-game contexts, and serious gaming in which a virtual reality environment is created. To illustrate this, a virtual worksite with contractors, supervisors and workers might be helpful in training workers in skills such as opening a discussion on psychosocial factors.<sup>72</sup> These kinds of technique might also be powerful in encouraging workers to link psychosocial and physical work demands with long-term issues such as sustainable employability. Other relatively new technologies, such as smartphones and accompanying applications, might be useful in training sessions as well as for monitoring the behaviour of construction workers and supervisors, and for providing information and feedback.

#### *Future directions for prevention programmes in the construction industry*

Even though the prevention programme in this thesis showed promising results regarding the satisfaction and recommendation rates of the construction workers and the financial impact for the employer, I would not suggest implementing the programme at construction worksites because the programme did not enhance the health and work ability of the construction workers. Based on the findings and the lessons learned, I would like to propose directions for future prevention programmes in the construction industry.

The ineffectiveness of the prevention programme described in the current thesis is in line with other high-quality studies on primary prevention that did not show significant effects on subjective health outcomes either.<sup>27,73-75</sup> This raises the question as to whether primary prevention programmes are necessary for whole populations including those workers who are completely healthy. In my opinion, future prevention programmes should shift their focus

from primary prevention for all workers towards aiming at specific target populations who are at a higher risk of reduced employability. Nowadays, the obligatorily offered periodic medical examination in the construction industry is already in use as a starting point to select individuals at risk. Construction workers are currently offered programmes if the results of this examination show that they are, for instance, at high risk of being overweight or cardiovascular diseases.<sup>76</sup> Additional to these health-related individual programmes, there seems to be a need for prevention programmes that take into account the socio-ecological approach of sustainable employability. This approach considers the complex interplay between workers, work environment and social elements<sup>77</sup>, and asks therefore for programmes at department or company level. Companies need first to gain an insight into the sustainable employability within their organisation. Nowadays, a general needs assessment already exists in the Netherlands that provides companies with indicators on how to improve the sustainable employability of their workers.<sup>78</sup> However, more tailored needs assessments are required for specific industries such as the construction industry. Because companies and construction workers are familiar with the periodic medical examination, I believe this examination should have the ability to serve as a needs assessment for sustainable employability in the construction industry. For that purpose, an adjusted version of the examination is needed in which a broader range of constructs will be assessed, such as physical and psychosocial work demands, but also the opportunities, capacities, motivation and ability to continue working. In the case of a potential risk factor for sustainable employability, companies are offered directions for interventions policies to reduce this specific risk factor. Based on the group results of the periodic medical examination, it might be that one company is recommended to implement one supplementary training session, whereas another company needs to implement several complementary sub-programmes or change its policies. In short, a more tailored approach is recommended in which companies employing workers at risk of a reduced employability can form a comprehensive multi-component prevention programme based on the company's specific risk factors.

## General conclusion

Prevention of emotional exhaustion and promotion of a healthy social work climate may support both the willingness and ability to continue working until the age of 65 in older workers. Both, the ability and the willingness to continue working until the retirement age are important predictors for the choice of workers to retire or not. Among construction workers, poor health, high physical job demands, and high psychosocial job demands play a role in their ability and willingness to continue working until the retirement age.

The development of a prevention programme by using the Intervention Mapping approach revealed that interventions should not only focus on reduction of physical workload but should also assist construction workers in their attempts to exert influence at worksites. We did not succeed in incorporating this notion into an intervention that was effective. The prevention programme neither improved work ability, health status, social support, and work engagement, nor reduced the physical workload and need for recovery among construction workers in the intervention group. Yet, a statistically non-significant trend was found in the reduction of the prevalence of musculoskeletal symptoms and long-term sick leave in favour of the intervention group. Additionally, the finding that a non-significant reduction in sick leave resulted in a positive financial impact for the employer is intriguing. This, in combination with the fact that the construction workers were rather positive about the intervention, indicates that interventions focusing on physical and psychosocial work factors still have potential in the future.

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