

Workplace-level interventions and trials of working time reduction

A SCOPING REVIEW



**Kati Karhula
Timo Anttila
Päivi Vanttola
Mikko Härmä**

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Kati Karhula, Finnish Institute of Occupational Health

Timo Anttila, University of Jyväskylä

Päivi Vanttola, Finnish Institute of Occupational Health

Mikko Härmä, Finnish Institute of Occupational Health

Finnish Institute of Occupational Health

Work Ability and Work Careers

P.O. Box 40

FI-00032 Työterveyslaitos

www.ttl.fi/en

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Abstract

The effects of reducing working hours on well-being at work and productivity have been the subject of debate in Finland. Working time can be reduced in many ways, and the options, and effects of reducing working time vary from one sector to another. Reduced working time can be very suitable for voluntary part-time workers or older workers, for example, and can already be agreed at the individual level in the workplaces in Finland. On the other hand, it is known that no major experiments at the organisational level have been scientifically published in Finland since the turn of the millennium.

The aim of this scoping review was to find out the effects of experiments with shorter working hours at the organisational level on health, well-being at work and productivity. A total of 109 references were found using four databases and a supplementary search. The inclusion criteria were original publication in Finnish/English/Swedish/German, an intervention study/trial on working time reduction at the workplace or organisation level, and a full-text available. We found ten peer-reviewed quantitative and four qualitative studies on working time reduction, as well as nine reported but non-peer-reviewed experiments on working time reduction. The results were summarised and tabulated narratively.

According to the results, reduced working hours were generally associated with greater job satisfaction, but on also with experiences of work intensification. A 20–25 percent reduction in working hours with full pay improved perceived sleep quality, and in some studies, sleep duration, as well as work-life balance and reduced work-related musculoskeletal symptoms. The evidence on the impact on sickness absence is scarce and mixed. In a few studies have been able to reduce working hours without reducing productivity, but the number of studies is still very small.

It is concluded that the usefulness of the information gathered from working hour reduction trials is limited by the weaknesses in the study designs and methods, such as the selection of companies or organisations, short follow-up period of the interventions, insufficient number of employees in the trials and often lack of a comparison or control group. Assessing the well-being, health, and economic effects of reduced working time would require controlled follow-up studies with a sufficiently large and representative sample, and the use of a wider range of measures, including work productivity.

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1 Foreword

Recently, there has been an active debate in the media on reducing working hours. In these debates, the reduction of working hours has been justified in particular by the need to increase the attractiveness of work in terms of improved well-being at work and recovery from work. Other frequently used arguments for reducing working time are the more equitable distribution of work, the promotion of equality and the prevention of social exclusion, which are particularly prominent arguments in times of high unemployment (Brynja & Bildt, 2005). Reducing working time is also linked to ecological sustainability and the reduction of greenhouse gases (Neubert et al., 2022). Shorter working hours have been described as an opportunity to reduce material consumption or to offset the social inequalities associated with the green transition (Pullinger, 2014; Schor, 2005).

From a research perspective, the debate around the reduction of working time has highlighted the positive effects at employee and employer level in non-peer-reviewed studies, some of which have been compiled by consultancy firms. On the other hand, early studies published around the turn of the millennium have been referred. In spring 2023, the Ministry of Economic Affairs and Employment carried out a study on the implementation of working time reduction experiments in Finland (Ministry of Economic Affairs and Employment, 2023). Given the need for timely information, we aimed to compile up-to-date information on the results of peer-reviewed scientific studies on workplace-level interventions to reduce working time and other published workplace-level trials and interventions.

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In Helsinki and Jyväskylä, 13th November 2023

The authors

2 Introduction

In the longer term, average working hours have decreased in developed countries, for example in the OECD countries by around 8 hours per week since 1970 (OECD, 2021). Internationally and compared to other Nordic countries, Finland has a low level of part-time work (Anttila & Oinas, 2023). In 2022, 19% of all employed persons in Finland were working part-time (Statistics Finland, 2023), while the highest share of part-time workers in the European Union, 47% of employed persons, is in the Netherlands (Eurostat, 2018). In particular, the promotion of longer working lives for older workers is linked to the need for greater flexibility in working hours and opportunities for shorter working hours (Andrews, Manthorpe, & Watson, 2005).

According to the European Working Conditions Survey, approximately four out of five workers are satisfied with the number of hours they work (Eurofound, 2017). However, a mismatch between the actual number of weekly working hours and the number of weekly working hours desired by workers has been repeatedly reported (Angrave & Charlwood 2015; Anttila & Oinas 2023; Backhaus, Vieten & Nold, 2023; Bielinski, Bosch & Wagner 2002; Gerold & Nocker, 2015). The majority of those working more than 48-hour weeks would like to reduce their working hours. On the other hand, short working hours of less than 20 hours would not be desirable either. (Anttila & Oinas 2023.) In a large German study, the average number of preferred weekly working hours was 34 hours, which was about four hours less than the actual number of hours worked. Of those working full-time, 44% said they would like to switch to a four-day working week. (Backhaus, Vieten, & Nold, 2023.) In Austria, 30% would like to work less than at present (Gerold & Nocker, 2015).

Employers have expressed reservations about the economic feasibility of reducing working time and the potential employment effects. However, in several countries the employers have been willing to test options to shorten the average working hours. In Finland, a recent poll of The Federation of Finnish Enterprises showed that, around one fifth (21%) of entrepreneurs would be willing to try a four-day working week, even if employees' pay remained unchanged. If pay decreased in line with working hours, more than a third (35%) would be willing to try a reduction. The sectors most interested in experimenting shorter working hours were expert services and construction. (Hyry, 2023.)

The results of experiments with reduced working hours have previously been summarised from a mental health perspective in a review article in German (Jansen-Preilowski, Paruzel, & Maier, 2020) and from a health perspective in a review article in English (Voglino et al., 2022). In addition to these two reviews, reports on the topic were published in Swedish in the early 2000's (Brynja & Bildt, 2005; Malmberg, Byrgren & Hansson,

2003), as well as recently a national report by the Ministry of Economic Affairs and Employment (Ministry of Economic Affairs and Employment, 2023) and a pamphlet by the Finnish Confederation of Professionals STTK (STTK, 2017). The aim of this scoping literature review is to compile the results from published interventions and trials so far on the associations between working time reduction and physical, mental, and social well-being, as well as effects on productivity. The focus of the review is on the countries with a work-life context comparable to the Nordic countries.

3 Methods

The databases OVID MedLine, APA PsycInfo, EMBASE and Business Source Elite were searched from 1st January 1990 until 10th March 2023 for the EMBASE database and until 15th August 2023 for the OVID MedLine, APA PsycInfo, Business Source Elite databases. The search terms used at the title level can be found in Appendix 1, including various terms related to the reduction of working time. A total of 160 references were found in the above-mentioned databases, of which 129 references remained after excluding duplicates, and further reduced to 109 when references in Finnish, Swedish, English, and German were included. From these, the following were excluded: general book chapters or similar non-original publications (n=41), studies on individual ways of reducing working time (n=4), experiments where the working time after reduction was at least 35 hours per week (n=19) and studies with cross-sectional study design (n=3). Finally, studies that dealt with a reduction in working days or shifts without a reduction in total working hours (compressed working week) were excluded from the review (n=5). Four potentially applicable studies were excluded because their full texts were not available.

The search was supplemented by going through the reference lists of the workplace-level intervention articles found (16 new references), the reports on organisational reduction of working time (7 references), conference papers (3 references) and theses (4 references). (Figure 1.) Three researchers (KK, TA, PV) reviewed the abstracts of the publications and the full texts of those that were suitable for further reading, thus selecting a total of 16 peer-reviewed publications, four theses and eight non-peer-reviewed conference abstracts or other experiments to be included in the results section. The results from the main studies have been tabulated and summarised narratively.

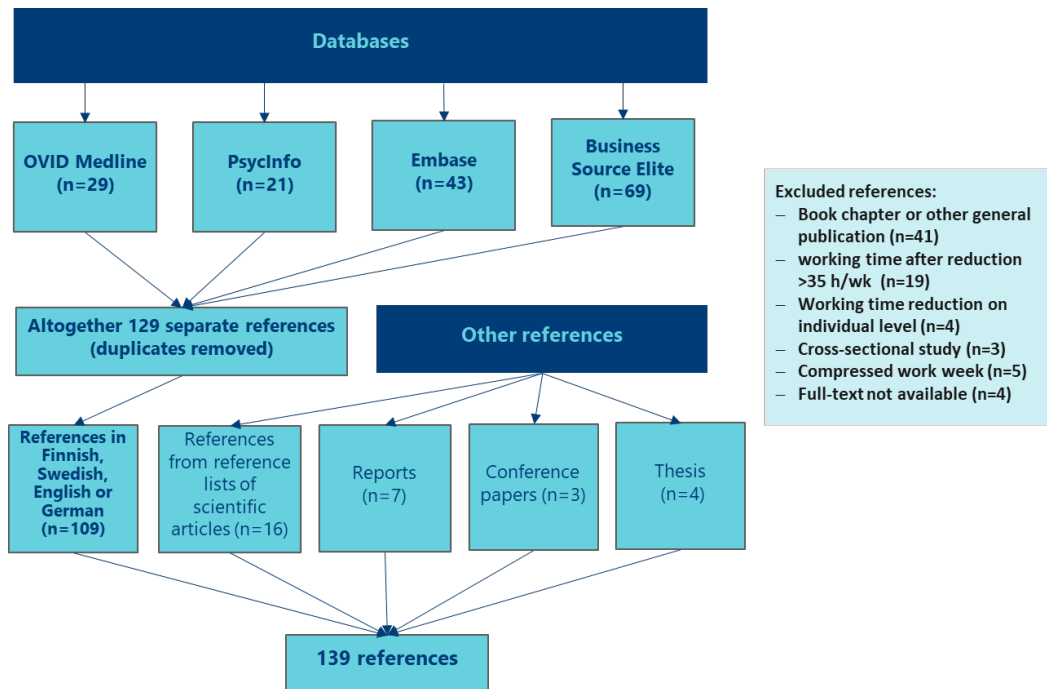


Figure 1: The search process and selection of references.

4 Results

4.1 Practical solutions for working time reduction

The various ways to implement the working time reduction experiments suggests that there is no single, consistent practice for introducing a reduction (Jansen-Preilowski, Paruzel, & Maier, 2020). Most commonly, full-time workers' working hours were reduced to six hours per day or 30 hours per week, with a reduction of around 20–25%. The most common solution was a four-day working week (Åkerstedt et al., 2001; Anttila, Nätti, & Väisänen, 2005; Barck-Holst et al., 2017; Lindfors & von Thiele Schwarz, 2022; Lorentzon, 2017; Schiller et al., 2017, 2018; Wergeland et al., 2003). In two studies, the workers could choose between a six-hour working day and a four-day working week (Mullens, Verbeylen, & Glorieux, 2021; Schiller et al., 2017). In Finnish experiments in the 1990s, the most common way of working time reduction in shift work was the use of six-hour shifts. In the municipal sector, three municipalities experimented with a six-hour working day, while in the other 14 municipalities (Anttila, 2005) the work communities had a free choice of working time reduction mode.

A Swedish study (Kecklund et al., 2019, 2020) compared a 10–15% reduction in shift workers' working hours with either participatory shift scheduling or alternatively traditional shift scheduling, where working hours remained unchanged. In other studies involving shift workers, no precise changes in shift patterns were described or no comparisons between different shift patterns were made (Lindfors & von Thiele Schwarz, 2022; Wergeland et al., 2003).

Individual working time solutions that were in place before the experiment were taken into account to varying degrees in the working time reduction experiments. Part-time workers had either been able to receive a direct pay increase without any change in working hours (Malmberg et al., 2003), or their working hours had been reduced in proportion to those of full-time workers (Lewis et al., 2023; von Thiele Schwarz & Hasson, 2011; von Thiele Schwarz, Lindfors, & Lundberg, 2008), or they could have increased their working hours to match the reduced hours of the full-time workers' week to receive the same pay as the full-time workers (Mullens et al., 2021). In some firms, part-time workers also had a choice between the previous options or had the option of balancing their working time over a longer period of time, for example to ensure that they could retain their annual leave entitlement (Lewis et al., 2023).

Only one study had verified the reduction in working time on the basis of the employer's actual working time data (Kecklund et al., 2020). In other studies, the actual reduction in

working time was estimated, for example, through diaries (Åkerstedt et al., 2001; Schiller et al., 2018). Precise changes in working time patterns in shift work in the working time experiments were not monitored. In practice, the most common way of implementing a four-day week in daytime work was a day off on Friday (Kallis et al., 2013), although some employees reported answering work calls on Fridays as well (Kunttu, 2022). Other practical solutions for shortening working hours were a day off on different days, shortening daily working hours or flexible working hours of 32 hours per week (Lewis et al., 2023).

In the public sector, usually in the social and health care workplaces, the reduction of working hours has mostly been compensated by hiring new employees (Åkerstedt et al., 2001; Barck-Holst et al., 2017; Lorentzon, 2017). In the Finnish experiments in the municipal sector in the 1990s, a key objective was work sharing. On average, the workers' wages were reduced by 7% by local collective agreements, but 580 new workers were hired. (Anttila, 2005.)

4.2 Quantitative studies on working time reduction

A total of ten peer-reviewed quantitative intervention studies on working time reduction were found. Of these, one was conducted in Finland (Anttila et al., 2005), one in Belgium (Mullens et al., 2021), eight in Sweden (Åkerstedt et al., 2001; Barck-Holst et al., 2017; Lindfors & von Thiele Schwarz, 2022; Schiller et al., 2017, 2018; von Thiele Schwarz & Hasson, 2011; von Thiele Schwarz et al., 2008) and one in Norway and Sweden (Wergeland et al., 2003). In five of the interventions, participants were social and health care workers, in four interventions public sector workers from different sectors, and in one intervention third sector employees. In all studies, at least three quarters of the participants were women. Table 1 summarises the eight main studies.

Studies have shown that reducing working hours by 20–25% with retained salary reduced the stress experienced by workers (Barck-Holst et al., 2017; Schiller et al., 2017), improved sleep quality (Åkerstedt et al., 2001; Barck-Holst et al., 2017; Schiller et al., 2017), prolonged sleep duration (Schiller et al., 2017) and increased time for social relationships (Åkerstedt et al., 2001) or facilitated work-life balance (Barck-Holst et al., 2017). In Finnish experiments, work-life balance was also improved, but with a parallel decrease of pay by about 7% (Anttila et al., 2005). In physically demanding care work, neck and shoulder symptoms and physical overload were significantly reduced (Wergeland et al., 2003). In a Belgian third-sector organisation's experiment, working hours were reduced to 30 hours per week. Time use diaries showed an increase in time spent on housework and care. The stress and pressure on leisure time in the household was reduced and the work-life balance was also improved. (Mullens et al., 2021.) On the other hand, in a 12-month

follow-up study, no lasting changes in well-being variables were observed in a trial in elderly care (Lindfors & von Thiele Schwarz, 2022). (Table 1.)

There has been little research on the economic impact of working time reduction experiments, such as absenteeism. There was no change in sickness absence rates of health care and day care workers as a result of the reduced working time experiment (Åkerstedt et al., 2001). The number of patients treated in dental care increased in both the intervention and the control groups, but in this study the actual reduction in working hours was smaller than planned (von Thiele Schwarz & Hasson, 2011).

The early Finnish working time experiments were divided into ten private sector experiments and seven public sector experiments. In the business experiments, the focus was on innovations in working time experiments, changes in work organisation and the impact of the experiments on performance. The experiments showed positive developments in productivity, mostly measured as changes in per-unit production costs in the experimental units. The experiments also meant that work was made more efficient by reducing breaks and reorganising work. The introduction of six-hour shifts extended production times, which led to more efficient use of machinery and facilities. In the municipal sector, the experiments were mainly carried out in social and health care services. The aim of the experiments on reducing daily working hours was to increase the quality and accessibility of services by organising work into shifts. In addition to the work sharing, the objectives of the experiments emphasised both the efficiency of operations and the well-being of employees. (Anttila, 2005.)

Table 1: Peer-reviewed quantitative working time reduction interventions where weekly working time after reduction was less than 35 hours.

AUTHORS, YEAR	PARTICIPANTS (WOMAN/ MAN/ OTHER OR NOT KNOWN)	STUDY DESIGN	OUTCOME VARIABLES	RESULTS: EMPLOYEE LEVEL	RESULTS: ORGANIZATION LEVEL	OTHER NOTES
ANTTILA T ET AL., 2005	public sector employees, intervention group=116, control group n=110 (94/6/na %)	6h working day, 6- and 18-month measurements in the intervention and the control group, 20–25% reduction in working time	work-family and family-work conflicts	work-family conflict decreased in the intervention group. The daily working time reduction reduced the work-family conflict more than other forms of reduced working hours.	not investigated	change in income on average -7% Trials included 1320 employees and hired approx. 580 substitute employees
BARCK-HOLST P 2020; BARCK-HOLST P ET AL., 2017	public sector social workers, intervention group n=127, control group n=77 (84/14/na %)	18-month intervention study, 25% reduction in working hours, 100% pay	multiple scales including JCQ ¹ , Karolinska Sleep Diary ² , KSS ³ , CFQ ⁴	on working days average perceived stress ↓, negative emotions and fatigue ↓, sleep quality ↑, work-life balance ↑, job demands ↓, support from superior no change	not investigated	the number of employees compensated
LINDFORS P ET AL., 2022	municipal eldercare employees, intervention group n=68, control group n=19 (100/0/na %)	12-month intervention study (3 months pre-intervention, 6- and 12-month follow-ups), shortening of work shifts 7→6 h/day, 100% pay	heart rate, blood pressure, blood sugar, blood lipids, perceived health, PSS ⁵ , psychosocial factors at work, biomarkers including, e.g., prolactin	no permanent beneficial changes in the welfare variables attributable to the intervention as such	not investigated	

AUTHORS, YEAR	PARTICIPANTS (WOMAN/ MAN/ OTHER OR NOT KNOWN)	STUDY DESIGN	OUTCOME VARIABLES	RESULTS: EMPLOYEE LEVEL	RESULTS: ORGANISATION LEVEL	OTHER NOTES
MULLENS F ET AL., 2021	women's organisation employees, n=60 (98/2/0 %)	12-month working time reduction from the age-based weekly working hours (36/34/32 h/week) → 30 h/week, 100% pay	desired and observed changes in time-use before, during and after the intervention (4 waves of diaries)	The employees wished for more personal time. In time-use comparisons time spent on housework and care and personal time ↑. Stress related to housework and leisure time pressure ↓, work-life balance ↑	not investigated	time-use study
SCHILLER H ET AL., 2017	33 public sector workplaces randomized at workplace-level, intervention group n=354, control group n=226 (76/24/na %)	18-month randomised controlled intervention study, surveys at 0, 9, and 18-months, 25% reduction in working time, 100% pay	job demands and job control, perceived sleep quality, KSS ³	sleep quality ↑, sleep length +23min, sleepiness ↓, perceived stress ↓, worrying at bedtime ↓	not investigated	both shortened workdays (average 1:40 h/day) and a 4-day work week
SCHILLER H ET AL., 2018	33 public sector workplaces randomized at workplace-level, intervention group n=370, control group n=266 (75/25/na %)	18-month randomised controlled intervention study, surveys at 0, 9, and 18-months, 25% reduction in working time, 100% pay	3 x 1 week time-use diary, 13 different activities	working time at the workplace -1:27h for both men and women, time used for restorative activities +53 min on workdays	not investigated	

(Table continues)

AUTHORS, YEAR	PARTICIPANTS (WOMAN/ MAN/ OTHER OR NOT KNOWN)	STUDY DESIGN	OUTCOME VARIABLES	RESULTS: EMPLOYEE LEVEL	RESULTS: ORGANIZATION LEVEL	OTHER NOTES
WERGE-LAND EL ET AL., 2003	nursing personnel, three separate interventions, intervention group total n=147, control group total n=257 (93/7/na %)	12–22-month intervention study, working time reduction ≥7 h→6 h/week = 30 h/week	musculoskeletal symptoms, physical overload	neck-shoulder pain symptoms decreased in 12-month follow-up 82%→68% in the intervention group, no change in the control group; in the 18-month follow-up the intervention group 41%→26% and the control group 57%→39%	not investigated	
ÅKER-STEDT T ET AL., 2001	health care and day care employees, intervention group n=41, control group n=22 (84/16/na %)	36-month intervention study; working time in the intervention group 39→30 h/week, working time in the control group remained unchanged	workload, social relationships, sleep quality, psychological and somatic symptoms	weekly working time reduced by -8,7 h in the intervention group, time for social activities, family, and friends ↑, sleep quality ↑, mental fatigue ↓, heart/respiratory symptoms ↓	no change in sickness absences	extra personnel were employed

¹JCQ = Job Content Questionnaire, ²Karolinska Sleep Diary, ³KSS = Karolinska Sleepiness Scale, ⁴CFQ = Cognitive Failures Questionnaire, ⁵PSS= Perceived Stress Scale

4.3 Qualitative studies on working time reduction

Four peer-reviewed qualitative scientific articles on working time reduction were found and are summarised in Table 2. One of the studies was Belgian (Mullens & Glorieux, 2022, 2023), one Swedish (Barck-Holst, Nilsson, Åkerstedt & Hellgren, 2022) and one from New Zealand (Delaney & Casey, 2021). The participants in these studies worked in the social sector, the third sector or the financial sector. In the studies that reported the gender of participants, at least three-quarters of the employees were female (Mullens & Glorieux, 2022, 2023; Barck-Holst et al., 2022).

In a social sector study, hours worked were cut by a quarter while wages remained unchanged. All the social workers interviewed reported that after the reduction in working hours, they had more positive emotions in anticipation of going to work than before the experiment. The risk of turnover was perceived to be lower and relationships with colleagues and clients were perceived to have improved. Positive effects were also seen in the reconciliation of work and life. The researchers, however, estimated that the positive aspects of the experiment had been emphasized in the interviews to foster continuing the experiment. (Barck-Holst et al., 2022.) (Table 2.) In his later dissertation based on the study, the researcher estimated that working conditions in the social sector had deteriorated since the implementation of the experiment (Barck-Holst, 2020).

In a Belgian working time reduction study among third sector employees, working hours were reduced from the age-based standard weekly working time (36/34/32h/week) to 30 hours per week with retained salary. According to the interview data, the employees perceived the reduced working hours as successful, but the challenges they faced included increased need to plan the timing of tasks, reduced porosity of working time and reduced social interaction. (Mullens & Glorieux, 2023.) The increased personal time expected by the employees did not materialise as expected (Mullens & Glorieux, 2022). (Table 2.)

In New Zealand, a 32-hour work week experiment with full pay was evaluated with mixed opinions in survey. Some interviewees saw the experiment as proof that management cared about the well-being of their employees. On the other hand, some strongly felt that the primary aim of the experiment was to improve work efficiency. The employees felt that they were more under managerial surveillance than before and that the media coverage of the experiment focused mainly on positive welfare effects, although there were negative experiences. (Delaney & Casey, 2021.) (Table 2.)

Table 2: Peer-reviewed qualitative experiments on working time reduction.

AUTHORS, YEAR	PARTICIPANTS (WOMAN/ MAN/ OTHER OR NOT KNOWN)	STUDY DESIGN	OUTCOME VARIABLES	RESULTS: EMPLOYEE LEVEL	RESULTS: ORGANISATION LEVEL	OTHER NOTES
BARCK-HOLST P, 2022	experienced social workers (work experience up to 14 years), 12/22 intervention participants interviewed (75/25/na %)	14–18 months intervention with 25% reduction in working time, 100% pay, structured interview 20-30 min	work-life balance, symptoms of exhaustion	All the interviewees reported that the negative emotional anticipation they had when going to work decreased. The risk of exhaustion was perceived to be lower and social relationships in the workplace to have improved. It was also easier achieve work-life balance.	not investigated	no control group, delay in publishing the results
DELANEY H & CASEY C, 2021	employees of a medium-sized financial company (na/na/na %)	2-month intervention study with working hour reduction 40→32 h/week, 100% pay, interviews with 41 employees (90 min) and 4 managers (30–45 min)	experiences of work-life balance, monitoring work performance	Conflicting results: some participants experienced the experiment as proof that management cares about the well-being of the employees, others perceived it as simply increasing work efficiency. The employees felt that they were under surveillance and that the media coverage focused on the positive welfare effects.	the experiment was perceived as top-down, and it was criticised	
MULLENS F ET AL., 2022	women’s organisation employees, n=60 (100/0/0%)	working time reduction from the age-based weekly working hours (36/34/32 h/week) → 30 h/week, 100% pay	expectations and experiences of leisure time	The personal time that the women expected from the experiment did not come true as hoped. Gender norms determine time use.	not investigated	

(Table continues)

AUTHORS, YEAR	PARTICIPANTS (WOMAN/ MAN/ OTHER OR NOT KNOWN)	STUDY DESIGN	OUTCOME VARIABLES	RESULTS: EMPLOYEE LEVEL	RESULTS: ORGANISA- TION LEVEL	OTHER NOTES
MULLENS F ET AL., 2023	women's organi- sation employees, n=60 (100/0/0%)	working time re- duction from the age-based weekly working hours (36/34/32 h/week) → 30 h/week, 100% pay	changes in the organi- sation of work in the context of reduced working hours	The employees and teams were given responsibility for organising working time. While the experiment was perceived as successful by the employees, the interviews also high- lighted the effort required for time management and working time in- tensification.	not investi- gated	

4.4 Other trials in reducing working time

The table of non-peer-reviewed working time experiments (Table 3) summarises the results of the other working time experiments. It includes four reports and one conference abstract from Swedish working time reduction experiments (Bildt et al., 2007; Kecklund et al., 2019, 2020; Lorentzon, 2017; Olsson, 1999) and a large private sector experiment with a four-day working week (Lewis et al., 2023). In addition to the above-mentioned trials, this chapter briefly reviews the results of two Master's theses (Erlandsson & Sundberg, 2016; Kunttu, 2022) and of a pilot study that used a cross-sectional survey to investigate the impact of the experiment at the end of the trial (Persson, Larsson, & Näs-sén, 2022).

Participants in the Swedish experiments were either city employees from different sectors (Bildt et al., 2007; Persson et al., 2022) or employees in the social and health care sector (Kecklund et al., 2019, 2020; Lorentzon, 2017; Olsson, 1999). At least three quarters of the participants were women. In the international trial (Lewis et al., 2023), just under two-thirds of the participants were women, with representation from sectors such as marketing and advertising, professional services, non-profit organisation and administration and information technology. In a Swedish health care company, 85% of the participants in a trial were women (Erlandsson & Sundberg), but the gender of the participants in a social sector trial Master's thesis was not reported (Kunttu, 2022).

The nursing home workers' pay remained unchanged during a nearly two-year trial of reduced working hours. The self-reported sleep length of the intervention group participants was on average more than an hour longer than the sleep length of the control group. The intervention group participants also reported positive effects on physical activity, energy levels after the working day and social relationships. Sickness absence decreased in the intervention group, while they slightly increased over the same period compared to the city's all elderly care workers. (Lorentzon, 2017.) (Table 3.)

For Stockholm City employees, the reduction of weekly working time to 30 hours was implemented at the former salary. The experiment had a positive effect on the participants' sleep quality, recovery, and social life, but had only minor effects on various health risk factors or biological markers such as cholesterol or cortisol hormone levels. In some of the units studied, there was a significant reduction in overtime. The workers in the home care and pre-school services described their working days as more organised and efficient and themselves as more proactive in their work and more energetic in their free time. However, some of the workers reported that they were busy and did not have enough time to complete their work. (Olsson, 1999.) (Table 3.)

In six Swedish municipalities, the working time of personnel different sectors was reduced by 25% while pay remained unchanged. No positive changes in the employees' physiological health variables (e.g., blood pressure, cortisol) or sick leave were observed after the reduction in working hours. No age or gender differences were found either. (Bildt et al., 2007.) In another Swedish study, a 12–15% reduction in working hours (100% pay) of shift workers did not reduce sleep problems or stress symptoms compared to a traditional or participatory shift scheduling with no change in working hours. In contrast, irrespective of the working time pattern, certain shift characteristics, such as short shift intervals, were associated with a reduction in sleep quality. (Kecklund et al., 2019, 2020.) (Table 3.)

Around 2,900 workers from 61 mainly private sector companies, took part in assumingly the largest four-day working week trial to date. Working hours were reduced by an average of four hours per week, while pay and productivity remained unchanged. The majority of the workers reported positive effects on symptoms of exhaustion and work-life balance. There was also a reduction in perceived stress and sleep problems compared to the six-month period prior to the trial. At the same time, almost two thirds of the employees reported an increase in work pace, but despite this, almost all the employees (96%) reported a willingness to continue the experiment. Around a third of the companies also collected organisational level data showing a slight increase in turnover, a decrease in the number of redundancies and a decrease in the number of sick days per employee. (Table 3.) The interviewed senior managers considered the four-day working week to be an advantage in terms of company reputation, recruitment, and workforce retention, especially in the post-Covid 19 pandemic context. (Lewis et al., 2023.)

For six months, a Finnish social services company implemented a working time reduction experiment, where working hours were cut down to 32 hours a week, either during four or five days a week, with no change in pay. The effects of the experiment were investigated in a Master's thesis using a semi-structured interview (n=7). Participants estimated that the experiment had a positive impact on their sense of achievement and employee engagement, but it also blurred the boundaries between work and leisure. (Kunttu, 2022.)

In a Swedish health clinic, the working time experiment was implemented by reducing daily working hours from eight to six hours for three months with no change in pay (n=13). According to the thesis, employees' experiences were largely positive; they reported reduced perceived stress, improved time management and increased time for social relationships. At the same time, however, the work community was perceived to be more vulnerable in the event of sickness absence and contacts between colleagues were reduced. (Erlandsson & Sundberg, 2016.)

In 2015, the City of Gothenburg offered all its employees the opportunity to move to part-time work. Almost 1 000 employees responded to a survey targeted to those who had reduced their working hours. The experiment had a positive impact on perceived health, energy levels and social relationships. In particular, non-manual workers reported an increase in work intensity. For manual workers, on the other hand, concerns about income were more pronounced, as in this experiment wages decreased in line with the part-time rate. (Persson et al., 2022.)

Table 3: Other working time reduction interventions and experiments.

AUTHORS, YEAR	PARTICIPANTS (WOMAN/ MAN/ OTHER OR NOT KNOWN)	STUDY DESIGN	OUTCOME VARIABLES	RESULTS: EMPLOYEE LEVEL¹	RESULTS: ORGANIZATION LEVEL¹	PUBLICATION TYPE/ OTHER NOTES
BILDT C ET AL., 2007	social and health care workers, technicians, and switchboard operators from 6 municipalities, altogether 33 jobs, of which 17 jobs in the intervention group (n=449) and 16 jobs in the control group (n=372) (79/21/0%)	max. 24 months in the intervention, reduction of working time by 25% for a "sufficient part" of the time, 100% pay	blood pressure, blood test, cortisol, perceived stress, health status and sleep quality	reduction in working time ka 36.1→27.6 h/week in the intervention group (34.2→33.8 h/week in the control group) no beneficial changes in physiological variables perceived sleep duration +24 min, sleep quality, stress, and health status ↑, negative emotions and neck and shoulder pain ↓ in the intervention group	no differences in sickness absences	report extra personnel hired
KECKLUND G ET AL., 2019, 2020	526 healthcare shift workers, in traditional shift scheduling group (n=130), participatory shift scheduling group (n=247), 12–15% or reduced working time group (n=149) (86/14/0%)	approx. 12-month intervention, 3 groups: traditional shift scheduling group (6 weeks of actual working hours), participatory shift scheduling group (12 weeks of working hours) and shortened shift work group with 100% pay (2–4 days of work, 2–4 days off, 12 weeks of working hours)	5–7 surveys, sleep problems ≥3 times/week, stress symptoms	no differences in outcome variables e.g., sleep problems associated with specific shift characteristics such as short shift intervals rather than with working time group	no differences in sickness absences	conference abstract and report

AUTHORS, YEAR	PARTICIPANTS (WOMAN/MAN/ OTHER OR NOT KNOWN)	STUDY DESIGN	OUTCOME VARIABLES	RESULTS: EMPLOYEE LEVEL ¹	RESULTS: ORGANISATION LEVEL ¹	PUBLICATION TYPE/ OTHER NOTES
LEWIS K ET AL., 2023	61 companies (including marketing and advertising, professional services, non-profit organisations and administration and information technology with approx. 2900 employees (62/37/1%)	6-months in 100–80–100% ² model, comparison with the same period of the previous year	frequency of experiencing stress (never-always), work-related fatigue 7 questions, sleep disturbances	decrease in working hours on average 38→34 h/week, 39% of workers stress ↓ and 13% ↑, 71% fatigue ↓ and 22% ↑, 43% better and 15% worse perceived mental health, 40% perceived sleep problems ↓ and 15% ↑, 60% work-life balance ↑ and 10% ↓, 62% work pace ↑ and 2%	turnover ka 1.4% ↑ during 6 months of intervention turnover also 34.5% ↑ compared to the same period of the previous year the proportion of resigned 2.0→0.8% (-57%) days absent/employee/month 2.0→0.7% (-60%)	publication of the consultancy 23/61 enterprises provided information at organisational level no description of scales/measurements used
LORENTZON B, 2017	nursing assistants in elderly care, intervention group n=68, control group n=56 (na/na/na %)	23-month intervention study, surveys at 6,12,18, and 23 months, reduction in working time to 6 h/day or 30 h/week, 100% pay	perceived health, musculoskeletal symptoms, stress, sleep, physical activity, sickness absence	sleep length +1 h, energy after work ↑, perceived stress ↓, completing work tasks ↑, intense fatigue ↓, physical activity ↑	sickness absence -4.7% in the intervention group, +62.5% in the control group; the difference was largest for people over 50 years of age on the same period sickness absences increased by 16% in the elderly care in the whole city	report 15 new employees hired for the intervention unit sickness absence data from all elderly care units in the municipality

(Table continues)

AUTHORS, YEAR	PARTICIPANTS (WOMAN/MAN/ OTHER OR NOT KNOWN)	STUDY DESIGN	OUTCOME VARIABLES	RESULTS: EMPLOYEE LEVEL ¹	RESULTS: ORGANISATION LEVEL ¹	PUBLICATION TYPE/ OTHER NOTES
OLSSON B, 1999	employees of Stockholm City home care, long-term care, and day care), n=74 (81/19/0%), 4 comparison work units	30 h/week for the first 24 months of the trial period, 100% pay	questionnaire (pre-trial, at 12 months and 24 months), interview, sickness absence data, blood and urine samples	positive impact on workers' sleep quality, recovery, and social life (family and friends), prolactin levels ↓ Employees' children valued increased time and interaction with their parent.	In one unit, overtime was reduced to less than a tenth of the previous level. Sickness absences decreased for reasons unrelated to the reduction in working time.	report extra personnel were hired, including temporary staff, some previously unemployed were employed, partly work was done with fewer employees

¹ number of significant figures reported as in the original reference, ² 100% pay, 80% working time, 100% productivity

5 Discussion and conclusions

The aim of this scoping review was to investigate the effects of workplace-level working time reduction experiments on workers' health, well-being, and productivity, especially in the countries with a work-life context comparable to the Nordic countries.

5.1 Effects on health and well-being

The literature review supports the findings of both individual studies and theses and earlier reviews with a more specific topic (Brynja & Bildt, 2005; Jansen-Preilowski et al., 2020; Malmberg et al., 2003; Voglino et al., 2022) that a 20–25% reduction in working hours with no change in pay has a generally beneficial effect on well-being. Reducing working hours reduces stress symptoms among workers (Barck-Holst et al., 2017; Erlandsson & Sundberg, 2016; Schiller et al., 2017), improves sleep quality (Åkerstedt et al., 2001; Barck-Holst et al., 2017; Schiller et al., 2017), increases sleep duration (Lorentzon, 2017; Schiller et al., 2017) and increases time for social relations (Åkerstedt et al., 2001; Erlandsson & Sundberg, 2016) or improves work-life balance (Barck-Holst et al., 2017; Bildt et al., 2007; Mullens et al., 2021, Anttila et al., 2005). In physically demanding work, neck and shoulder symptoms and perceived overload were also reduced (Wergeland et al., 2003). Several studies outside the inclusion criteria of this review, where reduced working hours were more than 35 hours per week or where working hours were reduced very little, have also found similar well-being results (Ahn, 2016; Fagnani & Letablier, 2004; Haraldsson & Kellam, 2021; Lepinteur, 2019).

However, not all the interventions or trials have shown beneficial changes in well-being variables (Bildt et al., 2007; Lindfors & von Thiele Schwarz, 2022) or changes in specific outcomes have not been permanent (Lindfors & von Thiele Schwarz, 2022). Very short reduction of working hours (2.5 h/week) was also not found to be beneficial for well-being (von Thiele Schwarz et al., 2008).

In the studies included in this review, it had rarely been possible to examine the impact of age on well-being. In two studies (Bildt et al., 2007; Schiller et al., 2018), the age of the workers was not associated with well-being outcomes. In a survey of more than 17 000 Dutch employees, a reduction in working hours to 36 hours per week was preferred compared to standard working hours, especially by the employees over 50 years of age and working in small and medium-sized enterprises (Tijdens et al., 2003). The association between the gender of employees and well-being effects has not been specifically studied either, and in some studies all participants have been female (Lindfors et al., 2022,

Mullens & Glorieux, 2022, 2023). In one of these studies, the increased personal time expected by female employees had not become a reality as expected (Mullens & Glorieux, 2022). In the large Dutch survey mentioned above, women were generally more positive than men about reducing working hours, and the respondent's family situation was not associated with this opinion (Tijdens et al., 2003).

The negative effect of reducing working hours is often perceived as an increase in work intensity, as found in two peer-reviewed studies (Delaney & Casey, 2021; Persson et al., 2022), one non-peer-reviewed private sector experiment (Lewis et al, 2023) and in Finnish experiments in the 1990s (Anttila, 2005). In addition, the work community has been reported to be more vulnerable to sickness absence and to have reduced contact between colleagues (Erlandsson & Sundberg, 2016). Increased work intensity may be associated with shorter or fewer breaks. Also, striving to maintain productivity with full wage compensation is likely to increase work intensity. The porosity of working time is probably also important for social interaction, information flow and successful organisation of work.

5.2 Effects on sickness absence and productivity

Only a few trials of reduced working hours had investigated the effects of the trials on sickness absence (Åkerstedt et al., 2001; Bildt et al., 2007; Lorentzon, 2017; von Thiele Schwarz & Hasson, 2011). Only the intervention reported by Lorentzon (2017) found positive changes, and these were greatest for the oldest workers. The researchers in one of the original studies stated that the follow-up period of the trials had been too short to assess the effects of sickness absence (Åkerstedt et al., 2001). In a non-peer-reviewed six-month trial, both the employee turnover and absenteeism per employee decreased (Lewis et al., 2023).

Only one peer-reviewed study (von Thiele Schwarz & Hasson, 2011) and one experiment led by a consultancy firm (Lewis et al., 2023) had attempted to estimate the change in work productivity or operational efficiency after a reduction in working hours. In the dental care intervention study, both self-assessed work efficiency and the number of patients treated increased in the reduced working hours group, but the number of patients treated also increased in the physical exercise and control groups (von Thiele Schwarz & Hasson, 2011). In a much-publicised trial of reduced working hours in English-speaking countries (Lewis et al., 2023), productivity was estimated through turnover in approximately one third of the firms, where productivity increased by about 1% over the six-month intervention. However, changes in turnover in other companies in the same sectors during the same period were not reported at all and the consultancy firm's

publication on the experiment is descriptive and limited in its information content. Moreover, turnover is not a true measure of labour productivity, as it does not reflect the link between a firm's income and its expenditure.

5.3 Strengths and limitations

The strength of this scoping literature review is that the search was conducted over a long period of time and from several different databases covering different disciplines from medicine and health sciences to psychology, sociology, and economics. In addition, the researchers (KK, TA, and PV) went through the reference lists of the articles accepted for the results section and other sources available to the researchers. Although the data search was limited to title terms, the overall search can be considered successful. In addition to all the studies cited in the recent review article (Vogolino et al., 2022), even more recent studies (Backhaus et al., 2023; Lindfors & von Thiele Schwarz, 2022) and several Finnish and Swedish publications (Anttila et al., 2005; Kecklund et al., 2019, 2020; Malmberg et al., 2003) were retrieved.

The current knowledge on the effects of workplace-level working time reduction is still very limited. Only four studies of relatively high quality, including a follow-up period of at least one and a half years and a comparison group, were found (Barck-Holst et al., 2017; Schiller et al., 2017, 2018; Wergeland et al., 2003). Randomisation at the workplace level had only been done in two intervention studies (Schiller et al., 2017, 2018; von Thiele Schwarz et al., 2011).

From the perspective of scientific reporting, a weakness of this review is that, despite the systematic search methods, the criteria used in systematic reviews, such as PICOS (Population, Intervention, Comparison, Outcomes, and Study Characteristics) (Munn et al., 2018), could not be used to select studies. This was a conscious choice as, for example, many interventions or trials of reducing working hours do not include a control group. As the aim was to collect as much data as possible from the trials, including both quantitative and qualitative studies published in both peer-reviewed and non-peer-reviewed publications, which also included reports, conference papers and theses.

5.4 The challenges of research on working time reduction

Generally speaking, the usefulness of the results from experiments on working time reduction is limited by the fact that these experiments have generally not been carried out using scientific intervention research methods. The study designs and methods used have had several limitations, such as the selection of companies or organisations, the

lack of a control group, relatively small number of workers involved in most of the experiments and short follow-up time -especially for detecting potential changes in health variables or sickness absence (Bildt et al., 2007; Malmberg et al., 2003; Voglino et al., 2022). Studies on shift work had not reported on the association of reduced working hours with different shifts, which is particularly relevant when evaluating results regarding sleep, alertness, and health.

The fact that the planned reductions in working time have been realized to varying degrees complicates summarising the studies (Jansen-Preilowski et al., 2020). For example, the working time and/or pay arrangements for part-time workers already in place can have had different solutions within a single study. A key area for further development in studies of working time reduction is the reliable measurement of working time (Lukács & Antal, 2023), especially from actual working time data, which is increasingly possible in the context of working time research.

The experiments were also characterised by the fact that other changes in work organisation and working methods were implemented at the same time as the reduction in working hours (Anttila 2005; Olsson, 1999), with the aim of, for example, maintaining work productivity (Lewis et al., 2023). When comparison groups were included, the workplaces compared may also have been different in many other respects than working hours.

The intervention studies often used only a few, rather limited, outcome variables (Voglino et al., 2022). In particular, sickness absence or work productivity have not been sufficiently studied. It is possible that productivity declines are overestimated if they are assumed to be linear in relation to reductions in working time (von Thiele Schwarz & Hasson, 2011). Possibly, the positive effect of a reduction in working time on productivity is short-lived and maybe due to a mediating mechanism, such as improved job satisfaction (von Thiele Schwarz & Hasson, 2011). The pathway from shorter working hours to health-promoting effects may also run first and foremost through perceived positive changes in psychosocial working conditions (Lindfors & von Thiele Schwarz, 2022).

Solutions related to pay have a clear impact on workers' opinions on the continuation of reduced working hours after the trial period. None of the employees in a Finnish social sector enterprise would have participated in a trial of reduced working hours if there had been a parallel pay decrease (Kunttu, 2022). In a large six-month trial in the private sector, almost all the employees wanted to continue working reduced hours at full pay (Lewis et al., 2023). In contrast, in a Swedish public sector experiment, less than one fifth of the employees would have been willing to continue working reduced hours if their pay had

decreased in proportion to the reduction in working hours after the compensated trial period (Bildt et al., 2007).

The conclusions of non-peer-reviewed experiments are mainly based on an interpretation of the effectiveness of the experiments. In the qualitative studies, participants may have emphasised the positive aspects of working time reduction, hoping that the experiment would become a permanent practice (Barck-Holst et al., 2022). Such reports can be useful, for example, when designing new experiments, but they do not enable drawing firm conclusions about the positive and negative effects of experiments.

A major shortcoming of the monitoring of the working time reduction experiments was that the description of the process leading to the reduction of working hours and other internal changes, such as negotiations between employer and employees with possible conflicts of interest, and other changes in work organisation in parallel to the reduction of working hours, were not described (Delaney & Casey, 2021; Mullens & Glorieux, 2023). Often, the reduction of working time was accompanied by other changes in the organisation of working time (e.g., a simultaneous change in the organisation of shift work or measures to reduce overtime), which may have had a significant impact on the initiation of working time experiments and the long-term feasibility of the experiment. In addition, working time experiments may be associated with increased work monitoring and increasing productivity pressures. A relatively common experience was that working time is intensified when it is shortened (Anttila, 2005; Delaney & Casey, 2021; Lewis et al., 2023, Persson et al., 2022). Increased working time intensification and irregularity have also been observed when reducing weekly working hours below the criteria for full-time work in this review, for example in France (Prunier-Poulmaire & Gadbois, 2001) and Iceland (Haraldsson & Kellam 2021).

This review did not cover individual-level experiments in reducing working hours. Since shorter working hours can reduce the workload, a shorter working week agreed at individual level may be suitable for employees with impaired work ability, or older workers, for example. Individual reductions in working time can already be commonly agreed in the workplace. Women are more likely to work part-time than men (Statistics Finland, 2023), so it should also be noted that individual part-time working solutions and reduced working hours in female-dominated sectors are linked to gender equality issues in the working life.

5.5 Conclusions

Reduced working hours were generally associated with better job satisfaction, but experiences of work intensification were also common. Reducing working hours by 20–25% at full pay improved employees' perceived sleep quality, including sleep duration, improved work-life balance and reduced work-related musculoskeletal disorders. The results are contradictory with regard to sickness absences. In some trials it was possible to reduce working hours without reducing productivity, but for now, there is a lack of studies on sickness absence or productivity.

Reliable assessment of the well-being, health and economic impacts of reduced working hours would require controlled observational studies with sufficiently large and representative samples, as well as large-scale research, including research on labour productivity and company-specific working time practices. The prerequisites and effects of reducing working time depend on the occupational sector and the prevailing conditions in the enterprises. International experiments show that, at its best, working time reduction can offer organisations the opportunity to support employee's well-being and promote labour supply.

6 References

- Ahn, T. (2016). Reduction of Working Time: Does It Lead to a Healthy Lifestyle? *Health Economics (United Kingdom)*, 25(8), 969–983. doi:10.1002/hec.3198
- Andrews, J., Manthorpe, J., & Watson, R. (2005). Employment transitions for older nurses: a qualitative study. *J Adv Nurs*, 51(3), 298–306. doi:10.1111/j.1365-2648.2005.03501.x
- Angrave, D., & Charlwood, A. (2015). What is the relationship between long working hours, over-employment, under-employment and the subjective well-being of workers? Longitudinal evidence from the UK. *Human Relations*, 68(9), 1491–1515. doi:10.1177/0018726714559752
- Anttila, T. (2005). Reduced working hours: Reshaping the duration, timing and tempo of work. *Jyväskylä studies in education, psychology and social research* 258. Jyväskylä: University of Jyväskylä. <https://jyx.jyu.fi/handle/123456789/13321>
- Anttila, T., Nätti, J., & Väisänen, M. (2005). The experiments of reduced working hours in Finland. *Community Work Fam*, 8(2), 187–209. doi:10.1080/13668800500049704
- Anttila, T., & Oinas, T. (2023). Työajan monet kasvot. In Tuija Koivunen, Markku Sippola & Harri Melin (eds.) *Työ elää - Murroksia, trendejä ja muutoksen suuntia Suomessa*. [The many faces of working time. In *Work lives on - Changes, trends and directions of change in Finland*] [In Finnish only] Helsinki: Gaudeamus, p.52–70.
- Backhaus, N., Vieten, L., & Nold, J. (2023). Wann werden Wünsche wahr? Arbeitszeitwünsche und Modelle der Arbeitszeitverkürzung in Deutschland. 69. Kongress der Gesellschaft für Arbeitswissenschaft. [When do wishes come true? Working time wishes and models of working time reduction in Germany. 69th Congress of the Society for Labour Studies] [In German only] Gottfried Wilhelm Leibnitz Universität, Hannover, 1.–3.3.2023.
- Barck-Holst, P. (2020). Reduced working hours and stress in the Swedish social services. Doctoral thesis. Karolinska Institutet, Stockholm University. <https://openarchive.ki.se/xmlui/handle/10616/47049>
- Barck-Holst, P., Nilsson, Å., Åkerstedt, T., & Hellgren, C. (2017). Reduced working hours and stress in the Swedish social services: A longitudinal study. *Int Soc Work*, 60(4), 897–913. doi:10.1177/0020872815580045

- Barck-Holst, P., Nilsson, Å., Åkerstedt, T., & Hellgren, C. (2022). Reduced working hours and work-life balance. *Nord Soc Work Res*, 12(4), 450–463. doi:10.1080/2156857X.2020.1839784
- Bielinski, H., Bosch, G., & Wagner, A. (2002). Working time preferences in sixteen European countries. Luxembourg: Office for Official Publications of the European Communities. https://www.eurofound.europa.eu/sites/default/files/ef_publication/field_ef_document/ef0207en_0.pdf
- Bildt, C., Åkerstedt, T., Falkenberg, A., Ingre, M., Kecklund, G., Larsson, I., Nyfjäll, M., Sandberg, T. (2007). Arbetstidsförkortning och hälsa -Försök med sex timmars arbetsdag inom offentlig sektor. [Reduced working time and health -Trial of the six-hour working day in the public sector] [In Swedish only] Stockholm: National Institute for Working Life.
- Brynja, O., & Bildt, C. (2005). Arbetstidsförkortning och hälsa: en litteraturgenomgång av befintlig forskning. Arbetslivsrapport NR 2005:11. [Working time reduction and health: a literature review of existing research. Labour market report NR 2005:11] [In Swedish only] Stockholm: National Institute for Working Life. http://nile.lub.lu.se/arch/arb/2005/arb2005_11.pdf
- Delaney, H., & Casey, C. (2021). The promise of a four-day week? A critical appraisal of a management-led initiative. *Employee Relations: The International Journal*, 44(1), 176–190. doi:10.1108/ER-02-2021-0056
- Erlandsson, M., & Sundberg, M. (2016). Från åtta timmars arbetsdag till sex timmars arbetsdag med bibehållen lön. Psykologexamensuppsats. [From an eight-hour working day to a six-hour working day with unchanged pay. Master's thesis in psychology.] [In Swedish only] Lund University.
- Eurofound. (2017). Working time patterns for sustainable work (pp. 86). https://www.eurofound.europa.eu/sites/default/files/ef_publication/field_ef_document/ef1720en.pdf
- Eurostat. (2018). Työllisyystilastot. https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Archive:Employment_statistics/fi&oldid=370010
- Fagnani, J., & Letablier, M.-T. (2004). Work and Family Life Balance: The impact of the 35-hour laws in France. *Work Employ Soc*, 18(3), 551–572. doi:10.1177/0950017004045550

- Finnish Confederation of Professionals STTK. 2017. Jos työviikko olisi neljä päivää? Keskustelua tulevaisuuden työstä ja työajoista. STTK:n pamflettisarja. [If the working week were four days? A debate on the future of work and working hours. STTK pamphlet series.] [In Finnish only] STTK_4pvko_A5_sisus_300317_AA_FINAL_LOW.pdf
- Gerold, S., & Nocker, M. (2015). Reduction of Working Time in Austria. A Mixed Methods Study Relating a New Work Time Policy to Employee Preferences. Vienna University of Economics and Business, Department of Socioeconomics. WelfareWealthWork for Europe Working Paper no 97, 132. https://www.wifo.ac.at/jart/prj3/wifo/resources/person_dokument/person_dokument.jart?publikation-sid=58139&mime_type=application/pdf
- Haraldsson, G. D., & Kellam, J. (2021). Going public: Iceland's journey to a shorter work week. https://autonomy.work/wp-content/uploads/2021/06/ICELAND_4DW.pdf
- Hyry, J. (2023). Yrittäjägallup maaliskuu 2023. Nelipäiväinen työviikko. [Entrepreneur Gallup March 2023. Four-day working week.] [In Finnish only] <https://www.yrittajat.fi/wp-content/uploads/2023/03/nelipaivainen-tyoviikko-kalvot.pdf>
- Jansen-Preilowski, V. V., Paruzel, A., & Maier, G. W. (2020). Arbeitszeitgestaltung in der digitalisierten Arbeitswelt: Ein systematisches Literatur Review zur Wirkung von Arbeitszeitverkürzung in Bezug auf die psychische Gesundheit. [Organization of working time in digitized work environments: A systematic literature review on the effects of reduced working hours on mental health]. Zeitschrift für Angewandte Organisationspsychologie (GIO), 51, 331–343. doi:10.1007/s11612-020-00530-0
- Kallis, G., Kalush, M., Flynn, H. O., Rossiter, J., & Ashford, N. (2013). "Friday off": Reducing Working Hours in Europe. Sustainability, 5(4), 1545–1567. doi:10.3390/su5041545
- Kecklund, G., Westerlund, S., Olafsson, U., & Karlsson, B. (2020). Må bra i skiftarbete: hur ser de goda lösningarna ut? [Well-being in shift work: what are the good solutions?] [In Swedish only] Stress Research Institute, Stockholm University.
- Kecklund, G., Westerlund, S., Olofsson, U., & Karlsson, B. (2019). Is reduced working times and self-scheduling beneficial for shift workers sleep and health? Sleep Science, 12, 45.
- Kunttu, E. (2022). "Ei täää elämä oo pelkkää työntekoa." Tapaustutkimus työajan lyhentämisen kokeilusta sosiaalialalla. ["Life is not all work." A case study of a trial of reduced working hours in the social sector] [In Finnish only] Master's thesis. University of Turku, Faculty of Social Sciences.

- Lepinteur, A. (2019). The shorter workweek and worker wellbeing: Evidence from Portugal and France. *Labour Econ*, 58, 204–220. doi:10.1016/j.labeco.2018.05.010
- Lewis, K., Stronge, W., Kellam, J., Kikuchi, L., Schor, J., Fan, W., . . . Mullens, F. (2023). The results are in: The UK's four-day week pilot. <https://autonomy.work/portfolio/uk4dwpilotresults/>
- Lindfors, P., & von Thiele Schwarz, U. (2022). Health-related effects of an intervention involving reduced working hours among women employed in the municipal elder-care. *Nord Psychol*, 1–16. doi:10.1080/19012276.2022.2138516
- Lorentzon, B. (2017). 23 månader med 6 timmar - Följeforskning om försök med reducerad arbetstid. [23 months with 6 hours - Follow-up research on reduced working time trials] [In Swedish only] Aarhus: Scandinavian Book.
- Lukács, B., & Antal, M. (2023). The practical feasibility of working time reduction: Do we have sufficient data? *Ecological Economics*, 204, 107629. doi:https://doi.org/10.1016/j.ecolecon.2022.107629
- Malmberg, J., Byrgren, M., & Hansson, M. (2003). Kartläggning av arbetstidsförkortningar 2000–2003. [Mapping of working time reductions 2000–2003] [In Swedish only] Stockholm: National Institute for Working Life.
- Ministry of Economic Affairs and Employment. (2023). Työaikakokeiluista, työajan lyhentämisen vaikutuksista ja Suomen työaikakokeilujen vaihtoehtoista. [On working time experiments, the impact of working time reduction and alternatives to working time experiments in Finland] [In Finnish only] <https://tem.fi/documents/1410877/153287519/TY%C3%96AIKAKOKEILUT+FINAL.pdf/1c286e98-baee-d607-6c12-1439f3b2dbf9/TY%C3%96AIKAKOKEILUT+FINAL.pdf?t=1680238268029>
- Mullens, F., & Glorieux, I. (2022). Dreams versus reality: wishes, expectations and perceived reality for the use of extra non-work time in a 30-hour work week experiment. *Community Work Fam*, 1–27. doi:10.1080/13668803.2022.2092452
- Mullens, F., & Glorieux, I. (2023). Reducing weekly working hours: Temporal strategies and changes in the organization and experiences of work-Results from a qualitative study of a 30-hour workweek experiment. *Time & Society*, 32(2), 146–168. doi:10.1177/0961463X231156948
- Mullens, F., Verbeylen, J., & Glorieux, I. (2021). Rethinking the workweek: Results from a longitudinal time-use study of a 30-hour workweek experiment. *Journal for Time Use Research*, 16(1), 52–75. doi:10.32797/jtur-2021-4

- Munn, Z., Stern, C., Aromataris, E., Lockwood, C., & Jordan, Z. (2018). What kind of systematic review should I conduct? A proposed typology and guidance for systematic reviewers in the medical and health sciences. *BMC Medical Research Methodology*, 18(1), 5. doi:10.1186/s12874-017-0468-4
- Neubert, S., Bader, C., Hanbury, H., & Moser, S. (2022). Free days for future? Longitudinal effects of working time reductions on individual well-being and environmental behaviour. *J Environ Psychol*, 82, 101849. doi:https://doi.org/10.1016/j.jenvp.2022.101849
- OECD (The Organisation for Economic Cooperation and Development). 5. Working time and its regulation in OECD countries: How much do we work and how? *OECD Employment Outlook 2021: Navigating the COVID-19 Crisis and Recovery*. <https://www.oecd-ilibrary.org/sites/c18a4378-en/index.html?itemId=/content/component/c18a4378-en>
- Olsson, B. (1999). 6-timmars arbetsdag med heltidslön i Stockholms stad. [6-hour working day with full-time pay in the city of Stockholm] [In Swedish only] Stockholm Business School, Stockholm University.
- Persson, O., Larsson, J., & Nässén, J. (2022). Working less by choice: what are the benefits and hardships? *Sustain: Sci Pract Policy*, 18(1), 81–96. doi:10.1080/15487733.2021.2023292
- Prunier-Poulmaire, S., & Gadbois, C. (2001). The French 35-hour workweek: a wide-ranging social change. *J Hum Ergol (Tokyo)*, 30(1–2), 41–46.
- Pullinger, M. (2014). Working time reduction policy in a sustainable economy: Criteria and options for its design. *Ecol Econ*, 103, 11–19. doi:10.1016/j.ecolecon.2014.04.009
- Schiller, H., Lekander, M., Rajaleid, K., Hellgren, C., Akerstedt, T., Barck-Holst, P., & Kecklund, G. (2017). The impact of reduced worktime on sleep and perceived stress - a group randomized intervention study using diary data. *Scand J Work Environ Health*, 43(2), 109–116. doi:10.5271/sjweh.3610
- Schiller, H., Lekander, M., Rajaleid, K., Hellgren, C., Akerstedt, T., Barck-Holst, P., & Kecklund, G. (2018). Total workload and recovery in relation to worktime reduction: a randomised controlled intervention study with time-use data. *Occup Environ Med*, 75(3), 218–226. doi:10.1136/oemed-2017-104592
- Schor, J. B. (2005). Sustainable Consumption and Worktime Reduction. *J Ind Ecol*, 9(1–2), 37–50. doi:10.1162/1088198054084581

Statistics Finland, 2023. Vuonna 2022 työllisiä ja työvoimaa enemmän, työttömiä ja työvoiman ulkopuolisia vähemmän kuin edellisvuonna. Työvoimatutkimus 2022. [In 2022, more people were employed and in the labour force, fewer unemployed and inactive than in the previous year. Labour Force Survey 2022] [In Finnish only] <https://stat.fi/julkaisu/cl8e9iaj0j1y70avukedyye4c>

Tijdens, K. G. (2003). Employees' and Employers' Preferences for Working Time Reduction and Working Time Differentiation: A Study of the 36-Hour Working Week in the Dutch Banking Sector. *Acta Sociologica*, 46(1), 69–82. doi:10.1177/0001699303046001005

Vogolino, G., Savatteri, A., Gualano, M. R., Catozzi, D., Rousset, S., Boietti, E., . . . Siliquini, R. (2022). How the reduction of working hours could influence health outcomes: a systematic review of published studies. *BMJ Open*, 12(4), e051131. doi:10.1136/bmjopen-2021-051131

von Thiele Schwarz, U., & Hasson, H. (2011). Employee self-rated productivity and objective organizational production levels: effects of worksite health interventions involving reduced work hours and physical exercise. *J Occup Environ Med*, 53(8), 838–844. doi:10.1097/JOM.0b013e31822589c2

von Thiele Schwarz, U., Lindfors, P., & Lundberg, U. (2008). Health-related effects of worksite interventions involving physical exercise and reduced workhours. *Scand J Work Environ Health*, 34(3), 179–188. doi:10.5271/sjweh.1227

Wergeland, E., Veiersted, B., Ingre, M., Olsson, B., Åkerstedt, T., Bjørnskau, T., & Varg, N. (2003). A shorter workday as a means of reducing the occurrence of musculoskeletal disorders. *Scand J Work Environ Health*, 29(1), 27–34. doi:10.5271/sjweh.701

Åkerstedt, T., Olsson, B., Ingre, M., Holmgren, M., & Kecklund, G. (2001). A 6-hour working day--effects on health and well-being. *J Hum Ergol (Tokyo)*, 30(1–2), 197–202.

7 Appendix

Appendix 1. The search terms used in the literature search.

"30-hour week" OR "30 hour week" OR "30-hour work week" OR "30 hour work week" OR "4-day week" OR "4 day week" OR "four day week" OR "four-day week" OR "4-day work week" OR "4 day work week" OR "four day work week" OR "four-day work week" OR "6-hour work day" OR "6 hour work day" OR "6-hour work shift" OR "6 hour work shift" OR "6 hour shift" OR "6-hour shift" OR "reduced working hours" OR "reduced work-hours" OR "reduced working time*" OR "reduced worktime" OR "working time reduction" OR "worktime reduction" OR "reduction of working hours" OR "reduction of working time" OR "reduction of worktime" OR "shortened workhours" OR "shortened working hours" OR "shortened working time*" OR "shortened worktime" OR "shortened shift*" OR "shorter workday" OR "shorter worktime" OR "shorter shift*" OR "compressed work week*" OR "compressed working time*" OR "compressed worktime" OR "100-80-10"

The potential impact of working time reduction on well-being and productivity has been the subject of debate. The aim of this scoping literature review was to investigate the effects of workplace-level interventions and experiments in reducing working time on health, well-being at work and productivity. The results show that reduced working hours were generally associated with improved job satisfaction but also with experiences of work intensification. Reducing working hours by 20–25% without reducing pay improved perceived sleep quality, work-life balance and reduced musculoskeletal disorders. Some trials have been able to reduce working hours without reducing productivity, but there are still very few studies focusing on sickness absence or productivity. High-quality research of the effects of reduced working hours would require a controlled follow-up study with a sufficiently large and representative sample, and the use of a wide range of measurements, including those of productivity.

Työterveyslaitos
Arbetshälsoinstitutet
Finnish Institute of Occupational Health

P.O.Box 40, FI-00032 Työterveyslaitos

www.ttl.fi/en

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