Myndigheten för arbetsmiljökunskap

Remote work

– review of international research on work environment and health, work–life balance and productivity before and during the COVID-19 pandemic with particular consideration for conditions for women and men

Report 2022:2

Remote work – review of international research on work environment and health, work–life balance and productivity before and during the COVID-19 pandemic with particular consideration for conditions for women and men
Report 2022:2
ISBN 978-91-987761-4-0
Published in 2022

Swedish Agency for Work Environment Expertise
Box 6051, 800 06 Gävle
Telephone: 026-14 84 00, E-mail: info@mynak.se
www.sawee.se

Remote work

– review of international research on work environment and health, work–life balance and productivity before and during the COVID-19 pandemic with particular consideration for conditions for women and men

Report 2022:2

Preface

The pandemic has changed how we organise working life, perhaps forever. The boundaries between working life and private life, as well as between the workplace and the individual's private sphere have become more elastic. New forms of work, new approaches to leadership and self-leadership among employees, and to the work environment overall are in the process of emerging. As the third report in a series of literature reviews and analyses of the pandemic's impact on the work environment in Sweden, the Swedish Agency for Work Environment Expertise has produced a new literature review of the work environment, health, work–life balance and productivity with remote work before and during the COVID-19 pandemic, with particular consideration for the conditions of women and men.

The literature review has been conducted by Professor Gunnar Aronsson, Stockholm University, and Professor Ulf Lundberg, Stockholm University, under the process management of Johan Stenmark, Swedish Agency for Work Environment Expertise. Maivor Hallén and Robin Gullstrand at the library at the Faculty of Engineering (Lund University) contributed literature and information searches. Marina Heiden, associate professor at the University of Gävle, has quality-reviewed the literature review on behalf of the agency.

The authors of the literature review have chosen their theoretical and methodological starting points themselves and are responsible for the results and conclusions presented in the literature review.

I would like to thank our external researchers and quality reviewers, as well as employees at the agency who have contributed to producing this valuable literature review. The literature review is published on the agency's website and in the Literature Review series.

Gävle, March 2022

Nader Ahmadi,
Generaldirektör

Contents

Summary

During the first wave of the COVID-19 pandemic in early spring 2020, most countries, including Sweden, chose to recommend or require employees for whom doing so was possible to work remotely from home in order to reduce the spread of infection at workplaces, and during commutes to and from workplaces. Working remotely differs in many respects from working at the employer's premises. The overall objective of this three-part review has been to compile and increase research-based knowledge of remote work from home.

This review encompasses research literature in three areas:

- work environment and health
- work–life balance
- productivity.

In the analyses, we have therefore focused in particular on similarities and differences in the conditions for men and women regarding paid work at home. Additional aims were to investigate and draw conclusions about remote work from home during the period before and during the pandemic, respectively.

The first part is a review of research reviews of remote work before the pandemic (published 2005–2021), while the second part is a review of original studies of remote work from home during the pandemic (2020–2021). Part three comments on and summarises the material presented in parts one and two. The main purpose of the division into before and during is that remote work before the pandemic was primarily voluntary and planned, while remote work from home during the pandemic was unexpected, with minimal planning, and more or less forced.

The review has been limited to remote work from home conducted by employees through an internet connection.

Method

The searches were conducted in the databases:

- *Social Science Citation Index (SSCI)*
- *Psycinfo*
- *Web of Science*
- *Scopus.*

Searches were also conducted of reference lists, and manually. A total of 165 articles were identified for the period before the pandemic as potential research reviews in the three areas:

- work environment and health
- work–life balance
- productivity.

After culling based on relevance, quality and overlap, 5 review articles remained. For part 2 of the report, 1,813 original articles were identified for the period of 2020–2021. After culling based on relevance and quality, 50 studies remained. Participants were often recruited through so-called "convenience sampling" using social media, email and more, but there are also studies with systematic recruitment. Because the searches did not produce any Swedish international scientific studies, manual searches were conducted for Swedish studies published another way. This resulted in the identification of four studies.

Study of review studies 2005–2021

The five reviews from before the pandemic primarily show positive results in the three investigated areas: work and health, work–life balance and productivity.

Work environment and health

By increasing self-determination and flexibility in time and space, remote work can be positive. However, reduced and inadequate contact with colleagues and managers as well as social isolation are prominent negative factors. Interpersonal relationships and collegial support are therefore important conditions for remote work to function well. No clear gender differences could be discerned.

Work–life balance

The four reviews addressing work–life balance differ from one another, but the results suggest that remote work provides better balance. The connection is not usually simple, but instead depends upon other conditions, and remote work can also lead to negative effects in some circumstances.

Productivity

Productivity is often assessed as higher than when working at the workplace, but it is negatively affected if employees lack the necessary skills for using technology effectively.

Original studies during the pandemic 2020–2021

None of the 50 published original articles referred to Swedish conditions. The studies were predominantly from Europe and the US, but articles also addressed conditions in Africa, Asia, Australia and South America.

The comparison between work at the workplace and remote work from home was usually made through retrospective assessments, but there were also several longitudinal studies with measurements both before and during the pandemic. Some of the studies focused exclusively on the period during the pandemic and analysed how different conditions had a positive or negative effect on work environment and health, work–life balance and productivity.

Work environment and health

Remote work from home seems to strengthen the effects of both problematic and good working conditions. One such factor is autonomy or self-determination regarding work, which includes getting to decide when and how to work, and at what pace. When working from home, conditions for autonomy include the worker having access to the necessary resources for carrying out the work, and the necessary skills for working independently. Delegated or false autonomy, in the sense that the employee working from home is expected to manage on their own, seems to have obvious negative consequences in the form of reduced mental well-being and reduced efficacy.

The few studies of managers' working situations indicate that managers are highly bound to their computer workstations and are overburdened by virtual meetings. Nevertheless, managers feel that their contact with employees is inadequate. Managers report having difficulty assessing how staff are doing and determining individual employees' needs for help and support. It is well-known from previous research that insufficient communication between manager and employee risks leading to problems on multiple levels. This risk is further accentuated by remote work from home with a manager who is pressed for time.

Work–life balance or conflicts between work and private life

The results of the international studies consistently demonstrate a negative impact on both work–life balance and self-assessed productivity for families with young children.

Some results point to the stress declining over time, but for families with younger children at home, the results show that the burden remains high. For single-parent households with younger children and without child care, the situation is even more problematic because the risk of infection thins out surrounding private networks. There is a risk of inadequate recovery, and the burden accumulates over time.

Sweden, which unlike essentially all other countries did not shut down child care or primary schools during the pandemic, differs significantly from this negative picture. The Swedish studies consistently show that parents with children have viewed remote work positively, especially female study participants. This indicates that keeping schools and child care open has had great significance for parents who worked remotely in Sweden, helping women in particular.

Productivity

The majority of the studies indicate increased productivity related to remote work. One reason for this outcome is that more hours of work are put in when working from home than when working at the primary workplace. Additional conditions contributing to increased productivity are:

- opportunity to maintain good contact with colleagues, even when working remotely
- having a home office
- autonomy
- cohesion.

Similarly, reduced productivity is related to:

- lack of work tasks
- inferior resources at home
- younger children staying home.

People who felt disrupted, uncertain and isolated at home reported worse productivity.

No systematic gender differences could be discerned regarding productivity, as the results point in different directions. The fragmented picture and background data on industries, professions and so forth are not sufficient to provide a basis for deeper analysis of the matter.

Comparison between international and Swedish studies

As previously stated, no Swedish scientific studies were identified in the systematic searches. However, four Swedish studies judged to be of sufficient quality and relevance were identified in manual searches. They were conducted by the unions Akavia (June and September 2021), ST (May 2020) and TCO (autumn 2020).

Compared with the international studies, the Swedish studies consistently demonstrate a more positive picture. The overall view is that for the majority – and sometimes a large majority – remote work from home has contributed to higher job satisfaction, has made it easier to combine work needs and family needs, and has resulted in feeling more productive and more effective.

In the TCO study, women reported having a higher workload when working from home than when working at the primary workplace before the pandemic. Nevertheless, nearly 70%, with a slightly larger share of women than men, wanted to continue working remotely several days a week. The share was even higher among the group with young children. An interpretation of this could be that improved work–life balance (making it easier to handle the "puzzle of life") weighed more heavily than the higher workload. The value of saved time spent commuting to and from work can be added to this.

A possible explanation for the differences between Sweden and other countries, and which has already been mentioned, is that preschools and primary schools stayed open in Sweden during the pandemic, which probably led to fewer role conflicts at home. Additional explanations for the positive experiences of remote work in Sweden include that many employees have prior experience with remote work, that broadband connections are well developed, and that most people have extensive experience working with computers, and are used to working with the independence required for remote work.

Despite more negative experiences of remote work during the pandemic in other countries, especially among women, there is a tendency even there among many people to be able to imagine continuing to work remotely a few days per week.

Overarching conclusions of the literature review

The two parts of the review complement one another by identifying the pros and cons of remote work from home under different conditions, but they also provide a basis for conclusions about what must change in order for remote work from home to work better in the future. Many studies from different countries repeatedly show that for individuals to successfully be able to work remotely, they must obtain or be equipped with adequate resources for working independently. Aspects of independence include:

- experience in the position
- ability to make judgements
- personal expertise
- ability to take action on one's own
- possibility for support and help if needed
- regular contact with colleagues and managers.

Another recurrent result is that it is difficult to combine working from home with small children at home during working hours. The difference between Sweden and other countries accentuates this result. This result can be assessed as having significant generality and applicability for continued and expanded remote work during normal, non-pandemic times.

There are individual differences in how different people perceive and are able to handle remote work. Social situation differences also play a role, but actual autonomy and freedom from caregiving duties during working hours must be viewed as mini conditions for remote work to function well. If these conditions are present, there is development potential for remote work from home. The long-term effects for businesses with regard to creativity and innovation remain unknown. This unknown requires more observation time

and more experience with remote work. It is only addressed in exceptional cases in the reviewed studies, and thus no scientific conclusions can be drawn.

The unusual circumstances that precipitated and remained during the shutdown, with a rapid adjustment to forced full-time work from home and social distancing, must be given consideration when interpreting the results and planning for continued remote work after the pandemic. Most of the studies were conducted during the first wave of COVID-19 in spring 2020. The report discusses which effects are probably pandemic-specific, and which are general effects of working remotely.

The studies are conducted in many countries with different cultures and different approaches – for example to men and women's roles, areas of expertise and division of labour at home – and during different phases of the pandemic, which has likely contributed to the varied results.

Knowledge gaps and research needs

As has previously been pointed out, it is desirable when discussing the research need to analyse which circumstances are linked specifically to the pandemic, and which relate to remote work and work from home in "normal" societal conditions.

Remote work from home differs from other work environment issues in that work from home affects many aspects of an individual's working life, but also their private life. The boundaries between areas of life other than work are much thinner and more permeable in time and space than at the primary workplace. In order to be practically relevant, this places particular demands on the research to have multiple perspectives and to give consideration to the context of a research question and its results.

Based on the assumption that future remote work without pandemic-related restrictions will combine work from home and at the primary workplace – so-called hybrid work – we see immediate practical needs for knowledge and research on, among others, the following questions:

- What kinds of work tasks are more and less suitable for carrying out while working remotely from home?
- What obstacles or advantages are there when working from home and when working from the primary workplace, respectively?

The answers to these questions have significance for how to best allocate time between work from home and at the workplace in the future. The reviewed research provides only vague responses, even though these are urgent practical questions for companies and millions of individuals.

One problem that has emerged in the studies during the pandemic is the loss of daily communication at the primary workplace. This need can be expected to decline with hybrid work, but it will still exist. Thus there is a knowledge gap in how to organise communication among employees, and between managers and employees, in order to benefit productivity and foster psychosocial conditions, as well as both short and long-term learning at work. A related need for research pertains to the potential negative impact of remote work on creativity and innovation for businesses, and what compensatory initiatives should thus be developed.

In addition to general principles, research should further increase knowledge of how to reconcile the specific needs and wishes of the individual and of the business. The review has provided a sample chart of conditions that are significant for promoting remote work from home and which may need to be managed to prevent problems and thus also benefit the interest of businesses in increased productivity. The degree of freedom can grow through autonomy and resources for support, as well as with adequate computer technology resources and training.

Introduction

Following the outbreak of the COVID-19 pandemic in early 2020, remote work has become the norm for millions of people all over the world. The Public Health Agency of Sweden recommended transitioning to work from home on 17 March 2020. Employees who were able to work from home were urged or ordered not to come in to work, but to handle their tasks from home instead. In conjunction with this, most countries also chose to shut down schools and preschools. An exception was Sweden, which chose to keep primary schools and preschools open. Upper-secondary schools as well as colleges and universities had to conduct classes remotely.

In autumn 2021, as the recommendations began to be reduced, remote work from home had been practiced for a year and half. However, at the time of this writing, the pandemic is not over and many countries reinstated recommendations for remote work in late autumn 2021. Experiences of this more or less mandatory requirement to work from home have begun to be collected, and the work-from-home model has expanded, for example through the development of many new communication tools. In conjunction with the first wave of COVID-19 spreading to all parts of the world, most countries chose to shut down all businesses that were not essential to maintaining basic societal functions.

The COVID-19 pandemic and the measures taken to prevent the spread of disease have had a profound influence on the economy, business operations and the lives of individuals, not only medically, but also on work and family life and social life in general.

From a work-environment perspective, remote work from home is not only a matter of the actual work; the related circumstances must also be given consideration. The home's compatibility with remote work has great significance. This involves factors such as:

- size of the home
- possibility for spatial privacy
- social situation, including children at home
- type of work
- demands for concentration on the work etc.

For someone who lives alone in a small apartment, where it is difficult to arrange a good home office and where the employee also loses the social community of the primary workplace, or for a single parent whose children must do their schoolwork at home instead of at school, the psychological effects are likely very different than for couples working from home who do

not have children. Another circumstance pertains to previous experience of remote work. A report from the *Organisation for Economic Co-operation and Development* (OECD) states that problems and difficulties are related in part to a lack of previous experience of remote work (Milasi et al. 2021). Scaling up remote work was easier, faster and less expensive in countries in northern Europe, where an average of 30 percent of workers regularly or sometimes worked from home already in 2019, compared to most other EU countries, where the share was less than 10 percent. According to data from Eurostat, Sweden and the Netherlands top European statistics with 37 percent having experience of remote work from home, followed by Luxembourg, Finland and Denmark. Bigger companies and organisations have more knowledge and experience for scaling up remote work than smaller companies and organisations.

Working remotely is nothing new, but began to be implemented already in the 1970s. There is previous research and experience related to remote work (Allen et al. 2015; Eurofound, 2020), but the scope during the COVID-19 pandemic is unique. The English language research literature has several designations:

- *telework*
- *telecommuting*
- *home-based telework*
- *distance work*
- *remote work (RW)*
- *mobile work*
- *work from home (WFH).*

Telework has probably become the most common term, in competition with *RW*, and both are overarching concepts. Thus, remote work from home is a subcategory to the broader concepts of telework, *RW and distance work*. The definitions typically include:

- ocation (the worker's home or another venue other than the main workplace)
- orm of employment (employee or self-employed)
- digital or manual labour (ILO, 2020).

There are many definitions of remote work among researchers and within organisations. What they all have in common are:

a. the work does not take place at the employer's central location or with the work resources found there
b. the remote worker is cut off from in-person contact with colleagues
c. contact takes place through various forms of modern communication technology.

We have limited this review study, focused on remote work during the pandemic, to work carried out from home. Delimitation to the home has not, however, been able to be fully applied to the review studies from the time before the pandemic, as they may have also included remote work at places other than the home.

The growth of remote work in the decades up until the COVID-19 pandemic in 2020 was undramatic, which is likely due to the fact that there was not usually any discord between employees and employers regarding remote work – remote work was voluntary, and if anything it was a benefit for employees. This must be kept in mind in interpretations of results when comparing the conditions before the pandemic to the forced situation during the pandemic. A social partner agreement on telework was entered at the EU level in 2002 (EU Social Dialogue, 2002).

Purpose and delimitations of the literature review

The overarching purpose of this literature review is to summarise and increase knowledge of the impact of remote work from home on three areas:

- work environment and health
- work–life balance
- productivity.

Additional purposes are to investigate and draw conclusions on gender differences, and on differences between the primarily voluntary remote work from home in the time before the pandemic, and work from home during the pandemic in 2020–21, which was ordered. In some cases, other moderating factors, such as age and previous experience, have also been investigated. The purpose here is to draw conclusions about what constitute general conditions and characteristics of remote work from home, as opposed to being specifically connected to work from home during the pandemic, which can thus be expected to decline or fall away entirely in more normal circumstances.

The literature review comprises two parts. The first part is a review of research reviews of remote work published from 2005 to 2021 and effects on the three areas named above. The second part is a review of published original studies of remote work in 2020–21 with reference to the COVID-19 pandemic. The two parts should complement one another by covering both voluntary part-time work from home, as well as ordered or recommended full-time work from home during the pandemic.

The literature review is limited to work from home carried out by employed individuals who worked via digital connection. Self-employed individuals, work carried out at a site other than the individual's own home, and non-digital work has been excluded. With these limitations, the focus lands on

the type of remote work that has experienced a major upswing during the pandemic, and which will become the most common if working life moves towards increased remote work after the pandemic is over. Working from one's own place of residence or in connection to it has been common among self-employed groups for a long time and is part of their lifestyle, which differentiates self-employed groups from wage earners working remotely.

Psychosocial work environment and health

Previous research provides a basis for comparisons between remote work from home and work at the traditional workplace, from the employer's premises. Research shows that the same work environment factors are present in remote work from home as at the regular workplace, but also indicates that a familiar concept from occupational psychology, "role conflicts", takes on a partly new meaning with remote work. It is also not surprising that the same work environment factors reappear, as the home office is viewed based on the perspectives and concepts of the traditional workplace, and analysed with instruments designed for the traditional workplace.

A qualitative new factor and potential stressor is what can be called a need for boundary management, which from the individual perspective responds to the capacity for boundary management. The basis of this stressor is the dissolution of physical boundaries between work and life outside of work, due to technological changes that have led to new and improved opportunities for employees to work from desirable places and at desirable times (Aronsson 2018; Mellner et al. 2014). The problem of managing boundaries also exists at ordinary workplaces, but it can take on new forms and require different skills at home in order to be managed successfully.

When it comes to the work environment and working conditions in this review, the focus is on changes to resources and workload, such as:

- control
- work demands
- social support
- role conflicts
- leadership
- opportunities for learning and skills development

Control or self-determination (usually referred to as "autonomy" in the studies), in the sense of having influence over one's work and being able to act independently, has intrinsic value and significance for health. Support from managers and colleagues is also related to health. The chosen variables are aspects of what is called good and inspiring work and are also determinants for health to greater and lesser extents.

Based on knowledge of the importance of control, freedom and resources to decide oneself where and when to work should contribute to greater well-being and less stress (Kossek et al. 2006). It is a reasonable prediction that when workplaces shut down during the pandemic, the freedom to decide when to work increased, but spatial freedom decreased when individuals were shut out of their regular workplaces, as well as other places to carry out work outside of the home.

Work–life balance

The development of computer technology, including fast broadband connections in private residences, has made it possible for many work tasks to be completed remotely and outside of ordinary working hours to a much greater extent than before. For that same reason, private errands can be carried out at the employer's premises. High-speed connections and smartphones allow individuals to be connected in both domains – at home and at the primary workplace – around the clock. Technological development has weakened the boundaries between these domains in a short amount of time, thus changing the conditions for separating and integrating the domains.

Work–life balance, or the balance between private life and working life, constitutes a large field research with branches including stress and health research. Conflicts or imbalances between roles at work and at home have been investigated in several review studies (Byron 2005; Khateeb 2021). Conflicts or an imbalance between the domains may arise when demands and expectations from one domain cross through the boundary to the other domain, creating disruptions and role conflicts.

Research in the area has, along with technological development, moved away from the perspective in which boundaries between work and private life are viewed as inherent and strong, which they also were in many cases. Instead, the perspective has shifted towards an interest in how individuals manage and construct boundaries that are rendered increasingly permeable and flexible by technological development (Ashforth et al. 2000; Schieman et al. 2021).

Part of boundary management is how people construct boundaries to balance and maintain a work–life balance when boundaries are weak and blurry in terms of both time and space, and when work is accessible at any place and any time. Managing boundaries also involves the individual's preferences when multiple and competing roles must be handled simultaneously (Ashforth et al. 2000: Allvin et al. 2011; Kossek et al. 2006). In this context, the concepts 'integration' and 'segmentation' are used to express different individual strategies. *Segmentation* (segmenter) means having a preference for keeping the roles separate, while *integration* (integrator) is a preference for alternating tasks and integrating the roles. The outcome of an individual's boundary management depends on how well the chosen strategy works

relative to the demands and possibilities of the business (Mellner et al. 2012; 2014). At the organisational level, researchers refer to *work–life integration* and how strategies for implementing *work–life integration* are designed and applied (Kumar et al. 2021).

When combining and integrating work and private activities at home, such as during the COVID-19 pandemic, there is potential for more and new types of role conflicts, which creates a more complex environment of demands, for example, demands from children who are present, versus work demands. When the boundaries become more permeable, the potential for conflicts increases. The environment and role conflicts that arise in a family in which both parents are working from home and the children are home as well, because schools and childcare facilities have shut down in most countries during the pandemic, is probably a fairly common scenario. This kind of situation creates an environment that has not previously existed in modern working life. How to manage this increased complexity depends, in addition to external influences, on the leeway of the work situation for those involved and on the ability to create flexible, functioning physical and mental boundaries.

In summary: work from home during the pandemic has both similarities and differences compared to work pre-COVID-19. The differences include the greater complexity of intersecting demands and role conflicts, and that the people involved must create internal solutions, as possibilities to quit and find a new job that does not need to be done from home have been very limited. The result of integration can be positive or negative, depending on how effectively the domains are integrated (Oksanen et al. 2021)

Productivity

Productivity is a multidimensional term, and there is no uniform measure of productivity that can be used across different activities. A common way to measure productivity is therefore the employee's subjective perception of it. Naturally, this measurement is not without problems, because employees may interpret the implications of productivity differently. An assumption here is that the individual's advantages or disadvantages regarding remote work also become the organisation's advantages or disadvantages (Martin & MacDonnell, 2012). Reduced or increased productivity with remote work from home depends on whether the environment helps or harms conditions that impact efficiency. Productivity-related factors at the individual level include (Baruch 2000):

- motivation
- ability to concentrate
- opportunities to work with the core task
- opportunities to work when most alert and productive
- reduced exposure to distractions and disruptions.

Our review has been limited to research on conditions that contribute to or prevent the individual from carrying out their work tasks and assignments effectively. Accordingly, we have excluded results and studies on the input–output relationship in economic terms.

Gender differences

Remote work from home has typically been voluntary and part-time. The question being asked and debated now is whether increased remote work could impact men and women differently with regard to work conditions, health, career opportunities and opportunities for learning and skills development. Will individually increased opportunities for a flexible arrangement of work in time and space be used differently by men and women (Arntz et al. 2020; Landivar, 2020; Lott, 2015)? There are concerns that men will use the flexibility for initiatives in the work sphere to a greater extent, while women will use the flexibility to coordinate family life and work life to a greater extent (Lott, 2015). The degree of flexibility permitted and how it is used can be expected, among other things, to have long-term professional consequences and consequences on the health of women and men.

Part 1. Method – literature review of review studies conducted before the pandemic

Review articles within a research area summarise the evidence and results of original studies. When there are several reviews, Smith et al. have established a series of recommendations for how reviews of reviews (meta-analyses) can and should be conducted to achieve high scientific evidence (Smith et al. 2011). Provided that the reviews are based on original studies of high scientific quality and with a similar purpose, and that the reviews are based on validated methods, reviews of review articles can enable conclusions to be drawn based on a much larger quantity of empirical research than would be possible in individual studies or reviews, by making use of the scientific review efforts that have already been carried out with the primary studies. These reviews of reviews can demonstrate fundamental trends in the results that cannot be established in reviews based on more limited materials.

A systematic review of previous reviews should follow the same principles as reviews of original studies, requiring relevant content, precision and objectivity. Special tools have been developed for this purpose. We have chosen a frequently used instrument, AMSTAR (Shea, Grimshaw, Wells, et al. 2007; Shea, Hamel, Wells et al. 2009). It involves a series of requirements for the reviews, including:

- specification of the research question
- explicit inclusion and exclusion criteria
- searches in more than one relevant database
- compilation of included and excluded studies, their content and scientific quality
- evaluation of data from at least two independent experts
- homogeneity (common questions)
- possible publication bias (selective sampling)

Systematic meta-analyses are powerful tools, but the conditions for carrying out meta-analyses may be difficult to achieve in a research field characterised by heterogeneity and a dearth of common theories and terminology, which is the case for remote work. In the review studies identified with the term *telework*, the researchers found relatively high heterogeneity. Some studies of *telework* and working conditions do not differentiate between different kinds of work and workplaces outside of the employer's workplace. Heterogeneity also arises through different follow-up times and which covariating factors,

that the researchers control for. This heterogeneity results in too few studies for conducting systematic meta-analyses and calculations of effect sizes etc.

In our review, we have structured the report and analysis according to the so-called PEO model:

- Population
- Exposure
- Outcome.

This model originates in epidemiological and medical research. In analogy with the model's terminology, a certain population is studied, in this case, wage earners. The exposure is remote work according to the delimitations made earlier. Outcomes are aspects of working conditions and the work environment, work–life balance, various medical and psychological symptoms, and productivity.

Search for review studies

The literature search began with a dialogue between the information specialists and the researchers for the purpose of identifying relevant concepts and terminology for the search strategy. The researchers provided standard articles and proposals for search terms and made definitive decisions about the search strategy. The searches were conducted from 18 May – 7 June for review articles before the pandemic (part 1) and up until 29 September for original articles during the pandemic (part 2 of the report). These were supplemented with manual searches by the researchers up until 10 October 2021.

The design and selection of the search terms was guided by the goal of identifying as many relevant studies as possible while setting reasonable delimitations for the completion of the project. The search for part 1 focused on systematic review articles and meta-analyses with the search word *"review"*.

The searches were conducted in the databases *Scopus, PsycInfo, Web of Science Core Collection* (WoSCC), and by searching reference lists in the identified articles. After a few searches in WoSCC, it was replaced with the *Social Science Citation Index* (SSCI), because the search results in WoSCC produced a large quantity of articles, many of which were irrelevant. The remaining databases were assessed in consultation with the information specialists as most relevant with reference to the content of this research review.

The time period included studies published from 2005 and later. The reason for setting the line at 2005 is that digital communication technology has developed so quickly in recent years that studies conducted earlier are hardly relevant. The final search strategies for each database are presented in appendix 2. The search strategy was established in the Scopus database and adapted to

search the other databases. The searches were conducted in the title, abstract and keyword fields. In Scopus and SSCI, a so-called post-query refinement was then applied to limit the search results further by filtering out specially selected "subject areas" in Scopus and "Web of Science categories" in SSCI. Searches were conducted separately for the four outcomes:

- work environment/working conditions
- health
- work–life balance
- productivity.

The search process as well as the inclusion and exclusion process are presented in table 1.1. The searches were only for articles published in English. The databases that were used do not include articles in Swedish and the searches did not capture any English-language scientific articles that referred to conditions in Sweden.

The articles and reports were screened in three steps according to inclusion, exclusion and quality criteria (table 1.1). In the first step, the project researchers reviewed the titles of the identified studies for relevance. Then the abstracts of the articles that appeared to be relevant were reviewed. Full texts of the studies that met the inclusion criteria were ordered. In the next step, the researchers reviewed the full texts for relevance and quality based on the inclusion and exclusion criteria. The researchers discussed any differing assessments in order to come to a common conclusion. Studies that did not meet the inclusion criteria were screened out. Manually searched materials were reviewed according to the same process for inclusion and exclusion criteria. The selection process is illustrated in the flow chart in figure 1.1.

Table 1.1 Inclusion and exclusion criteria for the review studies

	Inclusion	Exclusion
Population	Individuals with employment/ in paid jobs and similar concepts/synonyms.	Individuals without paid jobs, in non-profit jobs, self-employed, unpaid household work, care at home, teachers and distance learning.
Exposure	Remote work with modern communication technology, mainly work from home.	Other types of remote work, such as work during travel and from a hotel.
Outcome	Work environment, working conditions, mental and physical health, work–life balance, productivity.	Studies that do not connect remote work to the individual's health or working life aspects, ergonomic aspects. Internal connections between different variables during remote work.

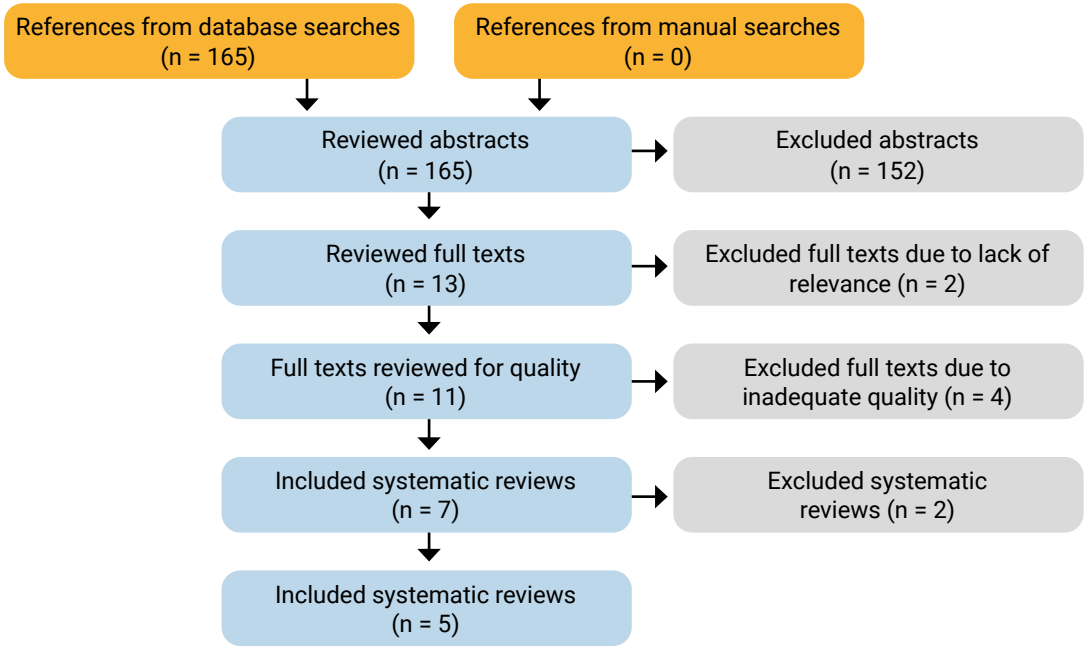
The first part of the report presents a review of the review studies. 165 potential review articles were identified in the first round of the literature search. After reviewing the titles and abstracts for relevance, 13 potentially relevant reviews remained, the full texts of which were independently reviewed by two researchers. Two of these articles were excluded due to lack of relevance, while four more were excluded due to inadequate scientific quality. AMSTAR (Shea et al. 2007; Shea et al. 2009) (see table 1.2) was used to assess the methodological quality of the review studies.

Thus, when the search was completed, 7 reviews had been identified that met the inclusion criteria. Two of these reviews (Gajendran et al. 2014 and Kröll et al. 2017) turned out to be included in the systematic review later conducted by Charalampous and colleagues (Charalampous et al. 2019) and were therefore excluded from our final documents to avoid doubling the results. A review study by Allen and colleagues (Allen et al. 2015), which has significant theoretical and other merits, lacks too much methodological information, according to the AMSTAR model, and had already been excluded for that reason. This study is still represented through its inclusion in two of the included reviews (Charalampous et al. 2019 and Oakman et al. 2020). The present review thus consists of five review articles based on a total of 202 original articles.

In order to investigate the extent to which the five review studies refer to the same original studies, which could entail overestimated support for a tendency, we have reviewed the included articles. The emerging image is that overlap is limited and cannot affect the overarching results and conclusions.

There is also a risk that review articles that should have been included were not captured by the searches. Because the result is based on searches in multiple databases, this risk should largely be eliminated. Most of the primary studies cover conditions in Europe and the US. It is noteworthy that no Swedish studies were included in any of the literature lists of the five review studies. The manual searches conducted by the researchers also produced no Swedish primary studies.

Figure 1.1. Flow chart of searches and excluded and included studies.



The following five articles are the final result of the review process:

Charalampous, M., Grant, C.A., Tramontano, C. & Michailidis, E. (2019). Systematically reviewing remote e-workers' well-being at work: a multidimensional approach, *European Journal of Work and Organizational Psychology,* 28:1, 51–73.

Ferreira, R., Pereira, R., Bianchi, I. S., & da Silva, M. M. (2021). Decision factors for remote work adoption: Advantages, disadvantages, driving Forces and challenges. *Journal of Open Innovation: Technology, Market, and Complexity,* 7(1), 70.

Kotera, Y. & Vione, K.C. (2020). Psychological impacts of the New ways of working (NWW): A systematic review. Int. J. Environ. *Res. Public Health,* 17(14), 5080.

Martin, B.H. & MacDonnell, R. (2012). Is telework effective for organizations? A meta-analysis of empirical research on perceptions of telework and organizational outcomes. *Management Research Review,* Vol. 35 No. 7, 603–615.

Oakman, J., Kinsman, N., Stuckey, R., Graham, M. & Weale, V. (2020). A rapid review of mental and physical health effects of working at home: how do we optimise health? *BMC Public Health* (2020) 20:1825.

Table 1.2 shows that the review studies included meet the AMSTAR criteria overall, while few of its criteria were met in the reviews we excluded. There are significant differences in the presentation in the reviews of the inclusion criteria for quality and relevance for the original studies. Three reviews (Charalampous et al. 2019; Kotera & Vione, 2020; Martin & MacDonnell, 2012) explicitly state that they started from and followed the recommendations for systematic reviews of observational studies and for examining the evidence of the results.

Table 1.2 Scientific quality of the included review studies according to AMSTAR

	Charalam-pous et al. 2019	Ferreira et al. 2021	Kotera & Vione, 2020	Martin & MacDonnell, 2021	Oakman et al. 2020
Explicit inclusion criteria	Yes	Yes	Yes	Yes	Yes
At least 2 independent assessors	Yes	Yes	Yes	Yes	Yes
Search in at least 2 databases	Yes	Yes	Yes	Yes	Yes
Publication status, only peer reviewed	Yes	no, mixed	Yes	including dissertations	Yes
List of included/excluded studies	Only included	Only included	Only included	Only included	Only included
Characteristics of original studies presented	Yes	Yes	Yes	Yes	Yes
Scientific quality assessed	Yes	No	Yes	Yes	Yes
Scientific quality factored in for conclusions	Yes	No	Yes	in part	Yes
Were the methods for combining the studies suitable	Yes	Not combined	Yes	yes, meta-analysis	Yes
Was publication bias assessed	Yes	No	Yes	Yes	Yes
Were conflicts of interest reported	Yes, no conflict	Yes, no conflict	Yes, no conflict	No	Yes, no conflict

Summary of review studies from before the pandemic, 2005–2019

First the focus and nature of the five review studies will be considered, followed by tables with more detailed information and findings from the studies. None of the reviews required a longitudinal or prospective design in which causality, in a strictly scientific sense, can be analysed. Most of the original studies in the reviews are indeed cross-sectional analyses, but some of the original studies had a longitudinal design. The studies cover a very large number of outcome variables. Our search strategy included multiple areas and the searches were conducted with four different blocks of outcome variables, which were subsequently reduced to three blocks in the report. Some variables border on health and well-being, while others border on working conditions. Some cover multiple areas and their placement in blocks is sometimes determined case by case. In the report, we have placed the outcome of job satisfaction and related dimensions in the work environment and health block.

Thus, the database searches resulted in five review articles published between 2005 and 2021, with four of the articles at the end of the search range regarding year of publication. No further relevant review articles were found in the manual searches. The reviews are fairly different in nature and can be said to be more focused on practical conclusions, more than what is typically the case for reviews. In a few cases, practical use is also superior to direct analyses of relationships through a focus on identifying advantages and disadvantages of remote work (table 1.3). In accordance with this focus of the review studies, we will give some space to practical implications. Indeed, research on the organisation of remote work and of consequences is justified by both practical use and by theory building. In four of the reviews, the outcome is at the individual level, while the fifth covers the organisation's effectiveness.

The 5 review studies

Charalampous et al. 2019

The review article by Charalampous et al. (2019) is well delimited and focused on studies of the outcomes of mental and physical health (work-related well-being), which in this study consists of five dimensions:

- affective
- cognitive
- social
- professional
- psychosomatic well-being.

However, the combination of dimensions does not form a scientifically defined factor. Work-related well-being, which is an experience variable rather

than a description of working conditions, is presented in the area of "Work environment and health".

The review covers the period of 1995–2017 and includes remote work both at home and at places other than the regular workplace. Most of the studies included are of work from home, but information to establish the proportions is absent. The review includes 63 studies with a total of 37,553 participants. The analyses include qualitative studies, quantitative cross-sectional studies, longitudinal studies, as well as case studies and quasi-experimental studies. In addition, as mentioned, three reviews were included.

None of the studies included in the review covered all five dimensions mentioned, but 26 studies included more than one of the dimensions of work-related well-being. Ten of the studies focused on affective and professional aspects of work-related well-being. The primary studies were carried out in 24 countries, including the UK, US, Australia and South Africa.

Ferreira et al. 2021

The review by Ferreira et al. (2021), in addition to Kotera & Vione (2020) below, was designed to identify advantages and disadvantages, or positive and negative effects of remote work. The Ferreira study was exploratory in that it did not have defined outcomes in advance, but instead compiled identified positive and negative outcomes in the 90 studies included. It is not clear how many people worked from home and to what extent. The Ferreira study does not weigh the advantages and disadvantages, but reflects the areas in which the researchers searched for and compiled information. The scientific quality of the primary articles included in the Ferreira study varies in that the researchers also included conference proceedings and book chapters, for which the scientific review was likely milder than it is for journal articles.

The Ferreira review was conducted based on the Design Science Research (DSR) method, the goal of which is not primarily to describe the existing state of knowledge, but to contribute information for decision-makers for future development in the area. This is a pragmatic research paradigm that focuses on advantages and disadvantages, challenges, driving forces and the relationships between them, but may also include descriptive and clarifying methods. The model works poorly with AMSTAR and therefore cannot be ranked very highly in accordance with AMSTAR. Of the four areas included in a DSR study, we have limited ourselves to the advantages and disadvantages in three areas (working conditions and health, work–life balance, productivity). The value of DSR studies lies primarily in that they point out the direction for both practical operation and for research and development in the area, and identify how different aspects in the area are related, based on a qualitative analysis. Proceedings are a common form of publication of DSR studies, with their focus on development and solutions. Within the framework of the present review, it is impossible to determine the quality of conference proceedings and similar materials. However, these circumstances are given consideration in overarching conclusions (Ferreira et al. 2021).

The review comprises a literature study conducted in September–October 2020, with a total of 90 articles included. It was supplemented with 129 qualitative interviews in August–September 2020.

Kotera & Vione 2020

This study is based on the concept of New Ways of Working (NWW) and is limited to psychological aspects. The purpose was to identify advantages and disadvantages of NWW. A fundamental concept in NWW is that communication technology liberates work in terms of time, space and collaboration, and the leadership of an organisation or company can compensate for lack of in-person contact with clearly defined goals. The concept is broader than the concept of remote work, but the similarities are such that after some scaling back, the study's results are relevant for a review covering remote work from home. The review by Kotera & Vione (2020) is based on seven primary studies, six of which were carried out in the Netherlands. It is a systematic literature review and meta-analysis of NWW, focusing on flexibility in time and space (in other words, not only on work from home).

Martin & MacDonell 2012

The study focused on investigating whether remote work is more effective for an organisation than traditional organisation. Consequently, it differs from other studies that focus more on outcomes and conclusions at the individual level. In order to draw conclusions about organisational effectiveness, individual data were analysed in five aspects, where good values at the individual level were aggregated into success for the organisation.

The review is based on 19 articles from 1991 or later that were assessed as relevant and of the necessary scientific quality (2/3 peer-reviewed and 1/3 doctoral dissertations). In these, effect sizes for relevant relationships were calculated. Remote work is defined as work outside of the regular workplace at least one day per week and could therefore also include places other than the home. The hypothesis in the meta-analysis that was conducted was that remote work is positively related to:

- productivity
- organisational commitment
- performance
- turnover intention
- retention.

In the review, in accordance with the structure, we excluded the last two factors, which involve the input–output relationship in economic terms. The data are based on experiences among employees or within the company expressed via interviews or surveys.

The study is strongly quantitative in nature. Relationships between remote work and outcome variables are calculated as correlations weighed with consideration for the number of participants. In total, 32 correlations were calculated from empirical studies. Moderating factors were: the whole company or unit within the company, number of participants from the same or several companies, response rate, age, proportion of women, and country in which the study was conducted (US – outside of the US).

The study was published in 2012, which means that the freshest studies and results are already a decade old. These years have seen, among other things, a significant increase in capacity regarding connection speed and other developments in computer technology, such as smartphones, which should have been beneficial from a productivity standpoint.

Oakman et al. 2020

The review by Oakman et al. (2020) contains 23 studies from 2007–May 2020, including 20 cross-sectional studies, one cohort study, one before-and-after study and one combined cross-sectional and before-and-after study, with a total of 3,889 participants. The review only includes remote work from home, but covers both part-time and full-time. One study was of mandatory remote work. 21 studies investigated the effects of remote work on mental health. Physical health impacts were investigated in three studies. Seven studies investigated gender differences in health-related outcomes. The studies were from the US, UK, New Zealand, Japan, Belgium, South Africa, Brazil, Germany and the Netherlands.

Table 1.3 Summary of the five review studies

Author, year, type of review article, found in the following databases	Population, country, number of studies and study participants	Exposure	Measure	Results
Charalampous et al. 2019 Review for the period 1995–2017. Includes three review articles. - PsycINFO - PsycARTICLES - PubMed - Academic search complete - Applied social sciences index and abstracts (ASSIA) - Business source complete - CINAHL.	Primarily from the US, UK, Australia and South Africa, 63 studies (37,553 participants)	Remote work both at home and places other than the regular workplace.	Work-related well-being, greater work–life balance or reduced work-life/family conflict, professional advancement, career training and development, autonomy, development opportunities, intensity, control, social life, social support, emotional exhaustion, emotions, psychosomatic health, recovery, loyalty.	**Work environment:** Ten of the studies show that autonomy is particularly significant as a moderating factor for job satisfaction in conjunction with remote work. Ten studies show that employees experienced increased control from their immediate supervisors in conjunction with remote work from home. **Health:** The scope of work from home was shown to be connected to increased emotional exhaustion. In one study, in which a group of people were studied both at the workplace and in conjunction with working from home, they demonstrated more positive emotions when working from home. **Balance:** Greater autonomy with remote work leads to better balance or fewer conflicts between work and private life compared to working at the workplace. The positive effects were greatest among women, but women who work remotely felt they had less time for recovery compared with women who did not work remotely. Autonomy was also shown to reduce feelings of emotional exhaustion, but remote workers worked more hours and with greater intensity and had greater challenges maintaining social contact with their colleagues and managers. **Skills and career:** Work outside of the workplace was connected to experiences of poorer career opportunities and fewer training and development initiatives for the professional role compared to work at the primary workplace.
Ferreira et al. (2021) A literature review from September–October 2020 as well as 129 qualitative interviews with 32 women and 77 men (average age: 31) during August–September 2020. - ACM - IEEE - Springer - Google Scholar	90 articles (unclear from which countries). Interviews with primarily Portuguese-speaking professionals.	Remote and virtual work.	Increased productivity and morale, reduced overall costs, work–life balance, balance of work, family and personal life problems, increased job satisfaction and reduced burnout, increased autonomy, feeling isolated and out of touch/lack of physical interaction problems, increased workload, stress load, technology dependency problems, communication problems.	The most frequently mentioned advantages and disadvantages of remote work are: Advantages: Increased productivity and morale in 25 articles, reduced costs in 19 articles, improved work–life balance in 15 articles, increased job satisfaction and reduced symptoms of burnout in 12 articles and increased autonomy in 8 articles. Disadvantages: Isolation in 19 articles, worse work–life balance in 16 articles, increased workload in 12 articles, increased stress load in 12 articles, technology dependency in 10 articles and communication problems in 10 articles.

Author, year, type of review article, found in the following databases	Population, country, number of studies and study participants	Exposure	Measure	Results
Kotera & Vione (2020) Systematic literature review and meta-analysis of New Ways of Working. - ProQuest - PsycINFO - Science Direct - Google Scholar via EBSCO	Six of the seven studies were conducted in the Netherlands and one in Slovakia. Seven studies with a total of 2,431 participants	Focus on flexibility in time and space (not only on work from home).	Psychological impact of new ways of working. The psychological outcomes included cognitive, emotional and social outcomes.	**Work environment:** Positive psychological outcomes of remote work were obtained regarding work engagement, work-related flow and connectivity among staff. **Health:** Negative psychological outcomes of remote work included blurred work–home boundary, fatigue and mental demands.
Martin & MacDonnell (2012) Articles from 1991–2011. - ABI/Inform - App. Science Index - Business source complete EBSCO - Google Scholar - JSTOR - ProQuest - PsycINFO - Wilson Web.	US, Australia, Belgium, Spain and Ireland. 19 articles.	Remote work outside of the regular workplace at least one day per week. May also apply to places other than the home.	Productivity, retention, turnover intention, organisational commitment and performance.	Significant positive relationships were found between remote work and productivity and performance. Remote work and organisational commitment were also found to have a weakly significant relationship. Remote work was negatively correlated with turnover intention. The proportion of women who participated was 53% on average.
Oakman et al. (2020) Review study of the period 2007–May 2020. - Psychinfo - Proquest - WoS	The studies were from the US, UK, New Zealand, Japan, Belgium, South Africa, Brazil, Germany and the Netherlands. 23 studies (3,889 participants)	The review only covers remote work from home and includes both part-time and full-time. Only one study was of mandatory remote work.	10 different health outcomes: Self-reported health, pain, depression, sense of well-being, stress, strain, fatigue, safety, quality of life, happiness, gender analysis.	**Health:** In seven studies, a positive relationship was found between remote work from home and mental health through increased autonomy, but the relationship was only significant for men. One study investigated stress among women and men who worked from home full-time and found that for women, increased conflict between work and family was due to an inability to disconnect from work, while men experienced more conflict due to work being integrated with the family situation. In four studies, men who worked remotely reported less pain, less stress and less fatigue compared with those who did not work remotely, while no equivalent relationship was seen among women. Another study found that men who regularly worked from home had less fatigue and stress compared with those who did not work remotely. For women, remote work was connected to less stress, but more fatigue. Another study found that men who worked remotely reported higher degrees of stress than men who did not, but no relationship was found among women.

Summary by area

Several reviews emphasise that remote work is associated with many social and psychological spheres of people's lives (see also Allen et al. 2015). The reviews that were studied show that both internal and external aspects of work interact; in other words, the conditions of one area may support or obstruct the conditions of another area, and thereby determine whether a factor contributes to or impedes desirable goals for good working conditions, health, balance in life and productivity. The reviews emphasise the complexity and when practical conclusions are drawn, they are in reference to overall pictures and under what circumstances the relationships are found. The reviews vary in how far they go in explaining and interpreting the results. In some cases, the questions were relatively narrow and there was enough background information for syntheses, while other reviews stop at descriptions.

There is no obvious structure for the result report, because many work-related conditions overlap or interact. We present work environment and health, work–life balance and productivity area by area. None of the five reviews analysed all three areas; instead, each one typically covered a couple of the areas. In some of the reviews, modifying and mediating variables were used in the analyses to obtain a more nuanced picture of the relationships. The basic principle for the compilation of results in tables 1.4 and 1.5 are the three areas, but with mediation analyses, variables from several areas may be involved.

In addition to results, tables 1.4 and 1.5 also show which aspects were most frequently studied in the reviews, and which areas were studied.

Work environment and health

Four reviews contribute to the area of work environment and health:

- Charalampous et al. (2019)
- Ferreira et al. (2021)
- Kotera & Vione (2020)
- Oakman et al. (2020).

Many different work environment factors influence well-being and health, and we therefore present the results without a precise connection to specific work environment factors. Thus, in addition to health variables, we also include job satisfaction and psychological variables relating to engagement, connectivity etc. in the outcomes. Some studies describe changes in work environment factors without analyses of relationships, while others also contain analyses of relationships between work environment variables and different health outcomes. There are also studies containing more complex analyses with modifying and mediating variables.

It is mainly the study by Oakman et al. (2020) that is focused on the work environment and health (table 1.4). Summarising the results, the researchers assert that the impact of remote work on health is highly complex and the total effect is a consequence of multiple interacting factors. Work from home can have both negative and positive effects depending on the presence of other moderating factors, such as demands in the home environment, the level of organisational support and social contact outside of work. The conclusions were that cost reductions and the flexibility that facilitates work–life balance were the most positive effects of remote work, while a lack of communication and technical problems were the most negative.

Emotional exhaustion is considered a primary dimension of burnout and therefore weighs heavily as a factor for illness. The study by Charalampous et al. (2019) indicated a lower risk of emotional exhaustion because remote workers do not have to commute to work, can be more flexible in terms of demands from the family, and can reduce the load from various daily activities (Charalampous et al. 2019).

The review by Charalampous et al. (2019) as well as other studies (Ferreira et al. 2021) point to more positive emotions on days when people work from home. This effect is related to how technology functions at home. Better technology for connecting with colleagues and the workplace plays a role by reducing the frustration of not being able to reach colleagues when needed (Ferreira et al. 2021).

The conclusions from the review of New Ways of Working point to positive outcomes for work engagement, work-related flow and increased connectivity, that is, how easily and how quickly employees can reach one another (Kotera & Vione 2020). At the same time, there were also negative sides, such as blurred work–home boundaries, fatigue and mental demands. One conclusion is that organisations must be able to handle these negative psychological effects and support employees' health and well-being if and when NWW are introduced in an organisation.

The review by Ferreira et al. (2021) paints a slightly darker picture and contrasting results on stress, exhaustion and symptoms of burnout. However, this study used another method – compilations of the advantages and disadvantages of remote work in the 90 studies included, rendering direct comparisons with studies using other methods uncertain.

The results are mainly positive, that is, remote work is beneficial in terms of health. The result for women is not as positive as for men, but the positive sides outweigh the negatives for women as well. If we consider individual work environment factors, we see the picture presented in table 1.4 and below.

Autonomy and self-determination

Autonomy or self-determination have been investigated in many primary studies, with somewhat different names. The results are clear and indicate the

value of autonomy in conjunction with remote work. Charalampous et al. (2019) conclude that autonomy can serve as a resource that reduces feelings of emotional exhaustion and leads to greater job satisfaction. Autonomy can also be an expression of trust, that the individual takes responsibility for the work, which can increase their commitment to the company and engagement in the work. At the same time, the risks of working autonomously with regard to isolation must be taken into consideration (Charalampous et al. 2019). High levels of autonomy may mean that the boundaries between work and private life become blurrier, which can contribute, among other things, to the remote worker feeling pressure to work outside of regular working hours – the greater the freedom, the harder it is to free oneself from work, also known as the autonomy paradox (Charalampous et al. 2019).

Autonomy plays a role as a mediating variable for several different outcomes. Autonomy:

- reduces the relationship between remote work and strain;
- mediates the relationship between remote work from home and job satisfaction.

Interpersonal relationships, support and communication

In the reviews, interpersonal relationships and support emerge as basic factors for remote work to function. At the same time, many studies indicate that without specific effort, communication and contact with colleagues decline both quantitatively and qualitatively.

Charalampous et al. (2019) point out the high significance of interpersonal relationships and conclude that the fundamental role of good relationships has become even more important with remote work. Organisations should therefore openly discuss how to counteract and eliminate experiences of isolation and contribute to creating networks for social support between remote workers, colleagues and managers. Similarly, there is an emphasis on the importance of strong connections between workers in the office and workers from home, and effectively planning times when home-workers and office-workers are at work at the same time.

Oakman et al. (2019) have structured the practical implications into four types of support that are necessary in order to achieve optimal working conditions.

1. *Organisational support* is important for handling uncertainty and lack of clarity regarding roles and role expectations, performance, workload and several other conditions that may change with remote work. Managers need training to handle a changed role.

2. *Co-worker support* may be of major significance because working from home can contribute to feelings of isolation. One antidote involves establishing and using technological and other systems that facilitate formal and informal contact and collaboration between colleagues working from home and with colleagues at the workplace. If it is possible to also work at the office, for example one day per week, this plays a positive role for maintaining interpersonal networks.
3. *Technical support* may be required when technical issues must be handled more independently at home. The importance of the proper technology for being able to work well remotely is also an important conclusion in Martin and MacDonnell's review (2012).
4. *Support* may be required to manage the boundary between work and private life. Specifically, this involves support for clarifying working hours and expectations of working hours, which may reduce employees' feelings of never being off of work and the effects of that feeling on relaxation and recovery.

Workload: allocation between work from home and the primary workplace

An increased workload and increased mental demands should not automatically be considered negative and these variables require a context to which to relate. One important practical question in this context is the optimal allocation between work from home and work at the primary workplace. Several studies in the review find a positive relationship between the scope of remote work from home and job satisfaction (Gajendran & Harrison, 2007, which is included in the review by Charalampous et al. 2019), but some studies indicate that in some circumstances, the link is curve-shaped and reaches a plateau and optimal level at around 15 hours/week (such as Golden & Veiga, 2005). One reason why remote work from home would be more advantageous part-time is that some flexibility still remains, but there is also space for direct, in-person meetings. Another study focused on technical problems with digital communication from home (technostress) divided the workload and found that those who worked from home less than 2.5 days reported more technostress than those who worked from home more than 2.5 days (Suh & Lee, 2017, in Oakman). Another study in Oakman's review (Bosua et al. 2013) found that the employees (for example at government agencies and in education) preferred to combine remote work from home with some time at the workplace in order to maintain contact with their colleagues.

The overarching tendency in the reviews is that more remote work is positive, but not in every circumstance. However, different outcomes have not been systematically studied and there are too few studies to be able to determine under which circumstances the connections between the quantity of work from home and different outcomes are linear, or follow a curve that reaches a plateau.

Table 1.4 Overview of compiled results for work environment and health

Factor	Charalam-pous et al. 2019).	Ferreira et al. 2021	Kotera & Vione 2020	Martin & MacDonnell, 2012	Oakman et al. 2020
Work environment					
Increased autonomy	Yes	Yes			Yes, for men
Increased work engagement			Yes		
Increased connectivity		Yes	Yes		
Increased commitment	Yes			Yes	
Increased workload		Yes, in part	Unclear		Yes
Increased mental demands			Yes		
Health, job satisfaction					
Better mental health					Yes
Increased psychosomatic health	No effect				
Less fatigue			No		Yes, for men
Less stress		No	No		Yes
Increased exhaustion	Yes	No			Yes
More burnout symptoms		No			
Less time for recovery	Yes, for women		Yes, for women		Yes, for women
More positive emotional experiences	Yes				
Increased job satisfaction	Yes	Yes			Yes
Better physical health					Unclear
Less pain					Yes, for men

Work–life balance

Work–life balance was included in four of the reviews (table 1.5). Once again, the value of autonomy emerges as a factor that moderates the link between remote work and work–life balance (Charalampous et al. 2019). Greater autonomy leads to better balance or less conflict and reduced emotional exhaustion.

The study by Oakman et al. (2020) demonstrates differences between men and women with regard to perceived causes of imbalance. The biggest problem for women is an inability to disconnect from work. For men, the mixing of work and private life is most difficult to manage.

Ferreira et al. (2021) reviewed how many articles demonstrated advantages and disadvantages of remote work. The overall conclusion from Ferreira and colleagues' (2021) review is positive. Remote work helps to enable employees to organise the day in such a way that facilitates both work and personal needs, which can improve motivation and productivity. Technology contributes to a better balance between work and life outside of work by allowing for greater flexibility regarding when and where workers want to carry out activities, which contributes to improved job satisfaction.

Ferreira and colleagues' presentation of the number of advantages and disadvantages of remote work provides a picture of how often a given factor has been studied, which can be expected to correlate with its significance in this context. Based on this method and an assumed connection, the balance between work life and private life has great significance compared with other factors. In the review by Ferreira et al. (2021), balance was a prominent theme and in fifteen articles, the most important advantage of remote work was found to be improved work–life balance, while in sixteen articles, the biggest disadvantages of remote work were problems with the balance of work, family and personal life. Eight articles were represented in both the advantages and disadvantages groups, which can be interpreted as indicating that the connections are complex and modified by different factors.

The focus, questions and analyses differ in the four reviews, but the results are relatively similar and point to better balance and fewer of the conflicts that arise between work and the rest of life. The research reviews are limited with regard to practical conclusions related to this imbalance or conflict. The connections are not typically simple, but are dependent upon other conditions. In some circumstances, for example with young children at home, or in the absence of a suitable workspace, remote work can also lead to negative effects.

If we consider specific conditions behind positive and negative outcomes, Charalampous et al. (2019) found that greater autonomy in conjunction with remote work leads to better balance and fewer conflicts between work life and private life.

Kotera & Vione (2020) found that negative psychological outcomes, such as fatigue and mental demands, were due to a blurred work–home boundary.

Productivity, skills and career opportunities

The three reviews – Ferreira et al. (2021), Kotera & Vione (2020) and Martin & MacDonnell (2012) – reflect different aspects of productivity. As can be seen in table 1.5, all three indicate that work from home is associated with higher productivity. The primary focus of the study by Martin & MacDonnell (2012) is productivity, and while it is the most sophisticated in terms of method, it is also a relatively narrow study.

In the literature review by Ferreira et al. (2021), 16 advantages emerge in 25 articles about remote work. Increased productivity and work morale were the most frequent advantages. The related aspect of generally reduced costs (which we excluded from our review) is in second place (19 articles) and work–life balance is in third place among the advantages (15 articles). At the same time, there were also disadvantages in a number of aspects that can be assumed to be related to productivity. The most frequently studied negative effects are feelings of isolation and lack of in-person interaction (19 articles), inadequate work–life balance, and family and personal problems (16 articles). In third and fourth place are increased workload and stress.

As can be seen above, Ferreira and colleagues' analysis (2021) is focused more on connections between different factors that affect productivity and the development of remote working than on analyses and descriptions of simple connections between variables. One of the heavier overarching practical conclusions is that if employees lack the necessary skills for effectively using technology, then various expected productivity-related advantages, such as coordination, learning opportunities, better accessibility and more, will not be realised.

In their review, Kotera & Vione (2020) found positive outcomes of NWW for engagement, work-related flow and connectivity, but they also found that NWW can be a basis for negative effects from a productivity standpoint, such as blurred work–home boundaries, fatigue and mental demands. Charalampous et al. (2019) found in their review both neutral and negative connections between remote work and remote workers' views on career opportunities. One mechanism in this connection is thought to be visibility at the workplace. Low visibility can conceal workers' engagement in the work. A meta-analysis from 2007 provided no support for a negative connection between remote work and views of career opportunities. It should be kept in mind that at that time, remote work was a personal choice, which means it cannot be directly compared or generalised to the situation of remote work from home during the pandemic.

Organisations can address and reduce remote workers' experience of having inferior career opportunities due to their physical absence from the office, compared to those who work in the office, through better contact and use of mentors (Charalampous et al. 2019). Maintaining a good relationship with management was of crucial importance for employees' opportunities for professional advancement. Several studies in Charalampous' review show that

autonomy increases in conjunction with remote work, but at the same time, it becomes harder to maintain social relationships and contact with colleagues and managers. To compensate for this, employees are encouraged to increase these contacts on days when they are at the workplace.

There are not many studies of skills and careers, and the result must therefore be considered uncertain. The study by Gajendran & Harrison (2007), which is included in the review by Charalampous et al. (2019), points out the risk of remote work from home reducing employees' career prospects through poorer relationships with colleagues and managers, but note that this does not seem to apply to women to the same extent as men.

Table 1.5 Overview compilation for work–life balance and productivity

Factor	Charalam-pous et al. 2019	Ferreira et al. 2021	Kotera & Vione 2020	Martin & MacDonnell 2012	Oakman et al. 2020
Work–life balance					
Worse work–life balance	No, (better)	15 better 16 worse	Yes		Yes
Productivity aspects					
Increased productivity and work morale		Yes	Yes	Yes	
Better performance				Yes	
Commitment (also see table 1.4)				Yes	
Skills and career					
Worse career opportunities	Yes, but not for women				
Contact and communication					
Inferior social contact	Yes				Yes, when full-time
Increased isolation	Yes	Yes			Yes, when full-time
Better communication		Nej			
Increased control from manager	Yes				
More technology dependency		Yes			

Gender differences

The reviews do not give prominent space to gender differences in reactions to remote work from home, but three of them do address this (Charalampous et al. 2019; Oakman et al. 2020; Martin & MacDonnell, 2012). Charalampous et al. (2019) summarise the result with the assertion that remote work entails

slightly more positive effects for women than for men, but that women are thought to have less time for recovery. Oakman et al. (2020) point out that the relationships are complex and require more in-depth analysis, but that women report improved health less often when working from home compared to men. For example, a positive relationship was found between remote work from home and mental health through increased autonomy, but the relationship was only significant for men.

Oakman et al. (2020) included one study (Eddleston & Mulki, 2017) that found that for women, increased conflict was due to an inability to disengage from work, while men experienced more conflict due to integration of work into the family domain. An earlier meta-analysis (Gajendran & Harrison, 2007) included in both Oakman and Charalampous' reviews, in which the majority of participants were female, showed no negative relationship between remote work and career training and development. Martin & MacDonnell (2012) did not find any gender differences in outcomes in the study of productivity.

Individual differences in suitability for remote work

Several reviews address the matter of different people being more or less suited to remote work, but research in this area is limited. One overarching result is that remote work may be problematic for people with a strong need for social contact and personal management (Charalampous et al. 2019).

Certain personality factors (strong focus on performance, workaholism) and the employee's circumstances at home modify the relationship between remote work and job satisfaction through potential difficulty establishing boundaries for their work tasks (Charalampous et al. 2019). Ferreira et al. (2021) point out that people with different work paces experience advantages with remote work, which allows them to choose when and how to work, independently of others.

Remote work is thought to make it more difficult for managers to identify and handle issues arising due to employees having different capabilities and performing differently (Ferreira et al. 2021; Oakman et al. 2020). This could be an expression of individual differences and personalities playing a larger role and having more space with remote work. Self-leadership has been emphasised as a key factor in this context. Self-leadership involves strategies for handling one's own thoughts and behaviours, and finding natural rewards in the work (Bäcklander et al. 2019).

An overarching conclusion is that for most people, voluntary remote work is positive, but unsurprisingly, variation exists between individuals. However, research and knowledge on this is limited.

Part 2. Studies conducted during the COVID-19 pandemic, from 2020–October 2021

Study methods and the results of the searches of studies that were carried out from the beginning of the pandemic until autumn 2021 are presented here.

Method – original studies

From 17 August through 29 September 2021, database searches were conducted in the *Social Science Citation Index* (SSCI), Scopus and Psycinfo, as well as of reference lists. The searches aimed to identify original studies on remote work from home in conjunction with the pandemic, with regard to the outcomes that are relevant to this report. In addition, manual searches were conducted by the authors of this report. These searches resulted in a total of 1,813 references. After the titles, abstracts and full texts were reviewed for relevance and scientific quality, 31 articles remained in the area of work environment and health, 19 remained in the area of work–life balance and 22 remained in the area of productivity. Some articles were relevant for more than one area, which is why there were 50 unique articles in total. Inclusion and exclusion criteria are described below and in the flow chart in figures 2.1–2.3. The included studies are presented in appendix 1.

Grey literature was searched directly by the researchers for part 2, in the form of reports with data from the period during the pandemic, aiming to study remote work at home during the pandemic. In this case, the search was limited to high-quality Swedish studies as well as comprehensive reports from the *European Foundation for the Improvement of Working and Living Conditions* (Eurofound). The result was four Swedish reports and one EU report.

Relevance criteria for inclusion and exclusion

Relevance was assessed separately according to the following for the three areas included in the report, which are described in the introduction to part 1:

- work environment and health
- work–life balance
- productivity.

Relevance criteria (changes to work conditions): The studies should include comparisons of conditions during remote work from home in conjunction with the pandemic and conditions while working at the primary workplace before the pandemic, either in longitudinal studies or through retrospective

assessments. The comparisons could also pertain to differences between people who continued to work at the primary workplace during the pandemic and those who worked from home. Repeated measurements during the pandemic were also relevant for studying changes (adaptation) over time.

Work environment and health

Inclusion: Studies containing analyses of changes in the work environment and work conditions and different health outcomes that can be connected to remote work from home during the pandemic, according to the relevance criteria above. Work environment and work conditions refer to demands, control, social support and more, not to the individual's reaction to the conditions. Health refers to mental and physical symptoms, including job satisfaction.

Exclusion: Studies that only address internal relationships between different work environment variables or between different outcome variables and studies that only address ergonomics and the physical work environment.

Work–life balance

Inclusion: Studies in which the relationship between work and private life (work–life balance) is compared in terms of work at the primary workplace before the pandemic and remote work from home during the pandemic. This includes both the impact of work on private life and the impact of private life on work. The relationship can be described as a balance or as a degree of conflict.

Exclusion: Studies that only describe work–life balance during remote work from home without a comparison to work at the primary workplace, before or during the pandemic, or over time.

Productivity

Inclusion: Studies in which productivity or effectiveness during remote work from home can be compared to the situation at the primary workplace before the pandemic, or in which comparisons can be made between those who work from home and at the primary workplace. Productivity and effectiveness are primarily measured through self-assessments.

Exclusion: Studies in which productivity and effectiveness are only described in connection to remote work from home, without a comparison to work at the primary workplace, before or during the pandemic, or over time.

Scientific quality

A modified version of the *Mixed Methods Appraisal Tool* (MMAT) (Hong et al. 2018) was used to assess scientific quality. This is a tool for assessing the scientific quality of different kinds of studies. The studies included in this review can most closely be described in MMAT classification as *quantitative descriptive,* but they also contain analyses of relationships. For this kind of study, there are five criteria to consider:

1. Is the sampling strategy relevant to address the question?
2. Is the sample representative of the target population?
3. Are the measurements appropriate?
4. Is the risk of non-response bias low?
5. Is the statistical analysis appropriate to answer the research question?

This method does not ordinarily lead to a quantitative measurement of scientific quality. If the answer to any of the first questions is "no", then the study at hand is not relevant. Other requirements can be fulfilled to greater or lesser degrees. In this review, based on the criteria above, we have chosen to create a quantitative scale of the studies' scientific quality, dependent on the extent to which criteria 3, 4 and 5 are met. On a scale from 1 to 5, "1" is the lowest and "5" is the highest scientific quality. In the relevant review, the quality assessments vary between 1–4. The assessments were conducted by one of the researchers and then reviewed by the other. In the event of different assessments, the researchers discussed until reaching a common assessment. Articles judged as "1" on the scale were excluded.

Most of the studies are based on so-called "convenience sampling" or "snowball sampling". "Convenience sampling" involves sending out a general invitation, usually via social media, websites or email, to employees of a company or people in general who meet the participation criteria. "Snowball sampling" involves contacting people in one's surroundings, often colleagues, and asking them to spread information about the study to people they know who are suitable for the study, and in turn asking them to pass on information about the study. These studies have usually been assessed as a "2" or "3" on the scale, depending on the rest of the scientific quality and the number of participants.

An assessment of "4" has been given to studies that used a random sample, national sample, or representative response panels, or in which the material was weighed based on background factors to compensate for attrition, as well as studies in which measurements were carried out both before and during the pandemic. As mentioned initially, most of the studies are cross-sectional studies involving a retrospective comparison of remote work from home during the pandemic to conditions at the primary workplace before the pandemic. In some cases it was possible to compare the situation, because employees alternated between the primary workplace and work from home, or some employees continued to work at the primary workplace and some worked remotely from home.

Figure 2.1 Work and health. Flow chart of inclusion and exclusion

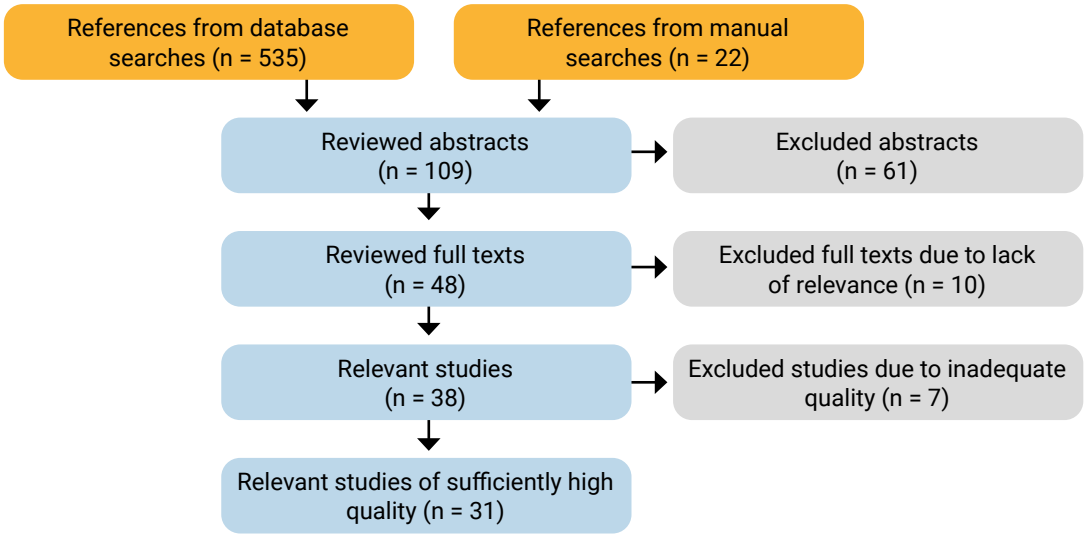


Figure 2.2 Work–life balance. Flow chart of inclusion and exclusion

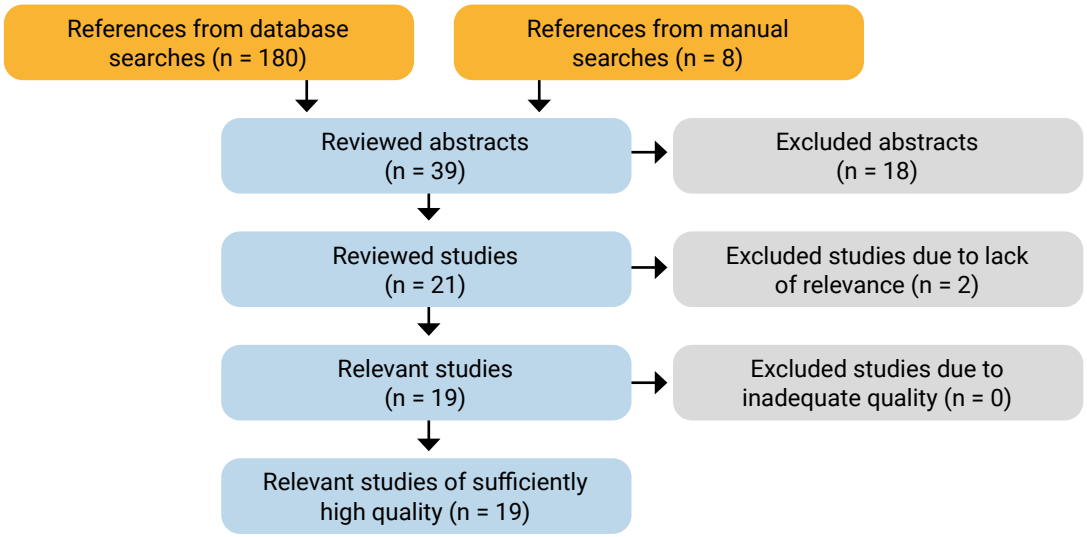
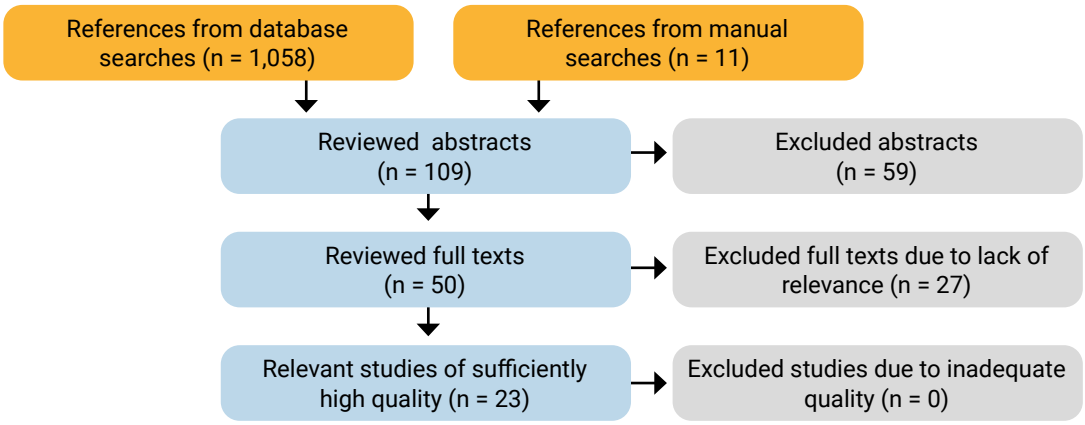


Figure 2.3 Productivity. Flow chart of inclusion and exclusion



Results of the primary studies 2020–2021

Below is a presentation of the results of the literature review of the 50 included articles.

Work environment and health

The searches produced a total of 31 studies which were classified according to the previously mentioned version of the *Mixed Methods Appraisal Tool* (MMAT). On the five-point scale, six of the studies were classified as a four, 13 studies as a three, and 12 studies as a two (see table 2.1). More than half of the studies were carried out in European countries and three of them are also among the five ranked the highest. The occupational composition is elusive, because many of the studies lack detailed descriptions, and many were conducted with a convenience sampling. There are four longitudinal studies (Ervasti et al. 2021, Gibbs et al. 2021, Shimura et al. 2021, Wood et al. 2021) in which the situation before and during the pandemic can be compared, and several studies with repeated measurements during the pandemic (Russo et al. 2021; Syrek et al. 2021; Wood et al. 2021). Retrospective estimates are common when comparing conditions before and during the pandemic. All COVID-19 data are from the first wave in spring and early summer 2020, except in the studies by Ervasti, Wood and Karácsony (2021), which also have measurements during the second wave in September 2020.

Table 2.1 Compiled information about the 31 studies on work environment and health

Country and reference	MMAT, 1–5	Number of respondents	Occupational category/sample
Australia, Pirzadeh et al. 2021	3	412	Employees, construction industry
Denmark, Kirchner et al. 2021	3	290 + 1,053	Managers and knowledge workers
Egypt, Gabr et al. 2021	2	142	University employees
Egypt, Mostafa, 2021	2	318	Different sectors via social media: Education, IT, medical care, pharmaceuticals, telecom, real estate
EU 29 countries, Ipsen et al. 2021	3	5,748	Majority academics
Finland, Ervasti et al. 2021	4	24,299	Public sector employees, 25% teachers
Finland, van Zoonen et al. 2021 (a)	4	2,242	Associated with unions, organisations
Finland, van Zoonen et al. 2021 (b)	3	5,452	Mixture of state and private employees, convenience sampling
India, Bhumika et al. 2020	3	180	Mixed occupations: IT, education, finance, auto industry
Indonesia, Irawanto et al. 2021	3	472	Mixed from different parts of the country, convenience sampling (public and private employees)
Italy, Galanti et al. 2021	2	209	Private and public sector organisations
Japan, Shimura et al. 2021	4	3,123	Office workers
Lithuania, Raišiene et al. 2020	2	436	Highly educated: service, administration and education
Mexico, Cernas-Ortiz et al. 2021	2	214	Snowball sampling: teaching, administration
Mexico, Garcia-Contreras et al. 2021	3	971	Public employees
Netherlands, Syrek et al. 2021	4	253 + 516	Highly educated from multinational organisation
Netherlands, Yerkes et al. 2020	3	852	Representative, mothers and fathers
Portugal, Carvalho et al. 2021	2	456	Service, consultation, health
Romania, Mihalca et al. 2021 (b)	2	701	Employees in IT companies
Romania, Miron et al. 2021	2	228 + 110	Administrative occupations
Slovakia, Karácsony et al. 2021	2	709	Snowball sampling from private multinational companies
Spain, Cuerdo-Vilches et al. 2021	2	256	90% academically educated
Spain, Escudero-Castillo et al. 2021	4	1,050	Assessed as representative
UK, Wood et al. 2021	3	1,174	University, both academics and others
Germany, Schmitt et al. 2021	2	403	Online panel
Hungary, Aczel et al. 2021	3	704	University-employed academics
USA, George et al. 2021	2	278	Assorted occupations recruited via survey service Amazon Mechanical Turk
USA, Gibbs et al. 2021	4	112	Office workers
USA, Jimenez-Gomez et al. 2021	3	491	Behaviour analysts
USA, Russo et al. 2021	3	154	Programmers
USA, Xiao et al. 2021	3	988	Snowball sampling, broad spectrum of different occupations, education and ages

The outline for this section is as follows: First, there will be a presentation of studies comparing the work environment before and during the pandemic for the same individuals, as well as studies that compare groups who work at the primary workplace during the pandemic to groups working remotely from home (in one case, the participants alternate between work from home and at the primary workplace). This will be followed by a presentation of studies that analyse the work environment and work conditions in terms of various aspects of health. Some studies have analysed groups from both categories. As a rule, these are categorised with the studies with analyses of relationships.

The studies contain several different questions and different health indicators. There are global measurements, general health questionnaires (GHQ), and more specific measurements of symptoms such as emotional exhaustion, sleep disturbances and more. Job satisfaction is not strictly a health aspect, but we have included it here because it was included in so many studies.

Studies of changes in working conditions

A dearth of studies investigate managers' situations, but one high-quality study from Denmark compares people with and without management duties (Kirchner et al. 2021, level 3). It demonstrates significant differences between these categories, primarily in the opportunity to use the potential flexibility entailed by remote work from home. Managers were limited by not being able to avoid long meetings and spent more time at the computer, had longer working hours, lacked social contacts and viewed their jobs as more demanding compared to the group without management duties. Non-managers experienced more autonomy in the actual work from home, but greater restrictions regarding access to equipment and a good work space, worse concentration, were chained to the computer more, and experienced less clarity about what was expected in their work and limitations in what tasks could be done from home. No analyses of gender differences are reported.

The large study with participants from 29 European countries (Ipsen et al. 2021, level 3) aimed to identify advantages and disadvantages of remote work from home. Work environment advantages included:

- better work efficiency
- better work control.

Work-environment-related disadvantages included:

- home office constraints
- work uncertainties
- inadequate tools.

The Dutch study of parents (Yerkes et al. 2020, level 3) compared mothers and fathers in the same family in three aspects of the work environment (level 3). The scope of paid work from home did not differ between mothers

and fathers. Of the participants, 36% experienced increased work pressure during the pandemic. Significantly more experienced increased pressure than reduced pressure from work, especially among mothers (39% compared to 31% among fathers). The schedule of working hours was shifted towards evening work and weekend work, which was more pronounced among mothers than among fathers.

The Spanish study by Cuerdo-Vilches et al. (2021, level 2) showed that only 27 percent of participants had an established home office, and one third of participants found their home office inadequate in terms of space, furnishings, access to digital tools and number of people in the home.

In the Hungarian study of university employees (Aczel et al. 2021, level 3), the researchers identified which tasks were better suited to being carried out at the primary workplace:

- sharing thoughts with colleagues
- keeping in touch with their team
- collecting data.

The following work tasks were better suited to being carried out at home:

- working on their manuscript
- reading the literature
- analysing their data.

Attitudes towards work from home were positive and 66 percent wanted to work from home more than they did before the pandemic.

George et al. (2021, level 2) found in their study that most remote workers did not report any difference in the amount of working hours. However, nearly half of them experienced an increase in demands, and more than twice as many reported an increase in responsibility compared with those reporting a decrease. The study does not analyse the extent to which increased responsibility and increased demands are positive or negative. Despite a potentially negative component to these aspects, attitudes towards work from home were obviously positive and 60 percent could imagine continuing to work from home.

Jimenez-Gomez et al. (2021, level 3) compared behaviour analysts at work to those working remotely from home and found that the latter reported more disruptions, but better time management and better exchange of information.

Pirzadeh & Lingard (2021, level 3) conducted measurements every week for seven weeks in a row. Those who worked at the primary workplace had greater work engagement than those working remotely from home. Mental well-being gradually declined during the course of the study, regardless of whether

workers were at the primary workplace or at home, which can be interpreted as a reaction to the ongoing pandemic.

Raišiene et al. (2020, level 2) found that effectiveness and quality with remote work from home depended on:

- gender
- age
- education
- work experience
- experience of remote work.

Women saw advantages such as a healthier lifestyle at home, and being able to work independently and without time pressure, while men saw disadvantages with several factors, such as disruptions from family members, reduced career opportunities, and lack of clarity regarding work tasks. Older people felt more negatively about remote work than younger people. People with higher education and a longer length of employment missed in-person contact with managers to a greater extent and were concerned about missing out on important information when working from home, while those who had previous experience with remote work saw more advantages to working this way.

The study by van Zoonen, et al. (2021 [b], level 3) showed that independence and clear work criteria were important for better adaptation to remote work from home, while social isolation was negatively connected to adaptation. In contrast to earlier results, the study shows that trust in colleagues and superiors did not make remote work easier, but rather, more difficult. Gender did not impact the result.

Studies with analyses of relationships

The large Finnish study (level 4) of public sector employees (Ervasti et al. 2021) showed that people who worked from home during the pandemic reported:

- more control over their working hours
- more procedural justice
- improvements in social capital at the workplace
- better self-rated health according to the GHQ scale.

These changes were determined through comparisons to measurements taken before the pandemic and to those who remained at the regular workplace during the pandemic. If remote work in conjunction with the pandemic entailed a transition to new tasks or changed teams, the estimates were the opposite, in other words, there were less favourable estimates of psychosocial conditions and slightly lower estimates of health. No comparisons were made between reactions in women and men.

The Spanish study (level 4) by Escudero-Castillo et al. (2021) also used the GHQ scale, but with the opposite result. It showed that people who worked remotely from home experienced a lower degree of mental well-being during the shutdown than those who were still working at the primary workplace. Women experienced more negative effects than men in mental well-being.

Another level 4 study (Gibbs et al. 2021) contained health data from the period before working from home, which were used as baseline data. The analyses demonstrated worse work-related health, worse sleep and more mood disturbance when working from home.

Shimura et al. (2021, level 4) investigated how different degrees of remote work impacted health outcomes and found that limited remote work reduced mental and physical stress reactions, while full-time remote work from home worsened sleep and increased sickness absence.

In the study by Bhumika et al. (2020, level 3), many felt more emotionally exhausted when working from home compared to working at the primary workplace. The relationship was strongest for women, because work interfered with their personal life to a greater extent than for men. The interference was mutual, that is, the impact of work on private life and the impact of private life on work contributed to increased emotional exhaustion.

Miron et al. (2021, level 2) found that those who worked remotely from home estimated their well-being as slightly lower than those who worked at the regular workplace. With remote work, there was a strong positive relationship between development, competence, job satisfaction, organisational climate and mental well-being. Women were more positive about remote work than men.

Positive and negative factors for health with remote work from home

The studies investigating health-related factors were very heterogeneous with regard to quality, questions, methods, analysed variables related to work organisation and other variables, and this limits the possibilities to make precise comparisons. The compilation is focused on presenting factors that recur in multiple studies and which should therefore constitute a more solid basis for drawing conclusions. Similar studies are presented together.

Four studies included symptoms of burnout, but from different perspectives, which is likely a reason for the somewhat varying results. The study by Mihalca et al. (2021, level 2) shows that when a heavy workload is unavoidable, employees' role clarity is particularly important for reducing the risk of symptoms of burnout. Carvalho et al. (2021, level 2) found that when different roles (work, family) disrupt one another most during remote work, work–family balance is at its worst, and these disruptions show relationships to burnout symptoms and the experience of a less meaningful life. This relationship was stronger for women than for men. Garcia-Contreras et al. (2021, level 3) showed that employees felt dissatisfied with remote work from home because they had to exert themselves more to be productive, while

they appreciated the freedom they had and the reduced risk of being infected with COVID-19, which led to a reduction in symptoms of burnout. Mostafa (2021, level 3) found that an increased quantity of remote work was related to higher estimates of burnout symptoms, but also found a positive relationship between the scope of remote work from home and well-being. A large majority (82%) wanted to continue working remotely from home.

The results of three studies of remote work and job satisfaction point in the same direction. Syrek et al. (2021, level 4) and Karácsony et al. (2021, level 2) found that remote work had a positive effect on job satisfaction. Irawanto et al. (2021, level 3) also came to that conclusion, but also found that work stress had a significant negative effect on job satisfaction.

Xiao et al. (2021, level 3) identified several factors that were connected to reduced physical and mental well-being with remote work from home, including:

- lack of communication with colleagues
- presence of children at home
- disruptions at home
- changed working hours
- less physical activity
- worse diet
- shortcomings with the physical work situation.

The studies by Russo et al. (2021, level 3) and Wood et al. (2021, level 3) showed, in addition to other results, signs of adaptation processes. Russo and colleagues found in a longitudinal study that the quality of social contacts was positively related to well-being and stress was negatively related to well-being on both measuring occasions. For several other factors that were studied, no relationship was found between the first and second measuring occasion, which can be interpreted as a sign of an ongoing adaptation process. Wood et al. (2021) showed that mental well-being was connected to:

- working conditions
- work–life balance
- working from home
- the pandemic as such.

Over time, well-being decreased while the experience of loneliness increased. The ability to separate oneself from work decreased over time (Wood et al. 2021).

Overload and its various causes could be observed in several studies, especially in the field of IT. Schmitt et al. (2021, level 2) identified cognitive overload as a mediator between text-based digital tools and mental well-being, but work performance was not affected. Children at home increased the cognitive

workload. Gabr et al. (2021, level 2) found that overload was more common among women than men, and among those with worse WiFi connections. They also found higher levels of the stress hormone cortisol in the blood among those who felt overloaded. However, many ambiguities in this study make the result uncertain.

In the study by Galanti et al. (2021, level 2) in which a majority of the study participants were women, work–family conflict and social isolation in conjunction with remote work from home were connected to increased stress.

Van Zoonen et al. (2021 [a], level 4) studied how employees and their managers experienced the transition to remote work. The results showed that managers and families with children had more difficulty adapting to remote work, but that those who had previously worked remotely had fewer problems.

Summary: work environment and health

Before we go into more detailed results, a brief overarching picture of the area will be presented in order to provide context and create understanding and frames of reference for the individual studies. A number of factors interact and affect how each individual might function with remote work from home. These factors are familiar from studies of regular workplaces as important for the quality of work, but the effects of problematic as well as good conditions seem to be magnified with remote work from home. One such factor is autonomy, or control of one's own work, which appears to be an even more polarizing factor with remote work from home. Provided that one has access to the necessary resources for doing the work, and the necessary skills for being able to work independently, autonomy appears to be a more powerful positive factor than it is at the primary workplace for creating good work conditions. Autonomy, or what could be called false autonomy, in the sense that the remote worker is left alone and expected to manage on their own, seems to have stronger negative consequences with work from home in the form of reduced mental well-being and reduced effectiveness. A heavily weighing factor in this complex is reduced contact with managers and colleagues as well as reduced support, which creates unclear working conditions. A dearth of studies focus on the work situation for managers, but their conditions are also a part of this picture. The Danish study that compared managers and employees indicates that managers are very bound to meetings, which could be one reason for the lack of contact and support for individual employees.

The studies that were able to directly compare work from home with work at the regular workplace do not offer unambiguous results. In the study by Ervasti, with highly ranked scientific quality, in which 24,000 people were included in pre-and post-measurements, the results point to positive health consequences. In another highly ranked study, the results point to negative health consequences (Escudero-Castillo et al. 2021). Thus, two scientifically well-regarded studies produced contrasting results using the same measurement (the GHQ scale) of health outcomes. Most of the other less-well-ranked studies also indicated negative health consequences when comparing work

from home with work at the regular workplace. One possible explanation for the contrasting results could be different cultural and social environments in the countries in which the studies were carried out, for example, differences in how the pandemic affected the country. The Finnish study (Ervasti et al. 2021) was conducted in September 2020, when Finnish society had opened after a calm summer (low spread of the disease), while the Spanish study (Escudero-Castillo et al. 2021) was conducted in April–May 2020, when Spain had been severely affected by the pandemic and society was in quarantine.

If we consider the category of studies focused on identifying factors that are correlated with health and illness, there are both hypothesis-testing and more exploratory studies. Many contributing circumstances emerged in the various studies. Common to several of the studies is the importance of social aspects:

- lack of communication with colleagues
- quality of social contacts
- experience of isolation
- experience of loneliness
- lack of organisational support.

The Hungarian study (Aczel et al. 2021) provided a sample chart of where it was best to carry out different tasks, and not unsurprisingly, the primary workplace was best for exchange of ideas and social contacts.

For specific outcomes in conjunction with remote work, many of the studies that included job satisfaction had positive results. For symptoms of burnout, the picture is fragmented – the studies have different perspectives and other factors may be involved, such as the ongoing pandemic.

The studies that highlight overload are primarily from the area of IT. However, it is difficult to point out this sector as particularly vulnerable, but one hypothesis could be that the area of IT has experienced added pressure during the pandemic through the expansion of IT-related remote work from home. Another explanation could be that many researchers chose to study this area.

A few studies followed the adaptation process to work from home, but the length of time between the measurements is likely too short for more solid conclusions and the studies were often conducted at the beginning of workplace shutdowns, making it unsafe to generalise the results. The study by Russo et al. (2021) points to better adaptation, while the four-week study by Wood et al. (2021) points instead in the opposite direction, with reduced well-being and increased experiences of isolation. Capacity for recovery improved, however, which should be a lasting change. The result does not provide a basis for any extensive conclusions about adaptation. The adaptation process may also be impacted by how employees experienced the development of the pandemic.

Only a few studies compared the working conditions for men and women. The tendency is towards a higher burden on women and a more negative situation, but it is difficult to discern a clear pattern in the studies comparing the experiences of women and men. We will return to this question in the next section, which covers work–life balance, and we will return to a more thorough discussion of the results in part 3 of the report.

Work–life balance

The COVID-19 pandemic and the shutdown of workplaces, child care and schools and orders to work from home have led to work roles and roles in private life blending together to an extent that has never before been seen in modern times. The potential for conflicts between an individual's different roles has increased, but at the same time, new solutions and possible combinations are arising that may reduce conflicts. Many studies have connected conflicts between the role at work and other roles in life to outcomes in several spheres:

- work
- family
- job satisfaction
- quality of life

Allen et al. (2020) address two areas of work–family research that have become particularly relevant through the pandemic. The blending of home and the workplace, and the blending of home and school in families with children, in which the home must sometimes also take over the tasks of a school, place new and higher demands on role management for individuals. Blurred boundaries create space for conflicts and old boundary-management strategies for separating work and private life do not work as well in this new situation, and likely particularly badly for people who prefer role segmentation, but the situation may also be new for those who prefer integration. There is also a risk that reduced possibilities to control the boundaries between different demands and roles impairs recovery by making it harder to turn off work demands. The other aspect pertains to burdens, which likely increase primarily through demands on the family increasing with children at home around the clock, all week long.

Searches in the area resulted in a total of 19 studies that were classified according to the revised version of the Mixed Methods Appraisal Tool (MMAT). On the five-point scale, one study was rated a level four, 10 studies were level three, and eight studies were level two. All data collection was carried out via online surveys.

As can be seen in table 2.2, the material is highly varied, both in terms of quality and in terms of distribution across countries and continents. Europe is represented in 11 studies. Only one study is based on a nationally representative sample (Schieman et al. 2021, level 4) and there are a few longitudinal studies in which data before and during the pandemic can be compared. Retrospective estimates are common.

Table 2.2 Compiled information on the 19 studies on work–life balance: countries, scientific quality, number of participants, occupational categories

Country and reference	MMAT, 1–5	Number of responses	Occupational category/sample
Australia, Pirzadeh et al. 2021	3	412	Employees, construction industry
Egypt, Mostafa, 2021	2	318	Different sectors via social media: Education, IT, medical care, pharmaceuticals, telecom, real estate
EU, 29 countries, Ipsen et al. 2021	3	5,748	Majority academics
Finland, Otonkorpi-Lehtoranta, 2021	3	348 couples with children	University-educated parents
Finland, van Zoonen et al. 2021 (a)	3	2,242	Associated with trade unions, organisations
India, Bhumika et al. 2020	3	180	Mixed occupations: IT, education, finance, auto industry
Indonesia, Irawanto et al. 2021	3	472	Mixed from different parts of the country
Italy, Galanti et al. 2021	2	209	Private and public sector organisations
Italy, Ghislieri et al. 2021	2	211	Technical and administrative staff
Latvia, Lonska et al. 2021	3	1,006	Assorted occupations, snowball sampling via website, social media, e-mail
Netherlands, Yerkes et al. 2020	3	852	Representative, parents
Portugal, Carvalho et al. 2021	2	456	Service, consultation, health
Singapore, Danker et al. 2021	2	2,024	Police employees
Spain, Seiz et al. 2021	2	1,287	Snowball sampling, highly qualified
South America, Sandoval-Reyes et al. 2021	3	1,285	Majority highly educated
Germany, Schmitt et al. 2021	2	403	Online panel
Hungary, Aczel et al. 2021	2	704	University-employed academics
73 countries, Frize et al. 2021	3	921	Biomedical professions, mostly academics
Canada, Schieman et al. 2021	4	2,024 + 1,869 + 1,843	Nationally representative sample (3 data collections)

The general question asked in many studies is whether the conflict between work and private life has changed – reduced or increased – and if so, what factors contributed in one direction or the other. Some studies also investigated the relationship between balance and (ill) health.

Conditions affecting conflict between work and private life

The study by Schieman et al. (2021) received the highest quality ranking and can be used as a reference. The study, which was conducted in Canada, is longitudinal and based on a representative sample, with one measurement from before the pandemic and two measurements during the pandemic (April and June 2020). The total result was reduced conflict between work and private life at the first measurement during the pandemic, and even more so at the second measurement in families with children over age 12, or with no children. However, this did not apply for families with children up to age 12, in which no reduction could be observed. No gender differences emerged, despite thorough examination. Schools were closed in Canada at the time of the study.

If we look at the studies with the next-highest quality rating, the results lean in the same direction as the Canadian study (Schieman et al. 2021) regarding the significance of children. The study by Aczel et al. (2021, level 2) which was conducted in Hungary, found that participants (university-employed academics) with young children benefited less from working from home and experienced more disadvantages when doing so than when working at the primary workplace. This applied both during the pandemic and in normal circumstances. Gender differences were not studied.

The large study (Ipsen et al. 2021, level 3) with data from 29 European countries showed that the majority of men and women experienced better work–life balance, and the majority also perceived working from home as primarily positive. However, women experienced greater limitations with working from home. Parents with children experienced more work–life conflicts and less effectiveness at work. Schools were closed in most countries (except Sweden), but no comparisons of outcomes between countries were made.

Otonkorpi-Lehtoranta (2021, level 3) studied gender roles and the boundary between work and the rest of life among parents with children at home in Finland, and found that the boundaries were almost completely dissolved, and that mothers, who already had primary responsibility for the children and household before, had an extra large burden and great difficulty taking care of their work. The other study from Finland by van Zoonen et al. (2021 [a], level 3) also shows that families with children experience greater conflict between work and the rest of life.

A study from Latvia (Lonska et al. 2021, level 3) with participants from assorted occupational groups, found that women and parents with young children had significantly more problems balancing work and the rest of life

than others, a result which did not, however, reach statistical significance when weighted based on the total population composition.

In the study by Frize et al. (2021, level 3) which was based on participants from 73 countries, women experienced more problems than men when it came to balancing work and household work/child care, as well as social isolation when working from home. Men experienced more disruptions and a bigger workload when working from home and were dissatisfied that they could not contribute to taking care of the children.

The retrospective study from primarily Colombia and Ecuador of academics (Sandoval et al. 2021, level 3) showed worse work–life balance when working from home for both women and men, but no analyses were conducted of how children at home affected the balance.

The results of the Indian study (Bhumika et al. 2020, level 3), which is based on assorted occupations and had relatively few participants, also lean in a negative direction. This group was young, and relatively many had children. Most felt more exhausted when working from home compared with at the primary workplace. The relationship was strongest for women, who experienced more disruptions between private life and work. Participative leadership subdued the disruptions. The significance of children at home was not analysed.

The Indonesian study (Irawanto et al. 2021, level 3) showed that remote work from home had negative effects on work–life balance, but positive effects on job satisfaction. No comparisons were made between women and men, or between families with and without children at home.

Some of the studies at level two show the same results, in other words, the significance of children and that women are more negatively impacted than men.

Ghislieri et al. (2021, level 2) found in the Italian study that participants with children experienced greater conflicts than those without children. Schools and preschools were closed in Italy during the measurements. The study by Danker et al. (2021, level 2) of police employees in Singapore found that people with caregiving functions at home were less satisfied, more stressed, and less productive than those without caregiving functions.

In the Egyptian study, Mostafa (2021, level 2) found the exact opposite result: remote work generally contributed to improved integration between work and the rest of life, but no analyses were conducted based on gender or the presence of children at home.

A subcategory includes studies focused on work allocation at home, in which changes are expected to affect work–life balance. A Dutch retrospective study (Yerkes et al. 2020, level 3) of mothers and fathers with at least one child at home found that mothers reported more unpaid work at home and less free

time than men, both before and during the pandemic. Both men and women reported worse work–life balance during the period of working from home. Schools in the Netherlands were shut down when the data were collected.

Development and adaptation over time

Some of the studies had data from several measuring occasions and could thus analyse adaptation and health in relation to work during the pandemic. As previously mentioned, the Canadian study by Schieman et al. (2021, level 4) found a reduction in conflicts among those who did not have children at home, or who had children over age 12 at home. No gender differences could be observed.

Pirzadeh et al. (2021, level 3) studied employees in the construction industry in Australia who worked from home every other week and found, with seven measurements, that the number of working hours was positively correlated with worse work–life balance. Mental well-being fell during the pandemic, whether working from home or at the office, which the researchers interpret as a general reaction to the pandemic. Gender differences were not analysed.

The study from Finland by van Zoonen et al. (2021 [a], level 3) found that families with children had a harder time adapting to working from home. No gender comparisons were conducted, but the results were controlled for gender, age and children at home.

Relationships between the conflict of work and private life and health

Some studies also investigated the relationship between balance and health, and compared to previous research, the results went in the expected direction. Carvalho et al. (2021, level 2) found in the Portuguese study that imbalance increased the risk of symptoms of burnout and the experience of meaninglessness, that women were affected more than men, and that children at home contributed to less balance. Ghislieri et al. (2021, level 2) found in the Italian study that conflicts between work and private life were connected to:

- stress
- worse recovery
- cognitive demands such as information processing, decision making and problem solving.

Pirzadeh et al. (2021, level 3) found a positive relationship between balance and mental well-being.

Summary of work–life balance

The studies of remote work from home during the pandemic have increased knowledge about the significance of children being at home. One unanimous result is that conflict between work and private life clearly depends on whether there are children at home, and especially younger children. All studies support this result in different ways.

High demands from work are a robust predictor of work–family conflict and not entirely unexpectedly, based on prior knowledge of gender-related work division, and based on the view that the home is primarily a realm of women's work and expertise. The results indicate that the increased workload has fallen to women more than to men.

When it comes to whether there is adaptation over time when working from home, that is, changes in the conflict between work and private life, the results are not unambiguous. Some results indicate that the stress decreases, but for families with younger children at home, studies indicate (Schieman et al. 2021) that the burden remains high.

Productivity

The searches produced a total of 22 studies which were classified according to the modified version of the Mixed Methods Appraisal Tool (MMAT). On the five-point scale, three studies were classified as level four, seven studies as level three, and 12 studies as level two (see table 2.3). All were online surveys.

As can be seen, the studies were divided among many countries and occupational categories.

Table 2.3 Productivity – Compiled information on the 22 included studies: countries, quality, number of participants, occupational category

Country and reference	MMAT, 1–5	Number of respondents	Occupational categories and sample
Denmark, Kirchner et al. 2021	3	1,053	Knowledge workers
England, Felstead et al. 2021	4	2,700	Nationally representative sample
EU 29 countries, Ipsen et al. 2021	2	5,748	Majority academics
India, Farooq et al. 2021	3	250	IT, banks, hospitals
Indonesia, Sutarto et al. 2021	3	472	60% in private companies or NGOs
Italy, Galanti et al. 2021	2	209	Private and public organisations.
Japan, Shimura et al. 2021	4	3,123	Office workers
Lithuania, Raišiene et al. 2020	2	436	Service, administration, education
Mexico, Garcia-Contreras et al. 2021	3	971	Public employees
Romania, Mihalca et al. 2021 (a)	2	482	IT companies
Singapore, Danker et al. 2021	2	2,024 x 4	Police employees
South Africa, Koekemoer et al. 2021	2	229	Service workers
South America., Sandoval-Reyes et al. 2021	3	1,285	Majority highly educated
Germany Bartsch et al. 2021	2	206	Service workers
Germany Schmitt et al. 2021	2	403	Online panel
Hungary, Aczel et al. 2021	2	704	Academics
USA, George et al. 2021	2	278	Assorted occupations recruited via survey service Amazon Mechanical Turk
USA, Jimenez-Gomez et al. 2021	2	491	Behaviour analysts
USA, Awada et al. 2021	2	988	Majority academics
USA and more, Cui et al. 2020	4	25 countries	Study of production of research articles
USA, England and more. Russo et al. 2021	3	192	Programmers
USA, Feng et al. 2020	3	286	Professionally active couples, assorted occupations

The overarching question is the relationship between work from home/at the primary workplace and productivity. The measurements are self-estimates of productivity and estimates of what aspects of work are correlated with productivity, or assessed as contributing to productivity. In addition to advantages and disadvantages of remote work from home and productivity, several studies also analyse development over time.

Factors connected to productivity

An English longitudinal study (Felstead et al. 2021) of high scientific quality (level 4) with data from before and during the pandemic shows increases in self-estimated productivity over time. The increase is connected primarily to more worked hours from home than at the primary workplace. Lower productivity was associated with both organisational conditions of work (lack

of assignments, worse resources at home) and the conditions at home (children requiring attention). No differences between men and women emerged.

In the Indonesian study by Sutarto et al. (2021, level 3) the employees reported higher productivity with remote work, which the researchers believe is related to less stress and higher well-being when working at home. The South American study (Sandoval-Reyes et al. 2021, level 3) also found that remote work contributed to increased productivity and engagement. In this study, stress had a more negative effect on productivity in men than in women.

In addition, a number of studies demonstrate positive effects in some conditions. In the study by Awada et al. (2021, level 2), good contact with colleagues, having one's own work space at home, and high income are such factors. The study by Bartsch et al. (2021, level 2) showed that for employees to maintain their performance, both task- and relation-oriented leadership were required. Other positive mediating factors were autonomy and cohesiveness. The study by Koekemoer et al. (2021, level 2) shows that resource-supported leadership behaviours have a significant positive relationship with effectiveness and self-estimated performance. Mihalca et al. (2021, level 2) identified individual factors, such as opportunities for planning and management by objectives as important for productivity.

Negative and differentiated effects on productivity

In the article by Cui et al. (2020, level 4), which is based on research articles by 76,832 authors in 25 countries, it was found that female researchers had fewer preprints than men 14 weeks before the pandemic and at a fairly stable level, but that the gap between women and men increased in the 10 weeks during the pandemic that the study was underway. The difference between women and men is thought to be because women take more responsibility for the home and children in conjunction with remote work from home. Schools were closed in most countries during the pandemic.

The longitudinal Japanese study by Shimura et al. (2021, level 4) compared productivity before and during the pandemic, and it was found that full-time remote work reduced productivity.

Raišiene et al. (2021, level 2) investigated what supported and thwarted effectiveness with remote work and found that women primarily saw advantages for effectiveness with being able to work independently and without time pressure, while men experienced more disruptions at home.

Kirchner et al. (2021, level 3) compared managers and people without managerial duties. The results showed that managers had to put in more working hours than those without managerial duties to maintain the same level of productivity as before. The latter reported more autonomy when working from home, but also more restrictions with regard to the physical work situation and lack of clarity about the professional role.

Galanti et al. (2021, level 2) studied employees in public and private organisations in Italy and found reduced self-reported productivity and work engagement with remote work from home. However, the results show that through self-leadership and autonomy, employees can maintain productivity and engagement, which is valuable information for organisations and employers for remote work in the future.

The Indian retrospective cross-sectional study (Farooq et al. 2021, level 3) shows a negative effect on productivity for both men and women, but mostly for women, which is believed to be because women take more responsibility for unpaid tasks at home. The result of the retrospective study by Feng et al. (2020, level 3) in the US leans in the same direction as the Indian study. Women estimate their productivity as lower during the pandemic, while men do not describe a difference.

In the study by Felstead et al. (2021, level 4) from England, the main result was positive, but negative factors were also identified, such as lack of tasks, worse resources when working from home and interruptions from children at home. Danker et al. (2021, level 2) showed in the study from Singapore that caregiving functions at home contributed to more stress and lower self-estimated productivity.

The study by Aczel et al. (2021, level 2) from Hungary gave a differentiated picture of productivity aspects for university employees. It indicated that the office was better for exchange of ideas and contact with people and teams, while the home was better suited to working on manuscripts, reading literature and data analysis.

Jimenz-Gomez et al. (2021, level 2) also contribute to the advantages and disadvantages of working from home. The study shows that those who work from home report better time management and better exchange of information, but more disruptions and worse productivity. There were no differences in other outcome variables.

Garcia-Contreras et al. (2021, level 3) concluded in a Mexican study that about half of the public employees in the study did not report increased productivity in conjunction with remote work, which is attributed in part to the rapid and unplanned adjustment to remote work. Commitment to the organisation increased through the trust employees were given to work more flexibly.

Two studies indicated no or a weak impact on productivity. In the study by George et al. (2021, level 2), most experienced no difference in productivity. The study by Schmitt et al. (2021, level 2) showed how cognitive overload mediates the relationship between increased use of digital tools and workload, with consequences for productivity.

Development and adaptation processes over time

Development processes could be investigated in some of the studies with multiple data collections during the pandemic. In the study by Russo et al. (2021, level 3) with participants primarily in the US and UK, the results indicated adaptation. The relationship between stress and other variables and worse performance at first data collection had reduced or disappeared at second data collection.

Finally, the large EU study (Ipsen et al. 2021, level 2) shows that men estimate higher effectiveness with remote work than women. Contributing factors included that men felt less limited, or that men felt they lacked important work tools to a lesser extent than women. People with children under age 15 at home (schools and preschools were closed in most countries in spring 2020) felt less effective at home compared to those without children. Gender differences were not reported.

Summary of productivity

The majority of the studies point to increased productivity, but the studies were conducted in different ways in part, which means they cannot all be compared. The study by Felstead et al. (2021) shows that increased self-estimated productivity is predicted by more hours worked at home than at the primary workplace, while reduced productivity was associated with a lack of assignments, worse resources at home, and children requiring attention. No differences between men and women were encountered in these analyses.

Other factors contributing to increased productivity are:

- good contact with colleagues (several studies)
- having a workstation at home (Awada et al. 2021)
- autonomy and cohesiveness (several studies)
- task- and relation-oriented leadership (Bartsch et al. 2021).

Having children at home is associated in several studies with estimates of lower productivity. Some studies analysed gender differences and the results point in different directions: in several studies, women estimate their productivity as lower than men do – and some studies find the opposite results. Studies of gender differences at work in recent years have found that such differences are usually associated with the fact that men and women work in different sectors or at different levels in an organisation. However, the material here is too limited to be able to draw conclusions on this result.

Results of Swedish studies and comparisons of Swedish and international studies

No scientific articles from Sweden emerged in the computer-based searches or in the manual searches. However, the manual searches did bring up a number of survey studies conducted by unions and consulting firms. Of this grey literature, we chose four studies, primarily because they were quantitatively comprehensive and had a clear selection framework (members of three unions). A few more studies were found, but were excluded due to their unclear selection frameworks and lack of attrition information and other method information. Also included was a study conducted by the European Foundation. Although the study uses so-called snowball sampling, it has the advantage of being based on a large number of respondents, which is the primary reason for its inclusion. This section will proceed as follows: first, brief information about the grey literature will be presented, followed by several primary results from them, divided into the three areas. In conclusion, some comparisons will be drawn between the Swedish results (including the EU study) and the results of the included international studies.

Akavia studies *The office after the pandemic* (2021a) and *Flexible working life – a trap for women?*
(2021b). The studies were conducted in June (n = 4,299, 42% response rate) and September 2021 (n = 3,692, 38% response rate). The responses are weighted to be representative for the member group. Some questions were only asked of managers. Akavia has 130,000 members: economists, lawyers, social scientists, IT academics, HR professionals and communication specialists. The Akavia study is primarily focused on working conditions, advantages and disadvantages, and members' attitudes towards working remotely.

ST study *Work from home – is remote work here to stay?* (2020)
The results are based on a survey sent to professionally active members (state employees) in the second half of May 2020. Just over 41,400 members received the survey and 13,468 members responded to it, which means that 33 percent responded. Of these, about one third never or very rarely worked remotely and therefore did not answer questions about remote work. A large majority worked at a government agency, followed by work at universities or colleges.

TCO study *The puzzle of life during the coronavirus pandemic* (2021)
The study was carried out in September 2020 with a selection of members (n = 2,046) in different TCO associations (Forsell 2021). The sample consisted of white-collar employees between 18 and 65 years old who had the same job before and during the coronavirus pandemic. The study was able to compare those working from home with those who continued to work at the workplace. The report does not provide response rate or attrition.

Eurofound study *Living, working and COVID-19 (Update April 2021): Mental health and trust decline across EU as pandemic enters another year* (2021).
Three data collections were conducted within EU27 – countries with many respondents. The third data collection in spring 2021 included 46,800 respondents. Selection for the online study took place using a snowball method and advertising on social media.

Results of grey literature from Sweden and the EU

Work environment and health

Workload – stress. In the ST study, experienced stress is associated with the quantity of remote work. Among those who work from home, more say they are less stressed than before (35 versus 21 percent before). Among those who are at the office, the share of stressed workers rose (to 35 percent from 11 percent before). In the TCO study, 41 percent of the women who continued at the regular workplace reported an increased workload, compared with 33 percent among men. Among women who worked from home, a higher share of women reported an increased workload (30 percent) compared with 20 percent among men.

Managers. According to the Akavia study (2021a), 46 percent of managers feel their opportunity for leadership has become slightly or much worse. The hardest aspects for managers about leading remotely have been assessing how employees are doing (30 percent) and determining whether any employees need support (22 percent). A disadvantage brought up about remote work is that it is difficult to distinguish between work and free time (34 percent). Despite these problems, as many as 86 percent of managers feel that for them, working remotely works very well or well, while only 3 percent feel it works fairly badly or very badly.

Social relationships and support for managers. The TCO study showed that women reported a decline in support to a greater extent than men. In the TCO material, 80 percent agree with the statement: "I have missed social interaction with my colleagues". In the Akavia study (2021a), it can be seen that good social and professional contact with colleagues and with immediate supervisors are a few of the most urgent factors for the ability to be satisfied with working from home.

Allocation of work between home and at the primary workplace. According to the Akavia study (2021a), managers and employees have a relatively similar view of the allocation between working from home and at the primary workplace. Most employees and managers prefer a combination of work from the office and from home. 40 percent of managers consider it optimal for employees to work about as much at the office as from home. Managers, especially male managers, tend to prefer to see more days at the office than employees prefer, and the higher the managerial position, the more negative the view of working many days from home.

Dissolution of time boundaries. The Eurofound study showed that working during free time was relatively common. The share was higher among women than among men and the gender difference was even greater among those with children under age 11 (35 percent among women and 23 percent among men). It was only 8 percent among those who worked at the primary workplace (the result is for the third data collection in spring 2021).

Work–life balance

In the ST study, fully 50 percent say that balance between free time and work is better with remote work. A larger share of women than men feel this balance has improved. The group aged 25–39 is more polarized than other age groups, which may be due to the different needs and circumstances of this age group.

The TCO study uses the phrase 'the puzzle of life', which we consider equivalent to work–life balance, and the study points in the same direction as the ST study. A high share of both men (54 percent) and women (68 percent) say it has become easier to fit the puzzle of life together. Among those with children under 12, the share is as high as 77 percent, compared with 53 percent among those without children. Men who work from home are stressed more often about fitting the puzzle of life together than men who work at the workplace.

In the Eurofound study, which included three measurements, the imbalance grew the most among parents of young children, where relatively many say they were so tired that they did not have energy for housework. The numbers were especially high among women with young children and who only worked from home. On the positive side, over time, worry about work declined among women and men, which is interpreted as indicating that the ability to separate work and free time may have improved with time.

Productivity

Regarding perceived effectiveness, according to the ST study, there is a clear difference between those who work remotely and those who do not. As many as 46 percent of those who work remotely every day say they are more or much more effective than before. Among those who do not work remotely at all, only 12 percent feel they are more or much more effective. There seems to be a dose–response relationship: the more remote work, the more people feel they have become more effective. This can be exemplified with a quotation from a study participant in the ST study (2020, page 15):

> *I feel that I have the peace I need to work, which isn't possible at the workplace, because our office space is open. This has led to significantly more effective work and reduced stress, and I still have energy at the end of the workday.*

The tendency in the TCO study is the same as in the ST study. Far more people say they 'get more done than usual' than the opposite. There is also a gender difference here. Among women, 40 percent say they get more done than usual, compared with almost 30 percent of men. Only a little more than

10 percent say they get less done. Women say to a greater extent than men that they can concentrate when working from home.

In the Akavia study (2021a), the tendency is clearer and the first part of the study was done in summer 2021, in other words, when participants had about a year more experience with remote work. Of the respondents, 53 percent said they have become more effective when working from home and 36 percent of managers felt the employees had become more effective. A very small share of employees and managers felt effectiveness had reduced, 13 and 16 percent, respectively. Both the first (2021a) and second study (2021b) showed that women are more positive about remote work than men, and feel to a greater extent than men that they are more effective, but they also assess their stress levels as higher than men.

There is a weak tendency in both Akavia studies for work from home to be perceived as good for creativity and innovation. Just under one third of both employees and managers feel that creativity and innovative ability were negatively affected during the pandemic, while 25 percent had the opposite perception.

Comparison of Swedish and international studies

Work environment and health

A clear majority of those who responded to the Swedish studies and who worked remotely from home would gladly continue working remotely. However, they would like to be able to alternate between the primary workplace and work from home and choose the days themselves. The international studies, like the Eurofound study, also show that many employees could imagine continuing to work remotely a few days per week (such as George et al. 2021). In both cases, independence and control are emphasized as advantages of remote work from home, but they also report disadvantages, such as lack of social contact, unclear working conditions and inadequate work tools (such as Ipsen et al. 2021).

However, the international studies show more negative health effects, such as increased stress and psychological ill health among those who work remotely full-time (such as Yerkes et al. 2020). Both in Sweden and in other countries, many study participants say they work more hours from home than they do at the primary workplace. Overall, the studies show that those in Sweden who worked remotely from home during the pandemic feel more positively than equivalent groups in other countries. The biggest differences are for women.

Managers, both in Sweden and in other countries, feel that their work situation has become more demanding in conjunction with remote work. The study by Kirchner et al. (2021), which compares managers and employees during remote work, showed that managers viewed their jobs as more demanding, due among other reasons to more work interruptions compared with the group without managerial tasks.

Work–life balance

With regard to work–life balance, the Swedish studies consistently demonstrate, as stated, that remote work has contributed to facilitating it. The published studies from elsewhere in the world show a more negative picture, where primarily parents with young children at home experience greater work–life conflict in conjunction with remote work from home (Schieman et al. 2021; Ipsen et al. 2021). Women experienced more constraints with work from home, and men experienced more disruptions to work at home. Work–life imbalance was connected to increased stress and worse opportunities for recovery.

In line with the international studies, the Eurofound study showed primarily negative effects to work–life balance in conjunction with remote work from home, and like these studies, it also showed that women who worked full-time from home and who have young children were affected the worst. In the Canadian study (Schieman et al. 2021) in which repeated measurements were conducted during the pandemic, some decline was seen in the conflict over time, but not among parents with children under 12 at home. One probable explanation for these differences is that in Sweden, unlike in most other countries, preschools and primary schools were open during the pandemic. When schools were closed, parents who worked from home had to share the space with children, and also help them with education at home.

Productivity

The Swedish studies consistently indicate that people are more productive and more effective when working from home, but that working from home is not good for creativity or innovation. The international studies demonstrate mixed results and several point to reduced productivity when working from home, which is occasionally compensated for by working more hours. The longitudinal study by Shimura et al. (2021) of Japanese office workers showed that employees reported worse productivity while working remotely from home compared with working at the primary workplace before the pandemic. The studies (such as Felstead & Reuschke, 2021) in which most people did not report worse productivity when working from home still brought up disadvantages, such as lack of suitable work tasks, worse resources and interruptions from family members. The study by Aczel et al. (2021) in Hungary of university employees shows that some work tasks, such as reading literature and analysing data, are better done at home, while contact with colleagues and exchange of ideas function worse at home. The Eurofound study does not address productivity.

Gender differences in the international scientific studies

Almost all groups of employees studied in relationship to remote work from home include both women and men, but gender differences in outcomes have only been analysed in about half of the studies. In some cases, however, background factors such as gender, age, education and children at home were used to weight the results. Gender differences in outcomes for the studies in which gender differences were analysed are presented here, divided into three blocks.

Work environment and health. In seven studies, women report a worse work environment and health than men. Women felt more exhausted, burnt out, overburdened and disrupted, and experienced worse well-being, worse health and greater constraints than men in conjunction with remote work from home. In two studies from Romania and Lithuania (Miron et al. 2021; Raišiene et al. 2020), with primarily highly educated participants, the results were the opposite: women felt more positively about remote work than men and saw advantages such as a healthier lifestyle at home as well as being able to work independently and without time pressure. One study from the Netherlands (Yerkes et al. 2020) reported differences in both directions: more mothers than fathers experienced more work pressure (39 versus 31%) and at the same time, more mothers than fathers experienced less work pressure (25 versus 19%) during lockdown compared with before the pandemic (estimated retrospectively). Taken together, the international studies thus demonstrate that remote work has primarily been more negative for women than for men with regard to work environment and health.

Work–life balance. Nine studies reported worse work–life balance during remote work from home for women compared with men. No study reported better balance for women than for men, but three studies found no difference in work–life balance between women and men. A worse balance could consist of work impacting women's personal lives to a greater extent, or different roles (work, family) interrupting one another more than they do for men. Women also experienced greater problems balancing work and housework/caring for children, greater constraints with working from home and greater cognitive demands than men. Thus, in summary, the international studies provide strong support for a more negative effect on work–life balance for women than for men in conjunction with remote work from home, especially in families with young children.

Productivity. Four studies (Awada et al. 2021; Danker et al. 2021; Sandoval-Reyes et al. 2021; Raišiene et al. 2020) report better productivity for women than for men in conjunction with remote work, for example through the opportunity to work independently and without time pressure, and by working more hours, or through men experiencing more disruptions when working from home. In five studies (Cui et al. 2020; Farooq & Sultana 2021; Feng & Savani 2020; Ipsen et al. 2021; Staniscuaski et al. 2021), women reported worse productivity than men, primarily due to greater responsibility for children and housework. One study (Felstead & Reuschke, 2021) found that the presence of children at home had a negative effect on productivity for both women and men. The studies show that productivity in conjunction with remote work from home is affected more by other factors than gender, such as responsibility for unpaid work in the home, opportunities to work uninterrupted, or by working more hours at home.

Part 3. Comments and summary of results, knowledge gaps and research needs

The purpose of this review has been to increase knowledge about remote work from home by conducting a review of research reviews of remote work published between 2005–2021, and combining this with a review of original studies of remote work from home in 2020–2021 during the COVID-19 pandemic. The purpose and plan of the review should contribute to increased knowledge about remote work from home in both normal circumstances (voluntary) and during the pandemic (mandatory).

Beyond the purely scientific purposes, the intention is to contribute practically useful, research-based knowledge to the discussion that is currently underway on the emergence of working life with more remote work from home after the pandemic. The plan included facilitating a better understanding of what work environment problems and other problems are applicable to remote work in general, and what problems are related specifically to remote work from home in the situation and conditions of the pandemic in 2020–2021.

The large scale of this 'natural experiment' with remote work from home, which in autumn 2021 has been underway for approximately 1.5 years in Sweden and even longer in some other countries, has made it possible to discover and analyse new and specific aspects that are valuable for a planned transition to remote work from home in normal societal conditions. More knowledge about specific and general features will contribute to support for an expected development towards increased remote work from home in the future, which is a preference that has emerged in many studies. Earlier, in conjunction with the presentation of the results, we addressed the question of what is applicable to remote work in general and what is specific to the pandemic. Here, we continue to tie the distinction to concrete conditions and results.

The measures taken during the pandemic, with widespread work from home to reduce the spread of the disease, have in many respects created both a new home environment and a new work environment. An example of this is that the less physical space a home has, the more these two environments must mix together, while the more space, the smaller the overlap between the work and home spheres needs to be. This means the work environment at home need not differ so much from a good work environment at the primary workplace. However, both cases involve the physical absence of managers and colleagues. This will still be the case once the pandemic-related shutdown of the primary workplace has ended, but the effects will be modified by the fact that in a normal situation, the individual is almost never forced to work from home; rather, work from home

is a choice. Personally choosing remote work should have contributed to work from home and individual needs and conditions being better matched than when employees had no choice. But the home is not all that is changing. The primary workplace is changing as well through the quantitative thinning of staff as a result of many people working remotely. This change was not included in the study, but is naturally a big question in the face of practical decisions about the expansion of remote work.

It is uncommon for any study to empirically attempt to determine and quantify pandemic-specific health effects from worry about the pandemic and its risks on the one hand, versus health effects and other effects caused by the new work situation in the home on the other. In one study (Pirzadeh & Lingard, 2021), the researchers sought with repeated measurements to correlate people's health experience with the effect on mental well-being that may stem from the infection intensity and death counts in society. The aim was to access and quantify the degree to which ill health can be attributed to worry and anxiety about the COVID-19 pandemic. The results show that the negative effects of remote work from home, with isolation, time pressure, long workdays and work–life conflict, are also affected by the worry and uncertainty experienced in the face of the risk of being infected with COVID-19 and about the spread of the pandemic across the world. An example of this is the following quotation (Pirzadeh & Lingard, 2021, page 14):

> *I think constant communication about updates distracts me from task at hand and makes me want to check the news. This then makes me feel on edge when I return back to my work that makes it hard to focus.*

In the review, we have examined the research on remote work from home in three areas. The first is work environment and health. The second is work–life balance, and the third is productivity in conjunction with remote work from home compared with work at the regular workplace. In practice, these three areas are not separate; rather, they are connected to one another, which increases the complexity for both analyses and for practical conclusions. Adding to the complexity is the presence not only of direct pathways from working conditions to mental well-being or stress, but indirect pathways as well. For example, working conditions are directly associated with mental well-being, but also indirectly through work–life imbalance. This complexity is also reflected in the description of remote work as having interfaces with many aspects of people's lives (Charalampous et al. 2019; Allen et al. 2015). For the discussion, as has previously been pointed out, it is important to differentiate between conditions connected specifically to the pandemic, and conditions related to remote work and work from home in 'normal' societal circumstances.

The reviewed studies were carried out in many countries, which are similar in some respects and different in others, and this complicates the interpretation of results. However, similarities and differences can also be seen as conditions for being able to develop good circumstances for remote work in the future.

The effects of different conditions for remote work should also be considered an important research area.

One similar condition in the studies is the focus on work that can largely be done via digital tools, where the equipment is similar worldwide, which also means that the micro situation is relatively similar. When it comes to the physical environment of the workplace, there may be significant differences depending on the conditions of the home for serving as a workplace, which differs both between and within countries and correlates with socioeconomic position. We have not identified any studies that empirically investigate the role of home size and floorplan for a good psychosocial work environment and opportunities to work effectively.

Further, there may be differences in culture and views of men's and women's roles and their areas of expertise in the home, which impacts the gender-related allocation of work, especially when multiple people who are working remotely live together and have children.

Different conditions at the macro level may have an impact and create conditions in the micro situation – in other words, in the concrete work at home. This includes things such as IT expertise in the population and access to fast broadband connections, where Sweden has a top position. In fresh data from an annual EU study, Nordic countries – Finland, Denmark and Sweden – take the top three places in this area (European Commission, 2021). Some workplace conditions that are particularly relevant to remote work from home may also play a role. Thus, Sweden places well above average in the EU's working life survey that is conducted every five years (28 countries in 2015), regarding fully autonomous teams (27 versus 11 percent), learning new things (91 versus 72 percent) and always or usually having an influence over decisions pertaining to one's work (53 versus 47 percent) (Eurofound, 2017). These organisational conditions of work may also contribute to Sweden's deviation from the main trends in international studies of remote work.

Overall, this review study demonstrates both clear tendencies and some dissimilarities, which are likely a consequence of the fact that the studies were conducted from different perspectives and many variables were used in the reviewed studies. In addition, as has been stated, remote work borders on many aspects of life and external societal context plays a role when comparing results from so many countries with different cultures. The study material is also small for some questions, which may contribute to the dissimilarities and render certain results somewhat uncertain. However, some results and tendencies do recur in different studies from different countries, in different societal and cultural contexts. These recurring tendencies in the three studied areas will be reviewed in the next section.

Work environment and health

Experiencing the surrounding world as predictable and relatively controllable is a powerful stress-reducer, not only in working life, but also in general. In both the reviews and in the original studies, control – which is usually referred to as autonomy in the studies – emerges as one of the most important work environment factors. However, what control entails seems to differ somewhat at the traditional primary workplace and when working remotely from home, which is related primarily to access to different resources for doing work. At the workplace, this involves management, colleagues and different specialists, as well as technical equipment and service of that equipment. When it comes to work from home, autonomy or control usually involves the opportunity to be able to decide oneself when and how to work and at what pace. Lack of control and its consequences, such as inefficiency and lower productivity, arise when access to resources declines and one's own competence for solving problems that continuously emerge is insufficient.

One interpretation of the strong impact for autonomy is that when working from home, there is a higher threshold than at the primary workplace for asking colleagues and managers for help. This condition increases the demands on autonomous action and competence. If the individual has insufficient conditions for acting autonomously, then autonomy, which is generally desirable, may have negative consequences. Viewed in relation to earlier research, the importance of autonomy is not surprising, but it seems in part to have new meaning and to play an even bigger role for remote work than for work at the regular workplace. Autonomy can thus become a work demand instead of a resource for managing work demands. This may impact the conditions for remote work in normal circumstances after the pandemic.

One relatively unequivocal and unsurprising result is that social aspects weigh heavily with work from home. In the absence of any specific initiatives, communication declines between the home-worker and colleagues and managers, and is complicated by working from home, which has consequences for productivity, work–life balance, and private life and health. The huge significance of well-functioning communication could be expected based on previous research, but is accentuated even more with remote work from home. There is a need for information as soon as possible regarding how to organise communication and what it should include in order to benefit productivity and psychosocial conditions for the individual, and to foster both short and long-term learning at work.

The experience of isolation, which is a known problem with remote work, recurs in several studies. The pandemic entailed further isolation through social distancing requirements and the general shutdown of society. In normal, non-pandemic circumstances, the latter causes of isolation will disappear. However, isolation in conjunction with remote work will continue to be a work environment issue that must be handled, albeit to a lesser extent than during the pandemic.

When it comes to workload, the results are difficult to assess and the tendencies differ. This is the case for several reasons. Many studies were conducted fairly soon after transitioning to work from home, which means the results may be coloured by the burden connected to this sudden, unplanned transition. The transition can have effects in two directions: a lower workload due to work routines and organisation not coming into place, or because some tasks cannot be carried out at home, and a higher workload, because additional work and problems arise. In a sense, workload is also connected to autonomy. One aspect of autonomy involves being able to lead oneself, which should be a means of having neither too much nor too little to do. The relationship between so-called self-leadership and productivity is a question for future research.

Work–life balance

The results related to balance and imbalance between work and private life are not unanimous, and given the distribution of the studies across countries and different societal and cultural contexts, this is not particularly surprising, as these conditions likely modify the significance of the work situation for balance between work and family/private life. For example, the importance of context was demonstrated in a recently conducted review and meta-analysis (Allen et al. 2020), which found among other things that both work–family conflict and family–work conflict were weaker in more collectivist cultures than in more individualistic ones.

Some studies point to a better balance, while others point to increased imbalance in conjunction with remote work. Two patterns seem to be particularly prominent: differences between men and women and Sweden's divergent pattern in relation to the result from most studies from other countries. Gender differences and dissimilarities in the shutdown are intertwined, in our interpretation. When considering all of the material, women tend to have a more negative and critical attitude towards remote work than men, while the opposite is the case in Sweden. The Swedish material comprises three non-scientific published survey studies, which are however on a similar level in terms of scientific quality as most of the international scientific published articles. Descriptive data are presented in detail, while the Swedish studies lack some relationship analyses beyond the relationships presented between conditions, attitudes and individual background (gender, age etc.). The Swedish studies show that during the pandemic, women generally feel positively towards remote work from home, and also more positively than men. Women with children feel more positively than women without children, which is contrary to the primary tendency in the international studies, where younger children at home are associated with mainly negative outcomes.

One interpretation of Sweden's divergent result is that it is related to the fact that child care and primary schools were not shut down during the pandemic in Sweden. Not all international articles contain information about the shutdown of schools and preschools, but our impression is that this occurred in essentially all countries where the included studies were conducted. One interviewed woman in France described the work situation during the pandemic as follows (Carillo, 2021, page 79):

> *My husband and I are in a telework situation with managerial responsibilities and our telework situation is greatly disturbed by the care of our two children under 3 years old at home. We therefore find it extremely difficult to reconcile the constraints linked to our professional life and those linked to children's expectations (meals, diapers to be changed, activities to be launched, etc.). This situation is exhausting, especially as the logistics of the house (meals, cleaning, storage, laundry) increases even more with the children at home continuously. All of this has the effect of significantly increasing our mental load, of forcing us to accept that we cannot remain focused on a task or a meeting due to the incessant demands of our children.*

The result is unsurprising: children at home require care and help in one form or another, which clashes with work demands with negative consequences for productivity, as well as work–life balance. This situation creates psychological stress and in many cases leads to attempts to compensate by working more hours, often outside of normal working hours and on weekends. The negative attitude towards remote work from home found in countries where child care and schools were shut down underscores the conclusion that remote work from home and children at home, especially younger children, are difficult to reconcile without negative consequences in multiple respects.

Many countries in the study also have less extensive child care than Sweden, which means that for many families with younger children, increased remote work from home leads to a greater burden in various respects, as people are unable to satisfactorily fulfil their professional roles or their parental roles. Child care is a factor that impacts the relationship between remote work and different outcomes and attitudes. Without functioning external child care with remote work from home, the risk of work–life imbalance increases and also has negative effects on health, especially for women.

The searches produced limited information on the importance of integration and segmentation strategies, in other words, how people with pronounced preferences for keeping work and private life separate handle an at-home situation when these two areas are competing for attention, and the boundary between them weakens or disappears. Segmentation is thought to be a more difficult strategy when all roles must be managed in the same physical space (Kossek et al. 2006). For people with strong preferences for segmentation, particular challenges include the blending of roles and clearer conflicts between work and family roles, and it is also likely to be more difficult to distance oneself from work. Earlier research has been done (see for example

Mellner et al. 2014), but it was conducted under circumstances dominated by self-selection of remote work. A knowledge gap and research need exists here with relevance to both companies and individuals.

The reviewed literature on the conflict between work–family/private life did not usually study the direction of the disruption, which is an important question in research on balance. Do the conditions of private life interrupt work, or the reverse? One meta analysis found that disruptions of the family by work were stronger than disruptions of work by the family (Allen et al. 2020), while Bhumika (2020) found that both the impact of work on private life and the impact of private life on work contributed to increased emotional exhaustion. Frize and colleagues found that men experienced the most problems with interrupted routines when working from home, while women experienced greater problems balancing work and housework/caring for children (Frize et al. 2021). This question has theoretical and practical relevance and is not pandemic-specific, but will remain a question for research after the pandemic as well.

A further distinction that was largely missing from the studies is the difference between a conflict between work and private life, and between work and family, and as a result we did not try to divide the material according to this line.

The reviewed research also largely lacked a distinction between time-based and strain-based conflicts. The former account for demands in one domain having a negative impact on performance in the other, while strain-based conflicts involve the experience of tension, worry and anxiety in one domain having a negative effect in the other. This is nothing new, but if the domains overlap much more in time and space in conjunction with remote work, then conflicts may become more frequent and change in a way that could result in the individual needing to develop new strategies.

Seen from a macro perspective, one question involves the extent to which people's spheres of life have been limited by the COVID-19 pandemic and what role this plays on the level of conflict at the micro level between work and private life/family life. The limitations – bans, social distancing and various restrictions – entail a reduction or loss of social capital, which could be expected to impact single parents more than coupled parents (Byron, 2005). Social capital in the form of support from friends and neighbours has previously been found to be even more important for single parents than for coupled parents (Freistadt & Strohschein, 2013). The pandemic may have reinforced this imbalance in the single-parent group with the consequence of increasing the difference between single parents and coupled parents. This difference can be expected to decline in normal circumstances and is indeed largely dependent on access to adequate child care.

Productivity

The majority of the studies point to increased productivity in conjunction with remote work, but the studies were carried out somewhat differently, which is an obstacle for closer comparisons. At the same time, the differences may be a strength as the outcome appears to be increased productivity, regardless of the choice of method or perspective.

Contributing factors to increased productivity are to have:

- good contact with colleagues
- a home office
- autonomy and cohesiveness
- task and relation-oriented leadership.

The large study by Felstead et al. (2021) shows that increased self-estimated productivity is primarily predicted by more hours worked at home than at the primary workplace, while reduced productivity was associated with a lack of work assignments, worse resources at home, and children requiring attention. The most problematic element for productivity is younger children being at home. In several studies, this situation is associated with lower productivity. No differences between men and women emerged in these analyses.

In studies in which gender differences were analysed, the results point in both directions. In some studies, women estimate their productivity as lower than men – and in some studies, the relationship is the opposite. These results are somewhat difficult to interpret, but direct comparisons between men and women are often troublesome, because men and women frequently work in different kinds of jobs, have different work tasks, and are at different hierarchical levels in an organisation. In recent years, working life research with comparisons between men and women point more and more to gender differences in health and sickness absence actually being related to these structural conditions, rather than gender, and reflecting different tasks and working conditions. When it comes to remote work, it may be the case that suitable and unsuitable work tasks for remote work are unevenly distributed between men and women. One study in the review investigated what tasks were most suitable for work from home and from the primary workplace, respectively (Aczel et al. 2021), but did not analyse the allocation of these tasks by gender. More information regarding the suitability and unsuitability of certain tasks for remote work is a general matter of significant interest for the future.

Research needs and knowledge gaps

VTo what future working life can researchers refer with conclusions about knowledge gaps and needs based on research before and during the pandemic? The answer is not simple. Working life and work before and during the pandemic both deviate significantly from the working life that is expected to develop after the pandemic, which one can expect to involve significantly more remote work from home and less work at the primary workplace. This remote work will also be significantly more regulated in various respects, both through collective agreements and individual agreements, than the fairly unregulated remote work that has been practiced before and during the pandemic (Swedish Agency for Work Environment Expertise, 2021). Even though experiences of remote work are varied and the positive experiences in Sweden are not found in most international studies, many conclusions indicate that so-called hybrid work will be more common in the future.

For several reasons, Sweden can be seen as an experimental country with the proper conditions for being able to draw conclusions about remote work and prerequisites for it. Important factors had been established here already before the pandemic, such as functioning child care and primary school, good broadband coverage in homes with fast computer connections, good computer habits in much of the professionally active part of the population, and previous experience of remote work from home in a comparatively high share of the population.

In conjunction with the presentation of results and comments on the different blocks, we have continuously addressed research needs and knowledge gaps. In this section, we will consider some issues again, but now with a more systematic approach, beginning with what research needs and knowledge gaps emerge in the review studies of the situation before the pandemic. We will comment on these in relation to the current state of research, which includes the studies during the pandemic. The question is whether the current state of knowledge has changed in the sense that some issues before the pandemic have gained or lost relevance, and whether new issues have arisen with relevance to working life after the pandemic. In the run-through, we reference research issues considered important by the researchers, and issues that are also important when we consider the overall picture that emerges in the two reviews. We continuously attempt to differentiate between issues that are pandemic-specific, and applicable to remote work from home in general, respectively, but that differ from work at the primary workplace.

Remote work from home differs from other work environment issues in that work from home affects many aspects of an individual's working life, but also private life (Charalampous 2019; Allen 2015). The boundaries between areas of life other than work are much thinner and more permeable in time and space than at the primary workplace. In order for the research to be practically relevant, this places particular requirements on giving consideration to the context of a research question and results even more than usual. This picture

clearly emerges from the studies during the pandemic that pertain to many aspects and include a number of different outcomes.

In their review, Charalampous and colleagues call for research on whether an individual working from home needs to develop special skills in order to be effective in the work – skills other than those needed at the primary workplace (Charalampous et al. 2019). An adjacent question is whether some personality types are more or less suited to working remotely from home. Such information is called for in several articles and this knowledge gap persists even after the review of the pandemic studies.

The review studies also contain questions about what types of tasks are more or less suitable for remote work – for example, work that demands significant concentration, as well as teamwork, and what obstacles or advantages are present when working from home. These questions were included in some studies during the pandemic and knowledge has increased, but there is still a need for research.

Emerging research questions that are related to these questions to some extent and which are now highly topical pertain to how, in future working life, to optimise the allocation of work between home and the primary workplace and how to create what are known in the debate as hybrid workplaces. Research that answers this question is weakly represented in the reviews and the research during the pandemic is usually about either work from home or at the primary workplace. Natural experiments for research have been absent. The question about the optimal combination refers not only to time, that is, the best balance of time spent working from home and at the primary workplace, and the distribution in terms of time during the week. It also involves the suitability of various tasks for work from home as well as influence in these matters. Some research indicates that the benefit of remote work decreases with the scope and points to a curve-shaped relationship, which means that beyond a certain level of remote work – usually half time – the benefits of remote work decrease (Golden & Veiga, 2005).

Charalampous et al. (2019) also ask whether remote work from home contributes to developing the social norm, or what is called "always-on culture", that is characterised by blurred boundaries between work and private life. When individuals in such environments or cultures are exposed to pressure, it can be especially difficult to say no and to shut off work. They feel that they must be available continuously, which can prevent recovery and thus become a risk for ill health. Access to a workspace with powerful computer technology at home can further contribute to the development of always-on culture. Research-based knowledge exists about this culture at ordinary workplaces, but there is still a research need and knowledge gap regarding remote work from home and the associated risks for lost relaxation and recovery. The fact that remote work is spread out and social relationships are thinned out may suppress the occurrence of shared cultures, but could simultaneously make it harder to detect always-on culture.

Kotera & Viones' (2020) review was focused on New Ways of Working, where remote work from home is part of the concept. Knowledge from NWW research may therefore be highly relevant to the future design of hybrid work. Experience of working from home during the pandemic can be considered an unplanned, large-scale introduction of a new work method. It can sometimes be difficult to determine whether the problems that emerged in the studies were a consequence of the unplanned and rapid shutdown, or whether they are more permanent in nature. Different problems likely have different latency periods, that is, the time from initiation until they manifest as problems. Ergonomically unsuitable workstations may have a very short latency period, while the impact of remote work on creativity and innovation likely has a longer delay. Knowledge in NWW research, where new work methods could be introduced in accordance with a plan, is therefore extremely interesting for preventing problems with more extensive implementation of remote work from home after the pandemic.

Our conclusion is that the complexity of remote work and the current knowledge gaps in research mean that those who will establish the new hybrid work method should focus on reconciling the individual's specific needs and wishes with the needs of the business. From this starting point, continued research should be on how to increase degrees of freedom for both the individual and for businesses. The review has provided a sample chart of conditions that are significant for promoting remote work from home and which may need to be eliminated to avoid problems. Degrees of freedom can grow through better conditions, mainly for autonomy and resources in the form of support from managers and colleagues, as well as sufficient computer technology resources and training. These are therefore areas with potential for development, if an adequate foundation of knowledge is produced.

An observation that has been made, and also a research question with implications for the future, is whether remote work from home, which until the pandemic mostly involved well-educated professionals, is now expanding, meaning that routine administrative functions will remain as remote work in employees' homes after the pandemic. A concern is that this could lead to the expansion of the group of people who are working from home (WFH) with a category of employees referred to as working homebound with reduced flexibility (WHRF) (Rebolledo et al. 2021), which suggests less autonomy. In terms of the work content, this group's work situation differs significantly from the work of professional groups that dominated remote work from home before the pandemic. One research question is the validity of earlier studies for this group and the work-environment and social consequences of a change, which means that more routine tasks will be carried out remotely.

Another question for research is the adaptation process ensuing from the transfer of work from the primary workplace to the home. Some studies with longitudinal data have analysed this process, but the studies were far too few in number, and paired with short observation times and disparate results,

they cannot serve as a basis for describing and identifying different phases of the process. A knowledge gap of clear practical and theoretical interest exists here. On the one hand, the research can be based on an individual perspective and focus on so-called job crafting, in other words, how the individual acts to change work tasks, relationships and views of their work. On the other hand, continued research could be from an operational perspective and investigate consequences from the operation's perspective. Such an approach could be to identify when in time different consequences occur.

Limitations of this review study

Mapping out causal relationships in a strict sense requires randomised controlled studies, which is impossible in the natural experiment entailed by the pandemic and its effects. The studies are therefore limited to descriptions and to analyses of relationships, in most cases of quantitative data, but in some cases also of qualitative data.

Most of the studies used so-called "convenience sampling" or the "snowball method", which means the participants likely do not comprise a representative group for the relevant population. It is reasonable to assume that in these cases, the participants were selected through certain people or groups refraining from participation, while others may have been keen to participate for various reasons. In these cases, the scope of attrition is unclear, as well as what characterises the people who declined to participate. Because the various studies cover several different groups of employees, it can still be assumed that the overarching pattern in the results is fairly representative. However, a few studies used representative, well-defined groups or weighted data based on relevant parameters, such as gender, age, education, children at home etc. These studies have been given greater weight in the analysis of the results in this report.

The studies were carried out in a large number of countries within and beyond the EU, which means that cultural factors, including gender roles, and work environment factors, working conditions, labour law and economic conditions may differ considerably and contribute to different conditions for remote work from home.

Mandatory remote work full-time for those who have not worked remotely before constitutes a very significant change, in part because work is being done from home, and in part through employees losing the opportunity to have direct contact with managers and colleagues. For people who have worked remotely before, the adjustment and change may be limited. The experiences likely differ between the different groups that participated in the studies and are represented in the articles, and also between countries. As a rule, the studies have neither tracked nor considered previous experience, which is probably one reason for the somewhat contradictory results.

The studies conducted before the pandemic differ from those conducted during the pandemic, primarily in that remote work was almost exclusively voluntarily and in agreement with the employer, with tasks that were suitable for remote work. In addition, the employee could usually choose the extent to which they wanted to work remotely. Naturally, this circumstance must be taken into consideration.

The scope of remote work also varied in the studies conducted during the pandemic and in many cases, this was not analysed in relationship to outcomes. However, some studies only included full-time remote work.

Most studies during the pandemic were carried out early in the first wave of COVID-19, and for most employees and companies, the requirement to work remotely was sudden and unexpected. There may therefore be problems that were typical in the beginning of the shift, but which may have been resolved later, though perhaps not all of them, such as workspace ergonomics at home. Early studies may have also missed problems that likely emerge later on, for example the consequences of reduced communication between employees, which could influence learning in the long run, as well as a company's long-term development.

It would have been desirable for a study to have been able to separate the effects of pandemic anxiety from the effects of the work situation itself, in other words, the conditions of mandatory work from home.

Few studies took repeated measurements later during the pandemic, but in some cases when this did happen, there was a tendency for adaptation to remote work, while long-term absence from the workplace and distance from colleagues became a greater source of stress through isolation and lack of social contacts, both in and outside of work. Before a potential transition to more extensive remote work after the pandemic, it would be beneficial to have studies of remote work with a strategy that makes it possible to distinguish effects related to the specific conditions of remote work during the pandemic from general effects of remote work.

References

Allen, T. D., French, K. A., Dumani, S., & Shockley, K. M. (2020). A cross-national meta-analytic examination of predictors and outcomes associated with work–family conflict. *Journal of Applied Psychology,* 105(6), 539.

Allen, T. D., Golden, T. D., & Shockley, K. M. (2015). How effective is telecommuting? Assessing the status of our scientific findings. *Psychological Science in the Public Interest,* 16(2), 40–68.

Allvin M., Aronsson G., Hagström T., Lundberg U. & Johansson G. (2011). *Work without boundaries. Psychological perspectives on the new working life.* Oxford: Wiley Blackwell.

Arntz, M., Yahmed, S. B., & Berlingieri, F. (2020). Working from home and covid-19: The chances and risks for gender gaps. *Intereconomics,* 55(6), 381–386.

Aronsson G (red.) (2018). Gränslöst arbete. *En forskarantologi om arbetsmiljöutmaningar i anknytning till ett gränslöst arbetsliv. [Work without boundaries. A research anthology on the work environment challenges of working life without boundaries.]* Swedish Work Environment Authority, Report 2018:1.

Ashforth, B. E., Kreiner, G. E., & Fugate, M. (2000). All in a day's work: Boundaries and micro role transitions. *Academy of Management review,* 25(3), 472–491.

Bäcklander, G., Rosengren, C., Falkman, L. L., Stenfors, C., Seddigh, A., Osika, W., & Stenström, E. (2019). Navigating the activity based working environment: Relationships of self-leadership, autonomy and information richness with cognitive stress and performance. *Scandinavian Journal of Work and Organizational Psychology,* 4(1).

Baruch, Y. (2000), Teleworking: benefits and pitfalls as perceived by professionals and managers. *New Technology, Work, and Employment,* Vol. 15 No. 1, pp. 34–49.

Bosua, R., Gloet, M., Kurnia, S., Mendoza, A., & Yong, J. (2013). Telework, productivity and wellbeing: an Australian perspective. *Telecommunications Journal of Australia,* 63.

Byron, K. (2005). A meta-analytic review of work–family conflict and its antecedents. *Journal of vocational behavior,* 67(2), 169–198.

Carillo, K., Cachat-Rosset, G., Marsan, J., Saba, T., & Klarsfeld, A. (2021). Adjusting to epidemic-induced telework: Empirical insights from teleworkers in France. *European Journal of Information Systems,* 30(1), 69–88.

Eddleston, K. A., & Mulki, J. (2017). Toward understanding remote workers' management of work–family boundaries: The complexity of workplace embeddedness. *Group & Organization Management,* 42(3), 346–387.

EU Social dialogue, 2002. https://resourcecentre.etuc.org/agreement/framework-agreement-telework

Eurofound (2017), Sixth European working conditions survey – Overview report (2017 update), Publications Office of the European Union, Luxemburg.

Eurofound (2020), Telework and ICT-based mobile work: Flexible working in the digital age, New forms of employment series, Publications Office of the European Union, Luxemburg.

European Commission. (2021) Digital Economy and Society Index (DESI) 2021, Thematic chapters.

Freistadt, J. & Strohschein, L. (2013). Family structure differences in family functioning: Interactive effects of social capital and family structure. *Journal of Family Issues,* 34(7), 952–974.

Gajendran, R. S. & Harrison, D. A. (2007). The good, the bad, and the unknown about telecommuting: meta-analysis of psychological mediators and individual consequences. *Journal of applied psychology,* 92(6), 1524.

Gajendran, R. S., Harrison, D. A. & Delaney Klinger, K. (2014). Are telecommuters remotely good citizens? Unpacking telecommuting's effects on performance via i-deals and job resources. Personnel Psychology, 68, 353–393.

Golden, T. D. & Veiga, J. F. (2005). The impact of extent of telecommuting on job satisfaction: Resolving inconsistent findings. *Journal of Management,* 31, 301–318.

Hong, Q. N., Fàbregues, S., Bartlett, G., Boardman, F., Cargo, M., Dagenais, P., ... & Pluye, P. (2018). The Mixed methods appraisal tool (MMAT) version 2018 for information professionals and researchers. Education for Information, 34(4), 285–291.

International labour organization, ILO. (2020). COVID-19: Guidance for labour statistics data collection.

Khateeb, F. R. (2021). Work life balance-a review of theories, definitions and policies. *CrossCultural Management Journal,* (1), 27–55.

Kossek, E. E., Lautsch, B. A., & Eaton, S. C. (2006). Telecommuting, control, and boundary management: Correlates of policy use and practice, job control, and work–family effectiveness. *Journal of Vocational Behavior,* 68(2), 347–367.

Kröll, C., Doebler, P., & Nüesch, S. (2017). Meta-analytic evidence of the effectiveness of stress management at work, *European Journal of Work and Organizational Psychology,* 26:5, 677-693, DOI: 10.1080/1359432X.2017.1347157

Kumar, S., Sarkar, S., & Chahar, B. (2021). A systematic review of work-life integration and role of flexible work arrangements. *International Journal of Organizational Analysis.* DOI 10.1108/IJOA-07-2021-2855

Landivar, L. C., Ruppanner, L., Scarborough, W. J., & Collins, C. (2020). Early signs indicate that covid-19 is exacerbating gender inequality in the labor force. Socius, 6, 2378023120947997.

Lott Y. The need for a gender perspective on digitalization. 5 August 2015 https://www.socialeurope.eu/need-gender-perspective-digitalization

Mellner C, Aronsson G, Kecklund G (2014). Boundary management preferences, boundary control, and work-life balance among full-time employed professionals in knowledge-intensive, flexible work. *Nordic Journal of Working Life Studies,* 4, 4, Nov 2014.

Mellner, C., Aronsson, G., & Kecklund, G. (2012). Segmentering och integrering – om mäns och kvinnors gränssättningsstrategier i högkvalificerat arbete. *[Segmentation and integration – on men's and women's boundary-setting strategies in highly skilled work.] Arbete och Hälsa [Work and Health],* 46 (4).

Milasi, S., González-Vázquez, I. & Fernández-Macías, E., (2021–21) Telework before the COVID-19 pandemic: Trends and drivers of differences across the EU. OECD Productivity Working Papers, OECD Publishing, Paris.

Swedish Agency for Work Environment Expertise, SAWEE. (2021). Kartläggning och analys av förutsättningar för arbete hemifrån under Coronapandemin. *[Description and analysis of conditions for work from home during the Coronavirus pandemic.]* Report 2021:2.

Oksanen, A., Oksa, R., Savela, N., Mantere, E., Savolainen, I., & Kaakinen, M. (2021). Covid-19 crisis and digital stressors at work: A longitudinal study on the Finnish working population. *Computers in Human Behavior,* 122, 106853.

Rebolledo, O. A., Vega, D. C., & Belmar, R. S. (2021). Learning to work while homebound – The effects of remote work on job performance during the covid-19 pandemic. *Journal of Economics, Finance and Management,* 4(6) June 2021. DOI: 10.47191/jefms/v4-i6-13

Schieman, S., Badawy, P.J., Milkie, M.A. & Bierman, A. (2021). Work-life conflict during the covid-19 pandemic. *Sociological Research for a Dynamic World.* Volume 7: 1–19.

Shea, B. J., Grimshaw, J. M., Wells, G. A., Boers, M., Andersson, N., Hamel, C., ... & Bouter, L. M. (2007). Development of AMSTAR: a measurement tool to assess the methodological quality of systematic reviews. *BMC medical research methodology,* 7(1), 1–7.

Shea, B. J., Hamel, C., Wells, G. A., Bouter, L. M., Kristjansson, E., Grimshaw, J., ... & Boers, M. (2009). AMSTAR is a reliable and valid measurement tool to assess the methodological quality of systematic reviews. *Journal of clinical epidemiology,* 62(10), 1013–1020.

Smith, V., Devane, D., Begley, C. M., & Clarke, M. (2011). Methodology in conducting a systematic review of systematic reviews of healthcare interventions. BMC medical research methodology, 11(1), 1–6.

Suh A. & Lee J. (2017) Understanding teleworkers' technostress and its influence on job satisfaction. *Internet Research.* 27(1):140–59.

Articles included in the review study of reviews 2005–2021 (Part 1 of the report)

Charalampous, M., Grant, C.A., Tramontano, C. & Michailidis, E. (2019). Systematically reviewing remote e-workers' well-being at work: a multidimensional approach, *European Journal of Work and Organizational Psychology,* 28:1, 51–73.

Ferreira, R., Pereira, R., Bianchi, I. S., & da Silva, M. M. (2021). Decision factors for remote work adoption: Advantages, disadvantages, driving Forces and challenges. *Journal of Open Innovation: Technology, Market, and Complexity,* 7(1), 70.

Kotera, Y. & Vione, K.C. (2020). Psychological impacts of the new ways of working (NWW): A systematic review. *International Journal of Environmental Research and Public Health,* 17(14), 5080.

Martin, B.H. & MacDonnell, R. (2012). Is telework effective for organizations? A meta-analysis of empirical research on perceptions of telework and organizational outcomes. Management Research Review, Vol. 35 No. 7, 603–615.

Oakman, J., Kinsman, N., Stuckey, R., Graham, M. & Weale, V. (2020). A rapid review of mental and physical health effects of working at home: how do we optimise health? BMC Public Health (2020) 20:1825.

Original studies from 2020–2021 included in the review study (Part 2 of the report)

Aczel, B., Kovacs, M., van der Lippe, T., & Szaszi, B. (2021). Researchers working from home: Benefits and challenges. *PLoS ONE,* 16(3 March). doi:10.1371/journal.pone.0249127

Awada, M., Lucas, G., Becerik-Gerber, B., & Roll, S. (2021). Working from home during the covid-19 pandemic: Impact on office worker productivity and work experience. *Work-a Journal of Prevention Assessment & Rehabilitation,* 69(4), 1171–1189. doi:10.3233/wor-210301

Bartsch, S., Weber, E., Büttgen, M., & Huber, A. (2021). Leadership matters in crisis-induced digital transformation: How to lead service employees effectively during the covid-19 pandemic. *Journal of Service Management,* 32(1), 71–85.

Bhumika, B. (2020). Challenges for work–life balance during covid-19 induced nationwide lockdown: exploring gender difference in emotional exhaustion in the Indian setting. *Gender in Management,* 35(7–8), 705–718.

Carvalho, V.S., Santos, A., Ribeiro, M.T., & Chambel, M.J. Please, Do not interrupt me: Work–family balance and segmentation behavior as mediators of boundary violations and teleworkers' burnout and flourishing. *Sustainability,* 2021, 13, 7339.

Cernas-Ortiz, D. A., & Wai-Kwan, L. (2021). Social connectedness and job satisfaction in Mexican teleworkers during the pandemic: The mediating role of affective well-being. *Estudios Gerenciales,* 37(158), 37–48.

Cuerdo-Vilches, T., Navas-Martín, M. Á., March, S., & Oteiza, I. (2021). Adequacy of telework spaces in homes during the lockdown in Madrid, according to socioeconomic factors and home features. *Sustainable Cities and Society,* 75, 103262.

Cui, R., Ding, H., Zhu, F. (2020) Gender inequality in research productivity during the covid-19 pandemic. Accessed June 2020 from: https://en.wikipedia.org/wiki/Social_Science_Research_Network.

Danker, T.N., Yap, H.L., Zalzuli, A.D., Ho, H.F., & Ang, J. (2021) Surviving work from home: Observations from Singapore. *Journal of Police and Criminal Psychology,* 1-16.

Ervasti, J., Aalto, V., Pentti, J., Oksanen, T., Kivimäki, M., & Vahtera, J. Association of changes in work due to covid-19 pandemic with psychosocial work environment and employee health: a cohort study of 24 299 Finnish public sector employees. Occup Environ Med: first published as 10.1136/oemed-2021-107745 on 14 September 2021.

Escudero-Castillo, I., Mato-Díaz, F. J., & Rodriguez-Alvarez, A. (2021). Furloughs, teleworking and other work situations during the covid-19 lockdown: Impact on mental well-being. *International Journal of Environmental Research and Public Health,* 18(6), 1–16.

Farooq, R., & Sultana, A. (2021). The potential impact of the covid-19 pandemic on work from home and employee productivity. *Measuring Business Excellence.* DOI 10.1108/MBE-12-2020-0173

Felstead, A., & Reuschke, D. (2021). A flash in the pan or a permanent change? The growth of homeworking during the pandemic and its effect on employee productivity in the UK. *Information Technology and People.* https://doi.org/10.1108/ITP-11-2020-0758

Feng, Z., & Savani, K. (2020). Covid-19 created a gender gap in perceived work productivity and job satisfaction: implications for dual-career parents working from home. *Gender in Management,* 35(7–8), 719–736.

Frize, M., Lhotska, L., Marcu, L. G., Stoeva, M., Barabino, G., Ibrahim, F., . . . Bezak, E. (2021). The impact of covid-19 pandemic on gender-related work from home in STEM fields—Report of the WiMPBME Task Group. *Gender, Work and Organization,* 28(Suppl 2), 378–396. doi:10.1111/gwao.12690

Gabr, H. M., Soliman, S. S., Allam, H. K., & Raouf, S. Y. A. (2021). Effects of remote virtual work environment during COVID-19 pandemic on technostress among Menoufia University Staff, Egypt: a cross-sectional study. *Environmental Science and Pollution Research.* doi:10.1007/s11356-021-14588-w

Galanti, T., Guidetti, G., Mazzei, E., Zappalà, S., & Toscano, F. (2021). Work from home during the covid-19 outbreak: The impact on employees' remote work productivity, engagement, and stress. *Journal of Occupational and Environmental Medicine,* 63(7), e426–e432.

Garcia-Contreras, R., Munoz-Chavez, P., Valle-Cruz, D., Ruvalcaba-Gomez, E. A., & Becerra-Santiago, J. A. (2021). Teleworking in times of covid-19. Some lessons for the public sector from the emergent implementation during the pandemic period: Teleworking in times of covid-19 C3 - ACM International Conference Proceeding Series. 376–385.

George, T. J., Atwater, L. E., Maneethai, D., & Madera, J. M. (2021). Supporting the productivity and wellbeing of remote workers: Lessons from covid-19.*Organizational Dynamics.* doi:10.1016/j.orgdyn.2021.100869

Ghislieri, C., Molino, M., Dolce, V., Sanseverino, D., & Presutti, M. (2021). Work-family conflict during the covid-19 pandemic: Teleworking of administrative and technical staff in health-care. An Italian study. *La Medicina del lavoro,* 112(3), 229–240.

Gibbs, B., Kline, C. E., Huber, K. A., Paley, J. L., & Perera, S. (2021). Covid-19 shelter-at-home and work, lifestyle and well-being in desk workers. Occupational medicine (Oxford, England), 71(2), 86–94.

Ipsen, C., van Veldhoven, M., Kirchner, K., & Hansen, J. P. (2021). Six key advantages and disadvantages of working from home in Europe during covid-19. International Journal of *Environmental Research and Public Health,* 18(4), 1–19.

Irawanto, D. W., Novianti, K. R., & Roz, K. (2021). Work from home: Measuring satisfaction between work–life balance and work stress during the covid-19 pandemic in Indonesia. *Economies,* 9(3).

Jimenez-Gomez, C., Sawhney, G., & Albert, K. M. (2021). Impact of covid-19 on the applied behavior analysis workforce: Comparison across remote and nonremote workers. *Behavior Analysis in Practice,* 14(4), 873-882.

Karácsony, P. (2021). Impact of teleworking on job satisfaction among Slovakian employees in the era of COVID-19. *Problems and Perspectives in Management,* 19(3), 1.

Kirchner, K., Ipsen, C., & Hansen, J. P. (2021). Covid-19 leadership challenges in knowledge work. Knowledge Management Research and Practice. *Journal of International Women's Studies,* 22(6), 138–149.

Koekemoer, L., de Beer, L. T., Govender, K., & Brouwers, M. (2021). Leadership behaviour, team effectiveness, technological flexibility, work engagement and performance during covid-19 lockdown: An exploratory study. SA *Journal of Industrial Psychology,* 47.

Lonska, J., Mietule, I., Litavniece, L., Arbidane, I., Vanadzins, I., Matisane, L., & Paegle, L. (2021). Work-life balance of the employed population during the emergency situation of covid-19 in Latvia. *Frontiers in Psychology,* 12

Mihalca, L., Irimiaş, T., & Brendea, G. (2021). Teleworking during the covid-19 pandemic: Determining factors of perceived work productivity, job performance, and satisfaction. *Amfiteatru Economic,* 23(58), 620–636.

Mihalca, L., Rațiu, L., Brendea, G., Metz, D., Dragan, M., & Dobre, F. (2021 (b)). Exhaustion while teleworking during covid-19: A moderated-mediation model of role clarity, self-efficacy, and task interdependence. *Oeconomia Copernicana,* 12(2), 269–298. doi:10.24136/OC.2021.010.

Miron, D., Petcu, M. A., David-Sobolevschi, M. I., & Cojocariu, R. C. (2021). A muldimensional approach of the relationship between teleworking and employees well-being – Romania during the pandemic generated by the Sars-Cov-2 virus. *Amfiteatru Economic,* 23(58), 586–600.

Mostafa, B.A. (2021). The effect of remote working on employees wellbeing and work-life integration during pandemic in Egypt. *International Business Research,* 14(3).

Oksanen, A., Oksa, R., Savela, N., Mantere, E., Savolainen, I., & Kaakinen, M. (2021). Covid-19 crisis and digital stressors at work: A longitudinal study on the Finnish working population. *Computers in Human Behavior* 122, 106853.

Otonkorpi-Lehtoranta, K., Salin, M., Hakovirta, M., & Kaittila, A. (2021). Gendering boundary work: Experiences of work–family practices among Finnish working parents during covid-19 lockdown. *Gender, Work & Organization* DOI: 10.1111/gwao.1277

Pirzadeh, P., & Lingard, H. (2021). Working from home during the covid-19 pandemic: Health and well-being of project-based construction workers. *Journal of Construction Engineering and Management,* 147(6).

Raišiene, A. G., Rapuano, V., Varkulevičiute, K., & Stachová, K. (2020). Working from home – Who is happy? A survey of Lithuania's employees during the covid-19 quarantine period. *Sustainability* (Switzerland), 12 (13).

Russo, D., Hanel, P. H. P., Altnickel, S., & van Berkel, N. (2021). Predictors of well-being and productivity among software professionals during the covid-19 pandemic – a longitudinal study. *Empirical Software Engineering,* 26(4).

Sandoval-Reyes, J., Idrovo-Carlier, S., & Duque-Oliva, E. J. (2021). Remote Work, Work Stress, and Work–Life during Pandemic Times: A Latin America Situation. International Journal of *Environmental Research and Public Health,* 18(13), 7069.

Schieman, S., Badawy, P. J., A. Milkie, M., & Bierman, A. (2021). Work-life conflict during the COVID-19 pandemic. Socius, 7, 2378023120982856.

Schmitt, J. B., Breuer, J., & Wulf, T. (2021). From cognitive overload to digital detox: Psychological implications of telework during the covid-19 pandemic. *Computers in Human Behavior,* 124. doi:10.1016/j.chb.2021.106899

Seiz, M. (2021). Equality in confinement: Nonnormative divisions of labor in Spanish dual-earner families during the covid-19 lockdown. *Feminist Economics,* 27(1–2), 345–361.

Shimura, A., Yokoi, K., Ishibashi, Y., Akatsuka, Y., & Inoue, T. (2021). Remote work decreases psychological and physical stress responses, but full-remote work increases presenteeism. *Frontiers in Psychology,* 4190.

Staniscuaski F., Kmetzsch L., Soletti R.C., Reichert F., Zandonà E., Ludwig Z.M.C., Lima E.F., Neumann A., Schwartz I.V.D., Mello-Carpes P.B., Tamajusuku A.S.K., Werneck F.P., Ricachenevsky F.K., Infanger C., Seixas A., Staats C.C. & de Oliveira L. (2021). Gender, race and parenthood impact academic productivity during the covid-19 pandemic: From survey to action. *Frontiers in Psychology,* 12 doi: 10.3389/fpsyg.2021.663252

Sutarto, A. P., Wardaningsih, S., & Putri, W. H. (2021). Work from home: Indonesian

employees mental well-being and productivity during the covid-19 pandemic. *International Journalof Workplace Health Management,* 14(4), 386–408 doi:10.1108/IJWHM-08-2020-0152

Syrek, C., Kühnel, J., Vahle-Hinz, T., & de Bloom, J. (2021). Being an accountant, cook, entertainer and teacher—all at the same time: Changes in employees' work and work-related well-being during the coronavirus (COVID-19) pandemic. *International Journal of Psychology.*

van Zoonen, W., Sivunen, A., Blomqvist, K., Olsson, T., Ropponen, A., Henttonen, K., & Vartiainen, M. (2021 (a)). Understanding stressor–strain relationships during the COVID-19 pandemic: the role of social support, adjustment to remote work, and work–life conflict. *Journal of Management & Organization,* 1–22. doi:10.1017/jmo.2021.50

van Zoonen, W., Sivunen, A., Blomqvist, K., Olsson, T., Ropponen, A., Henttonen, K., & Vartiainen, M. (2021 (b)). Factors influencing adjustment to remote work: Employees' initial responses to the covid-19 pandemic. *International Journal of Environmental Research and Public Health,* 18(13), 6966.

Wood, S. J., Michaelides, G., Inceoglu, I., Hurren, E. T., Daniels, K., & Niven, K. (2021). Homeworking, well-being and the Covid-19 pandemic: A diary study. *International Journal of Environmental Research and Public Health,* 18(14), 7575.

Xiao, Y., Becerik-Gerber, B., Lucas, G., & Roll, S. C. (2021). Impacts of working from home during covid-19 pandemic on physical and mental well-being of office workstation users. *Journal of Occupational and Environmental Medicine,* 63(3), 181–190.

Yerkes, M. A., Andre, S. C. H., Besamusca, J. W., Kruyen, P. M., Remery, C., van der Zwan, R., Beckers, D. G. J., Geurts, S. A. E. (2020). 'Intelligent' lockdown, intelligent effects? Results from a survey on gender (in)equality in paid work, the division of childcare and household work, and quality of life among parents in the Netherlands during the covid-19 lockdown. PLoS ONE, 15(11).

Grey literature

AKAVIA & Rydell B (2021) Kontoret efter pandemin – så ser Akavias medlemmar på framtidens arbetsplats, 2021 juni. *[The office after the pandemic – How Akavia members view tomorrow's workplace, June 2021]* https://docplayer.se/220356069-Kontoret-efter-pandemin.html

AKAVIA & Rydell B (2021) Flexibla arbetslivet – en kvinnofälla – så ser Akavias medlemmar på det nya arbetslivet, stress och hushållsarbete *[Flexible working life – a trap for women – how Akavia members view the new working life, stress and housework]* https://www.akavia.se/siteassets/01-gemensamt/trycksaker-och-broschyrer/flexibla-arbetslivet---en-kvinno-falla.pdf

Eurofound (2021), Living, working and COVID-19 (Update April 2021): Mental health and trust decline across EU as pandemic enters another year, Publications Office of the European Union, Luxembourg. https://www.eurofound.europa.eu/publications/report/2021/living-working-and-covid-19-update-april-2021-mental-health-and-trust-decline-across-eu-as-pandemic

Forsell Å & TCO. (2021) Livspusslet under coronapandemin. *[The puzzle of life during the coronavirus pandemic]* Reports, TCO. https://www.tco.se/rapporter-och-remissvar/rapporter/2021/livspusslet-under-coronapandemin/

ST (2020) "Jobba hemifrån – är distansarbete här för att stanna?" *[Work from home – is remote work here to stay?]* https://st.org/jobba-hemifran-ar-distansarbete-har-att-stanna

Appendix 1

Summaries of all original studies on remote work and work environment and health, work–life balance and productivity

Author, year MMAT (1–5)	Purpose, participants, attrition, time period	Method, outcome measurements, background data	Result, comments Studied sub-area: • work environment and health – WH • work–life balance – Balance • productivity – Prod.
Aczel, Kovacs, van der Lippe & Szaszi (2021) **MMAT = 3**	**Purpose:** To study working conditions before and during the pandemic (lockdown) **Participants:** 704 academics (51% women) in Hungary ("convenience sampling") recruited through advertisements and email (via the Qualtrics Mailer service) **Attrition rate:** 18% of those who first offered to participate **Time:** 24 April–13 July 2020	**Method:** Survey (questionnaire via letter) on working conditions and work–life balance before (retrospectively) and during the pandemic **Outcome measurements:** Work efficiency, work–life balance **Background data:** Gender, academic position	**Result:** The majority felt that working from home could be combined with the rest of life, but participants with young children experienced greater disadvantages when working from home compared with working at the primary workplace. Some work tasks could be better carried out at the workplace, such as sharing thoughts with colleagues, keeping in touch with their team, and collecting data, while others could be better carried out at home, such as working on their manuscript, reading the literature and analysing their data. - 66% wanted to work more from home than they did before the pandemic. - 94% of participants worked more from home during the pandemic compared with before. - 47% viewed their work from home as less effective than working at the primary workplace. - 23% viewed their work from home as more effective than working at the primary workplace. - 30% felt there was no difference in effectiveness. **Comments:** A fairly large sample, but limited to academics and not a random sample. No specific analyses based on gender **WH, Balance, Prod.**
Awada, Lucas, Becerik-Gerber & Roll (2021) **MMAT = 2**	**Purpose:** To study how factors with remote work from home affect productivity and time in front of the computer (the workstation) **Participants:** 988 (64% women) employees in the US, recruited via email and social media. The majority had an academic degree and a relatively high income. **Attrition rate:** 30% incomplete responses **Time:** 27 April–11 June 2020	**Method:** Online survey Outcome measurements: Self-estimated productivity, time at the computer, before (retroactively) and during the pandemic **Background data:** Gender, age, education, income	**Result:** Productivity was generally considered the same as when working at the primary workplace, but was higher for those who had good contact with colleagues and their own workstation at home. Women and high earners reported higher productivity with remote work from home. Time spent at the computer increased an average of 1.5 hours per day with work from home. **Comments:** Unclear who chose to participate. Relatively large attrition rate among respondents. **Prod.**
Bartsch, Weber, Büttgen & Huber (2021) **MMAT = 2**	**Purpose:** To study how effectiveness in leadership impacts employees' work performance in a virtual work environment **Participants:** 206 (72% women) people employed in media, the insurance industry, consultation and education in Germany **Attrition rate:** Not stated **Time:** April–May 2020	**Method:** Online survey Outcome measurements: Individual work performance, job autonomy, work tension, team cohesiveness **Background data:** gender, age, children at home	**Result:** Enabling and managing leadership behaviour was required for employees to be able to maintain their work performance while remote working during COVID-19, but no relationship was found between performance and experiencing work tension. Mediating positive factors were individual job autonomy and team cohesiveness. **Comments:** "Remote work in a virtual environment" is indicated, but this appears to apply primarily to remote work from home. It is unclear who chose not to respond to the survey. The study was controlled for gender and age, but no analysis was conducted of how children at home affect productivity. **Prod.**

Author, year MMAT (1–5)	Purpose, participants, attrition, time period	Method, outcome measurements, background data	Result, comments Studied sub-area: • work environment and health – WH • work–life balance – Balance • productivity – Prod.
Bhumika (2020) **MMAT = 3**	**Purpose:** To analyse whether work from home improves or detracts from job satisfaction and work–life balance. **Participants:** 180 full-time employees (52% men) in northern India. The sample is based on the lead author's professional contacts. All worked from home during the COVID-19 pandemic (lockdown). Assorted occupational groups (IT, education, finance, auto industry). Most (78%) worked in the private sector. Aged between 25–35, and more than half had at least three family members in their home. **Attrition rate:** 7% **Time:** 10–20 April 2020	**Method:** Online survey (questionnaire) **Outcome measurements:** Work–life balance, job satisfaction, emotional exhaustion, participative leadership **Background data:** Age, gender, personality traits, skills, employment properties and job characteristics	**Result:** Most felt more exhausted when working from home compared with at the primary workplace, but the relationship was strongest for women, because the work interfered with their personal life to a greater extent than for men. The interference of work with personal life and of personal life with work both contributed to increased emotional exhaustion. Participative leadership contributed to reduced exhaustion when working from home, because the work had less of an impact on personal life. **Comments:** The comparison between work at the primary workplace and from home was conducted retrospectively. Fairly unique sample of professionals in India. **WH, Balance**
Carvalho, Santos, Ribeiro & Chambel (2021) **MMAT = 2**	**Purpose:** To study how blurred boundaries and work and family balance affect teleworkers' stress and well-being among men and women. **Participants:** 456 people in the consultation and health sector who worked remotely full-time during the pandemic in Portugal (73% women). 53% were married/cohabitating and 50% had children at home. Employees who worked remotely at companies were invited to participate in the study. **Attrition rate:** 41% of those contacted. **Time:** Unclear, but pertains to the first lockdown (2020) during the pandemic.	**Method:** Online survey **Outcome measurements:** Work–family balance, burnout, flourishing. **Background data:** Gender, children, marital status, job sector.	**Result:** Remote workers whose different roles (work, family) disrupted one another the most had the worst work–family balance, which is related to higher burnout and less flourishing. This affected women more than men. **Comments:** Primarily about whether work and family interact and disrupt/affect one another and work–family balance. **WH + Balance**
Cernas-Ortiz & Wai-Kwan (2021) **MMAT = 2**	**Purpose:** To study relationships between social connectedness outside of work and job satisfaction among remote workers in Mexico. **Participants:** 214 Mexican employees (65% women) who worked from home during the pandemic (snowball sampling). Most were in the education sector or administration. **Attrition rate:** 15% **Time:** 15 May–30 June 2020	**Method:** Online survey and interviews **Outcome measurements:** Social connectedness, job satisfaction, well-being **Background data:** Gender, full-time/part-time, married/unmarried/job area (education, administration, technology)	**Result:** A positive relationship between social connectedness outside of work and job satisfaction, mediated by positive well-being **Comments:** Well-established instrument seems to have been used, but the representativeness of the sample is unclear. The sample is based on surveys and acquaintances of acquaintances. The study analyses the effects of social connectedness rather than of remote work itself. No analyses of gender differences. **WH**

Author, year MMAT (1–5)	Purpose, participants, attrition, time period	Method, outcome measurements, background data	Result, comments Studied sub-area: • work environment and health – WH • work–life balance – Balance • productivity – Prod.
Cuerdo-Vilches, Navas-Martín, March & Oteiza (2021) **MMAT = 2**	**Purpose:** To investigate how remote workers experience their home workstation in terms of adequate space. **Participants:** 256 people (68% women) in Spain (Madrid) who worked remotely from home were recruited via email, websites and social media. **Attrition rate:** Unclear, because it is not clear how many people the invitation to participate reached. **Time:** "During lockdown 2020"	**Method:** Online survey **Outcome measurements:** Work environment at home (scale 1–5). **Background data:** Gender, age, income, profession	**Result:** One third of participants felt their home workstation was inadequate, which was related to space, dedicated workspace, furnishings, access to digital tools and the number of people in the home. Only 27% of participants had a dedicated place for remote work. **Comments:** The study focuses on the physical conditions of working from home in Madrid. Unclear how selective the material is. The results were controlled for gender and income. **WH**
Cui, Ding, Zhu (2020) **MMAT = 4**	**Purpose:** To investigate how academics' research productivity was impacted by remote work from home during the pandemic. **Material:** Search of the Social Science Research Network (SSRN). The material included a total of 41,858 research articles in 18 subject areas, produced by 76,832 authors in 25 countries (the majority from the US) over two years. **Attrition rate:** Not relevant. **Time:** Dec. 2018–May 2019, Dec. 2019–May 2020	**Method:** Comparison of productivity among female and male researchers before and during the pandemic. **Outcome measurements:** Number of articles produced over time among female and male researchers. **Background data:** Gender, position, country	**Result:** The difference between female and male researchers' productivity increased during the pandemic, to the disadvantage of women. The same trend applied for 21 of the 25 countries included in the study. **Comments:** The difference between women and men is thought to be because women take more responsibility for the home and children in conjunction with remote work from home. Schools were closed in most countries during the pandemic. **Prod.**
Danker, Yap, Zalzuli, Ho & Ang (2021) **MMAT = 2**	**Purpose:** To study the effects of long-term remote work among police employees in Singapore. **Participants:** In total, 2,024 people participated on four occasions, approximately 58% were men. **Attrition rate:** Unclear, because the responses were anonymous. **Time:** After 7 April 2020, when all who could were instructed to work from home due to the pandemic, four data collections were conducted. Unclear over how much time.	**Method:** Online survey with anonymous responses. **Outcome measurements:** Perceived productivity, well-being, satisfaction with telecommuting, stress, separation of work and personal life. **Background data:** Gender, department, caregiving tasks at home (children, elderly, sick).	**Result:** Satisfaction with remote work did not change over time, but people with caregiving functions at home were less satisfied with remote work, more stressed and less productive than those without caregiving functions. Men without caregiving tasks were less productive and less satisfied with remote work compared with women without caregiving tasks. Women generally worked more hours than men. **Comments:** Because the responses were anonymous on each occasion, it is unclear how many chose to refrain from the survey and to what extent the same people responded on the four occasions. **Balance, Prod.**

Author, year MMAT (1–5)	Purpose, participants, attrition, time period	Method, outcome measurements, background data	Result, comments Studied sub-area: • work environment and health – WH • work–life balance – Balance • productivity – Prod.
Ervasti, Aalto, Pentti, Oksanen, Kivimäki & Vahtera (2021) **MMAT = 4**	**Purpose:** To study relationships with pandemic-related changes to the work situation, the experience of the psychosocial work environment and effects on employees' health. **Participants:** 24,299 public employees in Finland, of which 44% were working remotely (75% women) from home. **Attrition rate:** Approximately 28% **Time:** 2018 and 2020 (September)	**Method:** Online survey before and during the pandemic **Outcome measurements:** Job strain: high demand–low control, distress, self-estimated health. **Background data:** Gender, age, occupation, socioeconomic status, lifestyle	**Result:** Working from home was connected to a greater increase in worktime control and better health (less distress according to the GHQ) compared with working at the primary workplace. The experience of the psychosocial work environment became more positive in conjunction with remote work during the pandemic and health was impacted less negatively than when working at the primary workplace. **Comments:** An extensive study with different groups of public employees who were studied both before and during the pandemic. No analysis of gender differences **WH**
Escudero-Castillo, Mato-Díaz & Rodriguez-Alvarez (2021) **MMAT = 4**	**Purpose:** To analyse the effects of lockdown on psychological well-being in Spain in conjunction with the COVID-19 pandemic. **Participants:** 1,050 people who are considered representative of employees in Spain (59% women) **Attrition rate:** Compensated through weighting **Time:** 11 April–7 May 2020	**Method:** GHQ questionnaire online **Outcome measurements:** Perceived well-being **Background data:** Gender, age, education, income, married/unmarried	**Result:** Lockdown led to a significant decrease in well-being among people who were unemployed and furloughed, compared with those who were employed. People who worked remotely experienced reduced well-being during lockdown compared with those who were still working at the primary workplace, but not by as much as those who were furloughed and unemployed. Women experienced more negative effects than men. **Comments:** Participants include remote workers, unemployed people and people who were furloughed. A comprehensive and well-selected sample. The focus is on the consequences of being furloughed and unemployment rather than on remote work. **WH**
Farooq & Sultana (2021) **MMAT = 3**	**Purpose:** To study the relationship between remote work from home and employee productivity, as well as whether gender has significance for this relationship. **Participants:** 250 people (57% women) from hospitals, banks and IT companies in India working from home during the pandemic. **Attrition rate:** 17% **Time:** "During the pandemic"	**Method:** Online survey **Outcome measurements:** Productivity, which was measured with a scale that was tested in previous studies. A pilot study indicates high reliability (0.92). **Background data:** Age, gender, children at home, married/unmarried	**Result:** Working from home had a negative effect on productivity after controlling for background variables. The effects were greater for women than for men, which is thought to be because women take greater responsibility for unpaid tasks at home. **Comments:** Unclear whether they were forced, urged, or voluntarily chose to work from home during the pandemic. **Prod.**

Author, year MMAT (1–5)	Purpose, participants, attrition, time period	Method, outcome measurements, background data	Result, comments Studied sub-area: • work environment and health – WH • work–life balance – Balance • productivity – Prod.
Felstead & Reuschke (2021) **MMAT = 4**	**Purpose:** To study the scope of work from home during the pandemic and its effects on self-reported productivity in England. **Participants:** Employees from three previous surveys constituting a nationally representative sample in 2009–2019 (over 40,000 participants), and a special group of 2,500 people who were studied each week during the pandemic, beginning in March 2020. An additional group, from the first group of 40,000 people, was studied before and during the pandemic. **Attrition rate:** Approximately 30% of the special group, which was compensated for through weighting, and a total of approximately 70% of the total material. **Time:** April–November 2020 (each month)	**Method:** Online survey and interviews **Outcome measurements:** Self-estimated productivity and the scope of work at home **Background data:** Gender, age, occupation, income, children at home	**Result:** - 40.9% of the employees say they are as productive in June 2020 as six months earlier. - 28.9% say they are more productive. - 30.2% say they are less productive. In September, 15.2% say they are less productive. The reason for reduced productivity was said to be a lack of tasks, children requiring attention, and worse resources for work at home. Those who are more productive say they work more hours from home than at the primary workplace. The presence of children at home has a negative effect on productivity for both women and men. **Comments:** This is probably the most comprehensive and well-done study on productivity, with measurements both before the pandemic and repeated measurements during the pandemic, where the quantity working from home varies (30–50% at the highest). Gender distribution is not given, but should be fairly even because the participants were chosen randomly. **Prod.**
Feng & Savani (2020) **MMAT = 3**	**Purpose:** To study gender differences in productivity in conjunction with remote work from home. **Participants:** 286 people in the US whose partners were also full-time employees and working from home during the pandemic. Assorted occupations **Attrition rate:** 5% **Time:** 15 April–4 May 2020	**Method:** Online survey **Outcome measurements:** Self-estimated productivity and job satisfaction before (retrospectively) and during the pandemic. **Background data:** Gender, age, education, occupation, position, children at home	**Result:** Before the pandemic, there were no gender differences in self-estimated productivity, but during the pandemic, women reported significantly lower productivity and worse job satisfaction. Control for children at home. **Comments:** A well-done study with relatively few participants, but a low attrition rate. Unclear who chose not to participate. **Prod.**
Frize, Lhotska, Marcu, Stoeva, Barabino, Ibrahim, Lim. Kaldoudi, Marques da Silva, Ha Tan, Tsapaki, & Bezak (2021). **MMAT = 3**	**Purpose:** To investigate how academics in biomedicine were affected by working from home during the pandemic. **Participants:** 921 people (63% women) from 73 different countries (majority high-income countries). **Attrition rate:** Unclear how large the share of those who were invited to participate chose to respond. **Time:** Late August 2020.	**Method:** Online survey **Outcome measurements:** Time spent on unpaid work at home. **Background data:** Gender, age, children at home, married or living with a partner	**Result:** Men take more responsibility for children and household work than they did 20–30 years ago, but not as much as women, which is believed to have negative effects on women's career opportunities. For men, the greatest challenges of working from home were disrupted routines, handling an increased workload, not being able to contribute to taking care of the children, focusing on work and not on the household, and social isolation. Women experienced more problems than men with balancing work and household work/caring for children. **Comments:** Comprehensive material from different countries, but unclear who chose to respond. A specific professional group. **Balance**

Author, year MMAT (1–5)	Purpose, participants, attrition, time period	Method, outcome measurements, background data	Result, comments Studied sub-area: • work environment and health – WH • work–life balance – Balance • productivity – Prod.
Gabr, Soliman, Allam & Raouf (2021) **MMAT = 2**	**Purpose:** To study technostress among university employees in Egypt in conjunction with remote work. **Participants:** 142 people (53% men). Unclear how recruitment was carried out. **Attrition rate:** Unclear **Time:** Unclear, but during the pandemic in 2020.	**Method:** Questionnaire and blood sample. **Outcome measurements:** Technostress, blood cortisol. **Background data:** Age, gender, study focus, home, education	**Result:** Overload was more common among women than among men, and among those with worse WiFi connections. More technostress among older people. Blood cortisol levels were higher among those who experienced technostress and overload. **Comments:** Unclear whether they worked from home or from other places. Includes university employees, including teachers. **WH**
Galanti, Guidetti, Mazzei, Zappalà & Toscano (2021) **MMAT = 2**	**Purpose:** To study the effects of remote work from home on family–work conflict, social isolation, autonomy, well-being etc. **Participants:** 209 (71% women) employees at private and public organizations in Italy. Unclear how the sample was chosen. **Attrition rate:** Unclear **Time:** May–July 2020.	**Method:** Online survey **Outcome measurements:** Family–work conflict, social isolation, distracting environment, job autonomy, self-leadership, productivity, work engagement, experienced stress. **Background information:** Gender, age, children	**Result:** Family–work conflict and social isolation in conjunction with remote work from home increased stress and reduced productivity and work engagement. **Comments:** Unclear who participated and how large the attrition rate was. No analysis of gender differences. The results were controlled for children at home, but no analyses of the effects of children at home were conducted. Schools and preschools were closed. **WH, Prod.**
Garcia-Contreras, Munoz-Chavez, Valle-Cruz, Ruvalcaba-Gomez & Becerra -Santiago (2021) **MMAT = 3**	**Purpose:** To study the effects of remote work on public employees in Mexico. **Participants:** 971 (52% women). **Attrition rate:** Unclear **Time:** Unclear, but during the pandemic in 2020.	**Method:** Online survey **Outcome measurements:** Job satisfaction, organizational commitment, burnout and productivity. **Background data:** Gender, education, type of work	**Result:** A large share of employees were dissatisfied with working remotely, because they had to exert themselves more to be productive. However, most were committed to the organisation through the trust the organisation showed with regard to freedom and flexibility of working hours and work responsibility. Symptoms of burnout decreased through the experience of a reduced risk of being infected with COVID-19 while working remotely from home, and of being able to retain employment. **Comments:** Fairly large group that is thought to be a representative group of public employees. No analysis of gender differences **WH, Prod.**
George, Atwater, Maneethai & Madera (2021) **MMAT = 2**	**Purpose:** To investigate whether remote work was experienced as positive or negative. **Participants:** 278 employees (45% women) in the US who worked at least half time from home, most 90–100%, during the COVID-19 pandemic. Recruited via survey service Amazon Mechanical Turk. **Attrition rate:** Unclear **Time:** June–July 2020.	**Method:** Online survey **Outcome measurements:** Responsibilities, working hours, accountability and demands, work intensity. **Background data:** Gender, age, education, ethnicity	**Result:** Most experienced no difference in working hours or demands and the majority were positive about remote work and could imagine continuing after the pandemic. However, there were significant individual differences in the experience. Most employees felt that remote work had a positive effect on productivity and creativity, but remote work also entailed a reduced sense of meaning and interest in life. **Comments:** Unclear which groups of employees chose to participate. Large variation in education and age. No analysis of gender differences **WH, Prod.**

Author, year MMAT (1–5)	Purpose, participants, attrition, time period	Method, outcome measurements, background data	Result, comments Studied sub-area: • work environment and health – WH • work–life balance – Balance • productivity – Prod.
Ghislieri, Molino, Dolce, Sanseverino & Presutti (2021) **MMAT = 2**	**Purpose:** To study the relationship between remote work from home during COVID-19 and cognitive demands and recovery. **Participants:** 211 people (76% women) with technical and administrative tasks at a hospital in Italy. **Attrition rate:** 42%. **Time:** 15–30 April 2020	**Method:** Online survey **Outcome measurements:** Stress, cognitive demands (information processing, decision-making and problem solving), work–family conflict and recovery. **Background data:** Gender, age, children, position, working hours	**Result:** Conflict between work and family was connected to stress, cognitive demands and worse recovery. No gender differences in the degree of conflict, but parents experienced more conflict than those without children. Women experienced greater cognitive demands than men. **Comments:** A special occupational category and high attrition rate. Schools and preschools were closed. **Balance**
Gibbs, Kline, Huber, Paley, & Perera (2021) **MMAT = 4**	**Purpose:** To study the long-term effects of work from home on work practices, lifestyle and well-being during the COVID-19 pandemic. **Participants:** 112 (69% women) office workers in the US. **Attrition rate:** 16% **Time:** There were already baseline data from January 2018. Follow-up was conducted May–June 2020.	**Method:** Online survey **Outcome measurements:** Lifestyle including physical activity and being sedentary, as well as well-being. **Background data:** Age, gender, education, ethnicity, type of job	**Result:** More non-workday sedentary behaviour during the pandemic, worse sleep, worse work-related health, and more mood disturbance compared with before. **Comments:** A longitudinal study in which baseline data before the pandemic could be compared with different degrees of remote work during the pandemic. No analyses of gender differences **WH**
Ipsen, van Veldhoven, Kirchner & Hansen (2021) **MMAT = 3**	**Purpose:** To determine the most important advantages and disadvantages of remote work from home during the COVID-19 pandemic. **Participants:** Total of 5,748 participants from 29 countries in Europe. 75% of the participants had an academic degree and worked at consulting firms, as lawyers, or at universities (knowledge workers). 60% were women and 76% of the participants were from Denmark, Germany, Italy, or Sweden. 35% had one or more children at home and 84% of the participants worked only from home during the pandemic. **Attrition rate:** Unclear **Time:** 11 March–11 May 2020	**Method:** Online survey (questionnaire) Outcome measurements: Factor analysis was used to identify three clusters of advantages and three clusters of disadvantages related to working from home. Advantages: Better work–life balance, better work efficiency, better work control. **Disadvantages:** Home office constraints, work uncertainties, inadequate tools. **Background data:** Gender, children, age, position (manager-employee)	**Result:** A majority of the participants (55%) experienced remote work as primarily positive. Both women and men experienced better work–life balance (no significant difference between women and men), but women experienced more home office constraints compared with men. Men felt their work efficiency was better and they felt less constrained with remote work from home, and had access to important work tools to a greater extent than women. The greatest disadvantages were missing colleagues and missing getting out of the home, as well as worse physical work conditions in the home office. Families with children experienced more work–life conflict and worse effectiveness at work. The individual differences in the experiences of working from home were generally large. **Comments:** A large number of participants from several countries in Europe, but unclear who chose to respond to the survey. In almost all countries, children were home from school and preschool (with the exception of Sweden). No comparisons were made between countries. **WH, Balance, Prod.**

Author, year MMAT (1–5)	Purpose, participants, attrition, time period	Method, outcome measurements, background data	Result, comments Studied sub-area: • work environment and health – WH • work–life balance – Balance • productivity – Prod.
Irawanto, Novianti & Roz (2021) **MMAT = 3**	**Purpose:** To study predictors of job satisfaction in conjunction with remote work from home during the pandemic in Indonesia. **Participants:** 472 employees (64% men) from different parts of Indonesia. Most (398) had worked from home for at least one month. **Attrition rate:** 6% **Time:** The first quarter of the COVID-19 pandemic in 2020	**Method:** Online survey **Outcome measurements:** Job satisfaction. **Background data:** Gender, age, married/unmarried, education	**Result:** Work–life balance and work stress had a significant effect on job satisfaction in conjunction with remote work from home. Remote work from home generally had a positive effect on job satisfaction. **Comments:** A wide sample of participants, but not random (convenience sampling). No analyses of gender differences **WH, Balance**
Jimenez-Gomez, Sawhney & Albert (2021) **MMAT = 3**	**Purpose:** To describe the consequences of COVID-19 on working conditions, symptoms of burnout and productivity among behaviour analysts at different levels in the US. **Participants:** 491 (89% women) questionnaires of 1,068 were properly filled in. 54% worked from home. **Attrition rate:** Unclear, because it is not clear how many people were reached by the invitation via email to the Behaviour Analyst Certification Board. **Time:** April 2021	**Method:** Online survey **Outcome measurements:** Job security, disruptions, time management, information exchange, support from supervisors, productivity, symptoms of burnout. **Background data:** Age, gender, education level, partner/single, ethnicity, children etc.	**Result:** Comparisons of those who worked from home and those who worked at the primary workplace showed that those who worked from home reported more disruptions, better time management, better exchange of information and worse productivity. No difference in other outcome variables. **Comments:** Unclear who chose to participate. Almost only women. **WH, Prod.**
Karácsony (2021) **MMAT = 2**	**Purpose:** To investigate how satisfied Slovak employees were with remote work. **Participants:** 709 people (46% women), mainly from private multinational companies in Slovakia. Snowball sampling. **Attrition rate:** Unclear **Time:** December 2020.	**Method:** Online survey **Outcome measurements:** Job satisfaction, work–life balance. **Background data:** Gender, age, position, education and work experience	**Result:** Remote work had a positive effect on job satisfaction and work–life balance. **Comments:** Unclear who chose to participate. No analysis of gender differences **WH, Balance**
Kirchner, Ipsen & Hansen (2021) **MMAT = 3**	**Purpose:** To investigate how managers experience leading work remotely during the pandemic, compared with how employees experience remote work. **Participants:** 1,053 employees (68% women) and 290 managers (55% women) in different fields of knowledge work in Denmark. Snowball sampling. Recruited via social media. **Attrition rate:** Not reported. **Time:** 21 March–11 May 2020	**Method:** Online survey **Outcome measurements:** Positive and negative experiences of working remotely from home. **Background data:** Gender, age, education, children at home, cohabitation.	**Result:** Compared to employees, managers experienced their role during the pandemic as more demanding, with more working hours and more disruptions to work. Employees experienced more autonomy than managers in the actual work from home, but greater restrictions with regard to access to equipment and a good workstation, worse concentration, felt more chained to the computer, less clarity about what was expected in the work, and limitations regarding what work tasks could be carried out from home. **Comments:** A comprehensive study comparing the conditions for employees and managers during remote work from home. Unclear who chose to respond to the survey. No analyses of gender differences **WH, Prod.**

Author, year MMAT (1–5)	Purpose, participants, attrition, time period	Method, outcome measurements, background data	Result, comments Studied sub-area: • work environment and health – WH • work–life balance – Balance • productivity – Prod.
Koekemoer, de Beer, Govender, & Brouwers (2021) **MMAT = 2**	**Purpose:** To study the significance of leadership for productivity in conjunction with remote work from home during the pandemic. **Participants:** 229 people (70% women) were recruited via social media in South Africa (convenience sampling). Most were service workers. **Attrition rate:** Not reported. **Time:** 16–26 April 2020	**Method:** Online survey **Outcome measurements:** Leadership behaviour, team effectiveness, technological flexibility, work engagement, performance. **Background data:** Gender, age, children at home, cohabitation.	**Result:** Resource-supported leadership behaviours had a significant positive relationship with work engagement and effectiveness on the work team. **Comments:** A study focused on how employees experience the significance of good leadership for effectiveness, engagement and performance in conjunction with remote work from home. Unclear who chose to participate. No analysis of gender differences **Prod.**
Lonska, Mietule, Litavniece, Arbidane, Vanadzins, Matisane & Paegle (2021) **MMAT = 3**	**Purpose:** To study how remote work from home during the pandemic impacts work–life balance. **Participants:** 1,006 professionally active people (mixed occupations) in Latvia (80% women) recruited via websites and social media. **Attrition rate:** 45% incomplete responses **Time:** 28 Sept.–27 Oct. 2020	**Method:** Online survey **Outcome measurements:** Perceptions of work–life balance. **Background data:** gender, age, children at home.	**Result:** Women and participants with young children had the most problems balancing work and personal life (before weighting). The differences were not significant after weighting. **Comments:** To emulate the working population (n = 892,100) in Latvia, weighting has been applied. Schools and most preschools were closed during the pandemic. **Balance**
Mihalca, Irimias & Brendea 2021 (a) **MMAT = 2**	**Purpose:** To investigate whether the same factors that have previously been important for remote work also apply during the pandemic. **Participants:** 482 people (47% women) who worked from home full-time for an IT company in Romania. **Attrition rate:** Unclear (part of an earlier study). **Time:** June 2020	**Method:** Online survey **Outcome measurements:** Work–family conflict, workload, organisational support, performance. **Background data:** Age, gender, position in the company, children at home.	**Result:** Individual factors such as planning and management by objectives (self-management tactics) and adequate conditions (equipment, space) for remote work from home are important for productivity, performance and satisfaction. Work–family conflict had no significant effect on these variables, which can be explained by the fact that only 22% had children at home. **Comments:** The study is part of a larger study and only includes those who work from home full-time. No analysis of gender differences. **Prod.**
Mihalca, Rațiu, Brendea, Metz, Dragan & Dobre (2021 [b]) **MMAT = 2**	**Purpose:** To study the relationship between workload and well-being with role clarity as a mediating factor, using the demands-resources model. **Participants:** 701 employed people (53% men) at an IT company in Romania working remotely from home. All 2,000 employees were invited to participate. **Attrition rate:** 65% **Time:** June 2020	**Method:** Online survey **Outcome measurements:** Well-being, symptoms of burnout. **Background data:** Age, gender, education.	**Result:** With a high workload, employees' role clarity is especially important for reducing the risk of burnout in conjunction with remote work. **Comments:** Very high attrition. No analysis of gender differences. **WH**

Author, year MMAT (1–5)	Purpose, participants, attrition, time period	Method, outcome measurements, background data	Result, comments Studied sub-area: • work environment and health – WH • work–life balance – Balance • productivity – Prod.
Miron, Petcu, David-Sobolevschi & Cojocariu (2021) **MMAT = 2**	**Purpose:** To study the effect of remote work on well-being. **Participants:** 228 people working remotely and 110 people working at the primary workplace (about 60% women) from Romania. **Attrition rate:** Unclear **Time:** Unclear, but during the COVID-19 pandemic in 2020.	**Method:** Own questionnaire. **Outcome measurements:** Well-being. **Background data:** Gender, age, length of employment.	**Result:** Well-being was estimated as slightly higher among those who worked at the primary workplace compared with those who worked remotely from home. In conjunction with remote work, a strong positive relationship was found between development, competence, job satisfaction, organisational climate and well-being, while at the workplace, a positive relationship was found between work–life balance, organisational climate and job satisfaction. Women were more positive about remote work than men. Comments: Unclear how comparable the groups are. The participants represent several different administrative occupations, most with higher education. WH
Mostafa (2021) **MMAT = 2**	**Purpose:** To investigate how employees experience remote work during the pandemic and its effects on their psychological well-being and work–life integration in Egypt. **Participants:** 318 people from different industries, presumed to be working from home, were recruited through social media (63% women). **Attrition rate:** 17% **Time:** "During the pandemic and lockdown"	**Method:** Online survey **Outcome measurements:** Positive experience (more productive, more time to learn), emotional exhaustion, psychological well-being, work–life integration. **Background data:** Gender, age, children at home, occupation.	**Result:** Remote work had a positive effect on well-being. 82% of the participants wanted to continue working from home. But at the same, the risk of emotional exhaustion increased. Remote work contributed to improved work–life integration. Comments: 67% worked full-time remotely from home. Unclear who chose to respond. No analyses were conducted based on gender or children at home. Schools were closed in the country during this time. **WH, Balance**
Oksanen, Oksa, Savela, Mantere, Savolainen, & Kaakinen (2021) **MMAT = 4**	**Purpose:** To investigate the stress that may be caused by new technology for communication at work. **Participants:** 1,318 employees in Finland (54% men) in different industries. **Attrition rate:** 18% at follow-up. **Time:** 16 Sept.–15 Oct. 2019 and 16 March–8 April 2020	**Method:** Online survey before and during the COVID-19 pandemic. **Outcome measurements:** Technostress caused by social media, exhaustion, online harassment. **Background data:** Age, gender, occupation, income, personality.	**Result:** The scope of communication via social media in conjunction with remote work increased the degree of technostress, while the degree of exhaustion decreased. The scope of technostress and exhaustion was lower among those who had experience with social media before the pandemic. **Comments:** Data were weighted with consideration for the national distribution of gender and age. The same group was studied before and during the pandemic. Explanations for the lower degree of exhaustion are thought to be increased autonomy and control in conjunction with work from home, and lack of travel to and from the primary workplace. Productivity is not measured, but can be assumed to be affected by exhaustion. **WH, Prod.**
Otonkorpi-Lehtoranta, Salin, Hakovirta, & Kaittila (2021). **MMAT = 3**	**Purpose:** To analyse how work–life balance affected Finnish families from a gender perspective during the pandemic, when schools and preschools were closed. **Participants:** 348 parents who both work, with at least one child under 18. A convenience sample recruited via the university's communication service. Over 80% were university-educated. **Attrition rate:** Unclear Time: 23 April–17 May 2020	**Method:** Online survey, quantitative and qualitative analysis. **Outcome measurements:** Boundary between work and personal life. **Background data:** Age, gender, children at home, gender-related allocation of work at home.	**Result:** During the pandemic, boundaries between work and personal life were dissolved significantly in terms of both time and space, and this was related to gender. In families that already had separate gender roles before the pandemic and with young children, mothers took primary responsibility for child care and had to exert themselves a great deal in order to take care of their work. **Comments:** Schools and preschools were closed when the data were collected. Researchers note that the results indicate the importance of child care, especially for women's opportunities to mix parenthood and employment. **Balance**

Author, year MMAT (1–5)	Purpose, participants, attrition, time period	Method, outcome measurements, background data	Result, comments Studied sub-area: • work environment and health – WH • work–life balance – Balance • productivity – Prod.
Pirzadeh & Lingard (2021) **MMAT = 3**	**Purpose:** To study the health and well-being of remote workers during the COVID-19 pandemic. **Participants:** In total, 412 responses (60% men) were obtained from people with varying work tasks at three large workplaces in the construction industry in Australia. Participants worked remotely from home every other week. **Attrition rate:** Varied between the different survey occasions, but not specified. **Time:** May–June 2020	**Method:** Online survey every other week (total of 7 measurements). **Outcome measurements:** Work engagement, work–life satisfaction, sleep. **Background data:** Demographic characteristics, work arrangements, including working hours and work location (onsite or working from home at the time of the survey), frequency of physical activities, and diet.	**Result:** Those who worked at the primary workplace had greater work engagement than those who worked from home. The number of working hours was positively related to worse work–life balance. Mental well-being was positively related to good work–life balance. Mental well-being gradually declined during the course of the study, whether working at the workplace or from home, which can be interpreted as a reaction to the ongoing pandemic. **Comments:** The study was conducted on seven occasions over the course of two months, both while working at the primary workplace and from home, and the number of responses on each occasion varied between 18 and 151. Unclear to what extent the same people were studied both at the workplace and while working remotely from home. Gender differences were not specifically analysed. **WH, Balance**
Raišiene, Rapuano, Varkulevi-čiute & Stachová (2020) ***MMAT = 2***	**Purpose:** To evaluate how employees working remotely from home perceive possibilities to work effectively and with high quality. **Participants:** 436 remote workers (67% women) in Lithuania, mainly highly educated, in service, administration and education. **Attrition rate:** Not reported. **Time:** 30 March–15 April 2020	**Method:** Online survey **Outcome measurements:** Factors that promote and detract from effectiveness and quality with remote work. **Background data:** Gender, age, education, work experience and experience with remote work.	**Result:** How people perceive possibilities to work remotely in terms of effectiveness and quality varies by gender, age, education level, work experience and experience of remote work. Women saw advantages such as a healthier lifestyle at home, and being able to work independently and without time pressure, while men saw disadvantages with several factors, such as disruptions from family members, reduced career opportunities, and lack of clarity regarding work tasks. Older people felt more negatively about remote work than younger people. Employees with more experience of remote work were more positive than those with less experience. **Comments:** Unclear how the participants were selected. **WH, Prod.**
Russo, Hanel, Altnickel & van Berkel (2021) **MMAT = 3**	**Purpose:** To study what factors predict well-being and productivity in conjunction with remote work during the COVID-19 pandemic. **Participants:** 192 (80% men) employees in the first data collection, 184 (96%) in the second. All were software engineers in different countries (primarily the US and UK) working from home during the pandemic, randomly selected from 500 potential participants based on a statistical power analysis. **Attrition rate:** 4% in the second data collection. **Time:** 20–26 April and 4–10 May 2020	**Method:** A questionnaire covering more than 50 factors, most psychological. **Outcome measurements:** Well-being and productivity. **Background data:** Age, gender, cohabitation/single.	**Result:** Well-being and productivity were positively correlated. Work-related stress had a negative relationship with well-being. The negative relationships decreased or disappeared by the second data collection, indicating adaptation to the situation. The predictive factors at the first data collection were not related to well-being or productivity at the second data collection. The only gender difference was that women felt more disrupted during remote work. **Comments:** An ambitious sample to represent the relevant group of employees in different countries. At least 75% worked from home in conjunction with the data collections. Longitudinal design could permit analysis of causality, but no such relationships were obtained. The analyses pertain to relationships between variables during remote work. No comparison was made with conditions of work at the primary workplace. **WH, Prod.**

Author, year MMAT (1–5)	Purpose, participants, attrition, time period	Method, outcome measurements, background data	Result, comments Studied sub-area: • work environment and health – WH • work–life balance – Balance • productivity – Prod.
Sandoval-Reyes, Idrovo-Carlier & Duque-Oliva (2021) MMAT = 3	**Purpose:** To study the relationship between remote work, work stress and work–life balance. **Participants:** 1,285 people in South America (approximately 95% from Colombia and Ecuador) who worked remotely during the pandemic (lockdown). Convenience sample based on professional networks. Average age was 29 years old and 66% were women. 50% had children at home. Most were highly educated and worked in education and service. **Attrition rate:** 31.5% **Time:** 24 April–25 May 2020	**Method:** An established instrument for measuring work-related stress and more was distributed online. Comparisons were made retrospectively to the situation at the primary workplace before the pandemic. **Outcome measurements:** Remote work demands, work stress, work–life balance, work productivity, work satisfaction and job engagement. **Background data:** Age, gender, children at home, education, field of work.	**Result:** Remote work during the pandemic contributed to significantly increased stress, reduced work–life balance and reduced work satisfaction. The relationships were identical for women and men. Remote work also contributed to increased productivity and engagement. Stress had more negative effects for productivity among men than women. **Comments:** A well-done study with primarily academics. The number of participants was based on a power analysis. No direct analyses of effects of children at home. **Balance, Prod.**
Schieman, Badawy, Milkie & Bierman (2021) **MMAT = 4**	**Purpose:** To test how the presence of children impacts work–life conflict. **Participants:** A representative sample of workers in Canada, studied on three occasions (19–24 Sept., 2019, n = 2,524; 17–23 April 2020, n = 1,869, and 17–23 June 2020, n = 1,843). The latter two measurements were carried out during the COVID-19 pandemic. **Attrition rate:** 58, 26, and 27% **Time:** 2019–2020	**Method:** National survey. **Outcome measurements:** Work–life conflict, work–home integration, which reflects the scope of work from home. **Background data:** Families with and without children as well as children of different ages: < 6, 6–12 and 13–18, gender, minority group, age, education, type of work, income, financial stress, married/unmarried.	**Result:** Work–life conflict decreased significantly ($p < 0.001$) from September 2019 to April 2020 and additionally in June 2020. Parents with children ages 6–12 and who work from home a lot experienced the most conflict, followed by parents with children under age 6. The reduction in work–life conflict during the pandemic was smaller for families with young children compared to families without children, while families with teenagers did not differ from those without children with regard to reduced work–life conflict during the pandemic. No clear gender differences in work–life conflict during the pandemic were obtained. Among the child-free, who carried out a large share of work from home (high work–home integration), work–life conflict reduced the most during the pandemic. **Comments:** The study group constitutes a representative (random) sample of the Canadian working population which was studied both before and during the pandemic. Precise gender distribution is not stated. Attrition was compensated for through weighting. However, the study does not show the actual scope of remote work from home, nor the use of digital communication tools. The scope of work from home is part of the variable: work–home integration. Schools were closed during the pandemic. **Balance**
Schmitt, Breuer, & Wulf (2021) **MMAT = 2**	**Purpose:** Analysis of the relationship between digital tools, cognitive overload, perceived work performance and well-being during the COVID-19 pandemic. **Participants:** 403 (64% women) from an online panel in Germany. **Attrition rate:** 35% **Time:** 27 April–7 May 2020	**Method:** Online survey **Outcome measurements:** Perceived work performance and well-being. **Background data:** Age, gender, children at home	**Result:** The relationship between text-based digital tools and well-being is mediated by cognitive overload, but did not impact work performance. Children at home increased the cognitive workload. **Comments:** Unclear which professional groups are represented. Focus on digital tools rather than work from home versus work at the office. No analyses of gender differences **WH, Prod.**

Author, year MMAT (1–5)	Purpose, participants, attrition, time period	Method, outcome measurements, background data	Result, comments Studied sub-area: • work environment and health – WH • work–life balance – Balance • productivity – Prod.
Seiz (2021) **MMAT = 2**	**Purpose:** To analyse the distribution of unpaid work at home among heterosexual couples with children under age 18 in Spain during the COVID-19 pandemic. **Participants:** 1,287 responses from both women and men with children under age 18 in Spain, as well as a subgroup of 265 women in highly qualified occupations. Snowball sampling. **Attrition rate:** Unclear **Time:** Early April to mid-May 2020	**Method:** Online survey **Outcome measurements:** Allocation of unpaid work at home. **Background data:** Age, income, children's age.	**Result:** Remote work made it easier for highly educated women to contribute to a less traditional allocation of work in the home. However, women continued to spend more time on unpaid work in the home than men. But gender differences in the scope of paid work were minor. **Comments:** Representativeness unclear. **Balance**
Shimura, Yokoi, Ishibashi, Akatsuka & Inoue (2021) **MMAT = 4**	**Purpose:** To investigate the effects of remote work on psychological and physical stress reactions, as well as how presenteeism is impacted. **Participants:** 3,123 office workers from 23 different industries in Japan (57% men). **Attrition rate:** 35% (2019) + 21.4% (2020) **Time:** 2019 (before) and 2020 (during the pandemic).	**Method:** Online survey before (no remote work) and during the pandemic (different degrees of remote work, 1–5 days/ week). **Outcome measurements:** Stress, sleep, attendance. **Background data:** Age, gender, overtime, stress factors, social support and sleep.	**Result:** Limited remote work reduced psychological and physical stress reactions, but working remotely full-time reduced productivity, worsened sleep and increased presenteeism. **Comments:** The results are controlled for background factors, including gender. **WH, Prod.**
Staniscuaski, Kmetzsch, Soletti, Reichert, Zandonà, Ludwig. Lima, Neumann, Schwartz, Mello-Carpes, Tamajusuku, Werneck, Ricachenevsky, Infanger, Seixas, Staats & de Oliveira (2021) **MMAT = 3**	**Purpose:** To investigate the significance of gender, parenthood and ethnicity on the productivity of academics during the pandemic in Brazil. **Participants:** 3,345 Brazilian academics (68% women, 71% parents). **Attrition rate:** Unclear **Time:** 22 April–25 May 2020	**Method:** Survey, invitation via social media, email and research institutions. Snowball sampling. **Outcome measurements:** The possibility to submit articles and meet deadlines during the first period of social isolation in Brazil. Self-reported. **Background data:** Gender, children at home, ethnicity, workplace, region, remote work.	**Result:** A majority of participants (69.4%) reported a negative effect from the pandemic on their productivity. The reason was said to be unpaid work at home, especially in families with children. Men were affected less than women. Male academics without children were affected least by the pandemic, while female academics with children were affected most. **Comments:** Preschools, schools and universities were closed during the relevant period. **Prod.**
Sutarto, Wardaningsih & Putri (2021) **MMAT = 3**	**Purpose:** To study how employees' mental well-being affects their productivity when working remotely from home during the COVID-19 pandemic. **Participants:** 472 employees in Indonesia (58% women), mostly in private companies and NGOs. **Attrition rate:** 11% **Time:** Spring 2020 after lockdown	**Method:** Online survey **Outcome measurements:** Self-reported productivity. **Background data:** Gender, age, education level, job experiences, marital status, number of children and nature of the organization.	**Result:** Employees reported high productivity and less stress with remote work. Psychological well-being contributed to better productivity. Background factors, such as gender and age, influenced well-being, but not productivity. Employees who did not have a dedicated workspace at home reported worse productivity. **Comments:** Fairly large and broad material, but unclear how the sample was chosen. **Prod.**

Author, year MMAT (1–5)	Purpose, participants, attrition, time period	Method, outcome measurements, background data	Result, comments Studied sub-area: • work environment and health – WH • work–life balance – Balance • productivity – Prod.
Syrek, Kühnel, Vahle-Hinz, & de Bloom (2021) **MMAT = 4**	**Purpose:** To study how work conditions are affected when transitioning from work at the workplace to remote work from home during the pandemic. **Participants:** Varied between 253 and 516 (72% men). The participants were often highly educated (50% with university degrees) from a multinational organisation in the Netherlands. **Attrition rate:** Varied on the five measurement occasions. **Time:** Jan.–May 2020	**Method:** Online survey every month, as well as qualitative data from participants' comments before and during remote work. **Outcome measurements:** Work engagement, job satisfaction, work–life balance, workload. **Background data:** Age, gender, children at home.	**Result:** Reduced work engagement and increased job satisfaction in conjunction with remote work. Employees without children generally had lower job satisfaction than those with children. Work–life balance worsened initially with remote work (most for women), but improved in May. **Comments:** Measurements both before and during the pandemic, which demonstrate changes over time. Schools and preschools were closed during the pandemic. **WH, Balance**
van Zoonen, Sivunen, Blomqvist, Olsson, Ropponen, Henttonen & Vartiainen, (2021 [a]) **MMAT = 4** (Understanding)	**Purpose:** To investigate how the transition to remote work during the pandemic was experienced by employees in Finland. **Participants:** 2,242 Finnish employees (74% women) were recruited via unions, government agencies and social media. "Convenience sampling". 87% worked from home all days of the week during the pandemic. **Attrition rate:** Unclear, because only those who responded were registered. **Time:** 8–22 May 2020	**Method:** Online survey **Outcome measurements:** Work stress, social support, work–life conflict, adjustment to remote work (perceived work stressors relate to psychological strain through perceptions of social support, work–life conflict, and adjustment to remote work). **Background data:** Age, gender, occupational position, children at home, working hours.	**Result:** Both challenges and obstacles had a negative effect with adjustment to remote work, while obstacles reduced in conjunction with social support. Control, work structure and communication technology had no minimising effect on work-related stress. Families with children experience greater work–life conflict and more difficulties adapting to remote work. People in managerial positions experience the most work–life conflict and greater difficulties adapting to remote work. Employees who were used to remote work from before had fewer problems during the pandemic. **Comments:** A fairly comprehensive study that controls for different background factors, such as gender and the scope of remote work. Several interesting direct and indirect effects were reported and discussed, including from a theoretical and practical perspective. The conditions between different variables in conjunction with remote work were analysed, but no direct comparison was made with work at the workplace. **WH, Balance**
van Zoonen, Sivunen, Blomqvist, Olsson, Ropponen, Henttonen & Vartiainen (2021 [b]) (Factors) **MMAT = 3**	**Purpose:** To investigate how structural, relational and contextual factors, as well as communication technology and quality, impact adjustment to remote work. **Participants:** 5,452 employees (69% women) in Finland were recruited through unions and organisations. Convenience sampling. **Attrition rate:** Unclear, because only those who responded were registered. **Time:** 26 March–13 April 2020	**Method:** Online survey **Outcome measurements:** Job satisfaction, performance, work–life balance. **Background data:** Gender, age, working hours, position, security.	**Result:** Working independently and having clear work criteria contributed to better adjustment to remote work, while social isolation had a negative relationship with adjustment. In contrast to earlier results, the study shows that trust in colleagues and superiors did not make remote work easier, but rather, more difficult. Gender did not impact the result. **Comments:** Underlying factors such as gender, age etc. were controlled for in the analyses. **WH**

Author, year MMAT (1–5)	Purpose, participants, attrition, time period	Method, outcome measurements, background data	Result, comments Studied sub-area: • work environment and health – WH • work–life balance – Balance • productivity – Prod.
Wood, Michaelides, Inceoglu, Hurren, Daniels & Niven (2021) **MMAT = 3**	**Purpose:** To investigate well-being in conjunction with remote work from home in the UK. **Participants:** 784 and 390 university employees at two British universities, both academic and other staff, were recruited through a general email or staff newsletter to employees. Just under 60% filled in the diary on all four days on both occasions. About 75% were women. **Attrition rate:** 80% and 92%, respectively, at baseline measurement. **Time:** May and September. 2020	**Method:** Data from 4 weeks of diaries, as well as a baseline measurement 2 weeks before lockdown. **Outcome measurements:** Autonomy, demands, social support, work–life conflict, well-being. **Background data:** Gender, age, married/partner/single, position, education, children at home.	**Result:** Autonomy, social support and the possibility to separate from work were positively related to well-being, while loneliness and job insecurity were negatively related at both data collections. Work–life imbalance was negatively related to well-being only at the first data collection. Factors connected to ordered remote work, such as care and teaching of children and limitations in equipment (such as computers) or access to information in the home and to the pandemic as such (number of deaths) were negatively related to well-being at the first, but not at the second data collection. Well-being declined over time while loneliness increased and the ability to separate from work decreased. Data are related to the baseline measurement. **Comments:** A very comprehensive study based on diaries in which most relationships are not specific to remote work during the pandemic. High attrition at baseline measurement. The results were controlled for age, gender, children at home, education, previous experience of remote work etc. but no specific analysis was conducted of gender differences. **WH**
Xiao, Becerik-Gerber, Lucas & Roll (2021) **MMAT = 3**	**Purpose:** To study social, behavioural and physical factors related to well-being among employees in the US working from home during the COVID-19 pandemic. **Participants:** 988 employees (57% women) working remotely during the pandemic, recruited via email and social media. **Attrition rate:** 30% **Time:** 24 April–11 June 2020	**Method:** Online survey **Outcome measurements:** Physical and mental well-being. **Background data:** Gender, age, ethnicity, education, income, occupation, children at home.	**Result:** Remote work from home was connected to reduced physical and mental well-being, reduced physical activity, worse diet, lack of communication with colleagues, disruptions in the home, changed working hours and shortcomings with the physical work situation. Women and people with lower incomes had worse health than men and high earners in conjunction with remote work. Worse health among women is interpreted as a result of the burden from both work and family. **Comments:** A relatively large group and a broad spectrum of different occupations, education and ages among the participants should provide a fairly good picture. **WH**
Yerkes, Andre, Besamusca, Kruyen, Remery, van der Zwan, Beckers, Geurts (2020) **MMAT = 3**	**Purpose:** To investigate differences between Dutch mothers and fathers with regard to paid work, the division of childcare and household tasks, as well as quality of life: leisure, work–life balance, and relationship dynamics in conjunction with remote work from home. **Participants:** A representative sample of a total of 852 mothers and fathers in the Netherlands with at least one child under age 18 at home, of which 748 had paid work: The LISS panel **Attrition rate:** 29% **Time:** 13–28 April 2020	**Method:** Cross-sectional study (survey data). Comparisons made before (retrospectively) and during the COVID-19 pandemic (lockdown). **Outcome measurements:** Paid work, the division of childcare and household tasks, work–life balance. **Background data:** Occupation, age, professional area, education, number of children and the children's school status.	**Result:** 49% of participants worked remotely from home full-time or part-time. The scope of paid work from home did not differ between mothers and fathers. 36% of participants experienced increased workload during the pandemic compared with before. Mothers experienced both more (39 versus 31%) and less (25 versus 19%) work pressure than fathers during lockdown compared with before. Mothers continued to do more unpaid work at home than fathers and had less free time. No gender differences were obtained in work–life balance and the decline in work–life balance over time (during lockdown) was similar for mothers and fathers. **Comments:** Representative material, but only half of participants worked remotely. Schools were closed during the pandemic. **WH, Balance**

Appendix 2

Search strings for the review studies from 2005–2021 and the primary studies 2020–2021

Search strings for the review studies from 2005–2021

Search strings in Web of Science Core Collection (WoSCC), Social Science Citation Index (SSCI), Psycinfo and Scopus and reference lists for each sub-area (block):

Search string for the block (population)/exposure…

Telework* OR Telecommut* OR ”work* from home” OR ”distance work*” OR ”Remote work*” OR homeworker* OR ”Mobile work*” OR Home-based OR Homebased OR ”Home Based Work*” OR ”Flexible workplace*” OR ”Home-work commute*”

… were then combined with the following search blocks separately, in which the search operator AND was used:

Search string for *outcome health:*

Stress OR Burnout OR ”Health complaint*” OR ”Mental health*” OR ”Mental distress*” OR ”Physical health*” OR ”Well being” OR Wellbeing OR Wellness OR Exhaustion* OR ”Switch off*” OR Sleep OR Recover* OR Presenteeism OR Isolation OR ergonomic*

Search string for outcome *work environment:*

”Job Control” OR ”Job resources” OR Autonomy OR ”Job demand” OR ”Decision demand” OR Workload OR ”Work load” OR ”Social support” OR ”Colleague support” OR ”Co-worker support” OR ”Supervisor support” OR ”Organizational support” OR ”Social interaction” OR ”Social isolation” OR Availability OR Feed-back OR Feedback OR Collaboration OR ”Organizational commitment” OR Leadership OR ”Worker surveillance” OR ”Role conflict” OR Justice

Search string for outcome *work–life balance:*

WLB OR” Work Life Balance*” OR ”Worklife balance*” OR ”Work–life conflict*” OR ”Worklife conflict*” OR ”Work–family conflict*” OR ”Work–family interference*” OR ”Work–home conflict*” OR ”Work–home interference*” OR ”Work-to home conflict*” OR ”Work life spillover*” OR ”Blurred boundar*” OR ”Work–life boundar*” OR ”Work Life Integration” OR ”Work life segmentation”

Search string for outcome *competence, productivity*:

Knowledge OR ”Skill development ” OR Abilit* OR ”Competence development ” OR ”Professional competence ” OR Learning OR Careers OR ”Self-management ” OR ”Self-leadership ” OR Performance OR Productivity OR Employability OR ”Gender equal* ” OR Inequal* OR ”Gender role* ” OR ”Double burden ” OR Childcare OR Housework

Search strings for the primary studies during COVID-19 2020–2021

Search strings in the Social Science Citation Index (SSCI), Psycinfo and Scopus and reference lists for each sub-area (block):

Search string for the block (population)/exposure…

Telework* OR Telecommut* OR ”work* from home” OR ”distance work*” OR ”Remote work*” OR homeworker* OR ”Mobile work*” OR Home-based OR Homebased OR ”Home Based Work*” OR ”Flexible workplace*” OR ”Home-work commute*”

… were then combined with the following search blocks separately, in which the search operator AND was used:

Search string for outcome *work environment:*

”Job Control” OR ”Job resources” OR Autonomy OR ”Job demand” OR ”Decision demand” OR Workload OR ”Work load” OR ”Social support” OR ”Colleague support” OR ”Co-worker support” OR ”Supervisor support” OR ”Organizational support” OR ”Social interaction” OR ”Social isolation” OR Availability OR Feed-back OR Feedback OR Collaboration OR ”Organizational commitment” OR Leadership OR ”Worker surveillance” OR ”Role conflict” OR Justice

Search string for outcome *health:*

Stress OR Burnout OR ”Health complaint*” OR ”Mental health*” OR ”Mental distress*” OR ”Physical health*” OR ”Well being” OR Wellbeing OR Wellness OR Exhaustion* OR ”Switch off*” OR Sleep OR Recover* OR Presenteeism

Search string for outcome *work–life balance:*

WLB OR” Work Life Balance*” OR ”Worklife balance*” OR ”Work–life conflict*” OR ”Worklife conflict*” OR ”Work–family conflict*” OR ”Work–family interference*” OR ”Work–home conflict*” OR ”Work–home interference*” OR ”Work-to home conflict*” OR ”Work life spillover*” OR ”Blurred boundar*” OR ”Work–life boundar*” OR ”Work Life Integration” OR ”Work life segmentation”

Search string for outcome *productivity, competence:*

Knowledge OR ”Skill development ”OR Abilit* OR ”Competence development ” OR ”Professional competence ” OR Learning OR Careers OR ”Self-management ” OR ”Self-leadership ” OR Performance OR Productivity OR Employability OR ”Gender equal* ” OR Inequal* OR ”Gender role* ” OR ”Double burden ” OR Childcare OR Housework

Swedish Agency for Work
Environment Expertise

www.sawee.se

ISBN 978-91-987761-4-0