

DOES REMOTE WORKING WORK?

QUANTIFYING THE EFFECT OF REMOTE WORKING ON THE MOTIVATION
OF EMPLOYEES DURING THE COVID-19 PANDEMIC

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Does Remote Working Work?

Abstract:

One of the most obvious impacts of the Covid-19 pandemic is perhaps the increase in the amount of people working remotely. Never before in modern days has there been a remote workforce this large and who have persisted this long. More than a year after the onset of the Covid-19 pandemic, as society starts to open up again, the verdict of the success of remote working still awaits. This has given attention to the academic field of work design. So far, studies have unproportionally focused on productivity as a measure of the success of remote working while little attention has been dedicated to the topic of motivation. This thesis aims to quantitatively explore how motivation has been affected by the pandemic's extraordinary context by surveying 151 individuals using the Job Diagnostic Survey (JDS) developed by Oldham and Hackman. Further, two new moderators, self-discipline and social need for interaction, is introduced. Findings reveal perceived motivation decreased in a remote setting compared to on-site which could be predicted by the proposed moderators. Finally, this study contributes to the JDS theory as constraints were found in its ability to predict perceived motivation during the pandemic due to its limitation in capturing the social dimension as a moderator.

Keywords:

Covid-19, remote working, motivation, job diagnostic model, job characteristics theory, work design

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Sincerely,

A handwritten signature in blue ink, appearing to read 'Isabelle He', with a horizontal line extending from the end of the signature.

Isabelle He

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Definitions

Before pandemic	This thesis sometimes refers to the time period “before pandemic” which corresponds to the time when remote working was not the new “normal”
During pandemic	This thesis sometimes refers to the time period “during pandemic” which corresponds to the time when remote working was the new “normal” due to the onset of measures to contain the spread of the covid-19 pandemic
Employee motivation	Willingness to exert high levels of effort toward organizational goals, conditioned by the effort’s ability to satisfy some individual need
Job characteristics	Basic parameters connected to job tasks, in this thesis Oldham and Hackman’s five job characteristics (autonomy, feedback, skill variety, task identity, task significance)
Motivating Potential Score (MPS)	A score developed by Oldham & Hackman which is motivation based on the average of the five job characteristics
On-site working	In this thesis, work predominantly at the office location
Perceived motivation	In this thesis, self-reported motivation as perceived by respondents of this thesis’ survey
Remote working	Work practice where employees work away from a central workplace - typically principally from home - using technology to interact with others as needed to conduct work tasks
The pandemic	In this thesis, the Covid-19 pandemic is also referred to as “the pandemic”

1. Introduction

One of the most obvious impacts from the Covid-19 pandemic is perhaps the increase in the remote working population. In March 2020, the Swedish public health agency Folkhälsomyndigheten (Fohlm) advised employers to consider allowing employees to work remotely to limit the rising spread of the virus (Folkhälsomyndigheten, 2020). More than one and a half year later, the recommendation for everyone who can work remotely to continue doing so is still intact (Folkhälsomyndigheten, 2021). Never before in modern days has there been a remote workforce this large who have persisted this long.

It is indeed a unique scenario giving immense attention to the research of organizational management and more specifically to work design research. As vaccination programs start rolling out in Sweden and globally, many business leaders and researchers alike are discussing the future way of working and the role of the workplace as the world starts to recover in a post-pandemic society (Molla, 2021). It has become clear that the topic of remote working vs. office-based/on-site working is both controversial and dividing. In May 2021, David Solomon, the CEO of one of the largest global investment banks, wrote in a memo to his employees that he does not believe in remote working and called remote working “an aberration which is not conducive to productivity.” (Forbes, 2021). On the other end of the spectrum, Michael Dell, CEO of Dell said during the same period that “remote working is absolutely here to stay” (CRN, 2021). Although these statements are only a small sample of the corporate sentiment towards remote working, it is difficult to ignore that large corporations are also some of the loudest and biggest voices with power to set the strategic direction for the future. Although not scientific in nature, these comments cannot be ignored due to the immense influence they yield on society (Grenville-Cleave, 2021).

The attentive reader might have noticed that many leaders mention productivity to make their case. They are not alone to gravitate towards that metric. So far, studies have unproportionally focused on productivity as a measure for the success or drawbacks of remote working (Galanti et al., 2021; Staniscuaski et al., 2021; Müller et al., 2021). The ways that studies typically measure productivity have been through labor output per

time unit, operating effectiveness, absenteeism (Kelly, 1988; Kraut, 1989) to name a few. A potential reason why studies have been unproportionally skewed towards measuring productivity might be because remote working cannot be observed by supervisors in the same way as physical work. As a result, remote working shifts the culture at the organization away from a “face-time culture” towards a more “result-oriented culture” (Hill et al., 2003). When work becomes more transactional in nature and results are accentuated, a parameter as measurable as productivity might become favorable.

Although interest has also been directed to how remote working has affected psychological states of employees such as creativity (Neves-Pereira, 2021), innovation (Brem et al., 2021) and work life balance (Palumbo, 2020), little attention has been given to how employee motivation has been affected. This is an alarming gap in current literature and academic studies.

In this thesis, I will quantitatively explore how employee motivation has been affected by the extraordinary context, shaped by the Covid-19 pandemic, that the office working population have found themselves in the past year. In contrast to many other self-reported surveys, I will measure motivation based on Oldham and Hackman’s Job Diagnostic Survey which predicts motivation without respondents being aware or directly answering questions about their motivation as well as measuring perceived motivation directly.

It is imperative not to neglect motivation although it might be more difficult to measure. The concept of motivation has captured researchers across multiple disciplines for decades (Pakdel, 2013) and it is no wonder why it is still a relevant topic. Employee motivation can be defined as the “willingness to exert high levels of effort toward organizational goals, conditioned by the effort’s ability to satisfy some individual need” (Robbins, 1993). Robbins explains this individual need as an internal force within people that makes certain outcomes seem desirable. If unsatisfied, tension arises and the greater the tension, the more drive will be created to reach a state of fulfillment. All motivational theorists are not completely in agreement with each other on exactly how this drive and energy is generated or where it originates from, but some dimensions of employee motivation are concurred on (Ramlall, 2004). All organizations are composed of people

and in order to perform and reach organizational goals, employees need to be motivated (Shahzadi et al., 2014). Motivated employees are much more engaged, involved in their work and take on more responsibility (Grant, 2008). Further, motivated employees are happier employees as there has been strong ties found between motivation, job satisfaction and organizational commitment (Lok & Crawford, 2004). These outcomes can be explained by the human internal drive to satisfy needs, as proposed by Robbins (1993). Because of these ties with positive outcomes, motivation is important to study from a business leader's perspective as well, because it is concerned with topics such as employee retention (Boutmaghzoute, 2021).

As the working environment has changed tremendously due to the pandemic and as business leaders are currently in the middle of facing a big decision when shaping the strategic direction of ways of working, it is more important than ever to include motivation in the discussion. I expect that findings from this study will contribute and add nuance to the current ongoing discussions related to work design and the future of work. Understanding antecedents to motivation benefits both managers, aiding them in becoming greater leaders, and employees, increasing their understanding of what drives them at work.

1.1. Purpose and research question

The purpose of the thesis is to understand how the motivation of employees is affected by working remotely during the Covid-19 pandemic and thus the following research questions is to be answered:

How has employee motivation been affected by remote working during the Covid-19 pandemic?

1.2. Delimitations

Several delimitations to various variables have been made in order to concretize the research question.

The term remote working, or telecommuting has been around for decades, but there has been a lack of consensus by researchers regarding accepted definitions which creates

significant challenges when reviewing scientific findings. For this thesis, the definition of remote working is the one suggested by Allen et al., “Telecommuting is a work practice that involves members of an organization substituting a portion of their typical work hours (ranging from a few hours per week to nearly full-time) to work away from a central workplace—typically principally from home—using technology to interact with others as needed to conduct work tasks.” (Allen et al., 2015).

Further, geographical, and demographic delimitations have been made. The thesis is focused on Swedish office workers who worked at a physical office before the pandemic but switched to remote working during the pandemic. The reason why the study only concentrates on Sweden is because of the variance between countries and their Covid-19 prevention strategies. For example, in Sweden, remote working has never been forced by law, which might put less pressure on employees compared to other countries where remote working has been mandatory. However, due to limiting data on Sweden in isolation, the scope of the theory will include international data and studies.

Finally, and perhaps most importantly, this study is grounded in the field of work design and more specifically in Oldham and Hackman’s Job Characteristics Theory which will be argued for in the theoretical framework. It is important to mention that after pre-studies on control variables such as demographic differences among Swedes and relational differences, a decision was made to solely focus on job characteristics as drivers of motivation in this essay.

2. Theory: Linking remote working to motivation

Understanding remote working and its associated outcomes in relation to employee motivation is no easy task as the subject itself taps into various research fields including psychology, management, transportation, communication, and information systems. To add on to the complexity, findings from these research fields have often been contradicting in their results as well (Allen et al., 2015). Combine that with the extraordinary contextual environment of the Covid-19 pandemic and it becomes an even trickier challenge. The theoretical framework developed in this thesis abides in theories of work design and motivation. Relevant concepts within these fields are remote working and job motivation (Shin et al., 2009). Connecting the theory to my research purpose, I will first review these two concepts. Finally, I will through Oldham and Hackman's Job Characteristics Theory (JCT), one of the most prominent theories within organizational psychology and work design, discuss theoretical connections between the previously mentioned concepts.

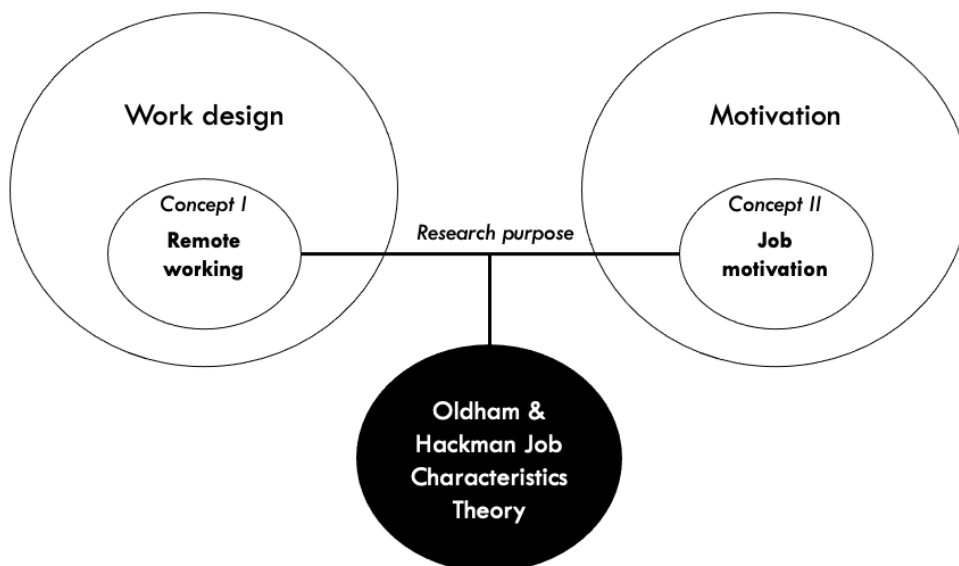


Figure 1. Illustration of the theoretical context and related concepts

2.1. Concept I: Remote working

First, I will start with the concept of remote working from a broad view that will act as a background to better understand how remote working has been shaped in light of the extraordinary context of the pandemic. I will then narrow my view, in order to emphasize and discuss recent literature related to remote working during the Covid-19 pandemic.

2.1.1. Remote working from a work design perspective: concept and definitional challenges

Findings from various research fields studying remote working have often found contradicting results (Allen et al., 2015). The reason for the disperse results in remote working literature can be due to the lack of consensus regarding the definition of remote working which makes the phenomenon incomparable across literature. Various factors that can vary in studies about remote working is the extent (intensity) of remote working, who the remote worker is and who they are not (Bailey & Kurland, 2002).

In this thesis, I, the author has chosen the definition of remote working as presented by Allen et al.:

Telecommuting is a work practice that involves members of an organization substituting a portion of their typical work hours (ranging from a few hours per week to nearly full-time) to work away from a central workplace—typically principally from home—using technology to interact with others as needed to conduct work tasks.

Allen et al. further concretizes this definition by adding that remote working individuals are not part of the mobile working population, independent contractors or individuals who work at the office and then completes work from home outside of their normal business hours.

This definition is chosen by me because I believe it best describes the remote working population that has arisen due to the pandemic, and thus is most appropriate for the purpose of this thesis. These are the individuals who are part of a larger organization where they have previously been tied to a specific primary location, but due to

extraordinary circumstances have switched to working remotely. To increase the relevance of the theoretical framework, this thesis will only consider theory related to remote working which shares the same or similar definition as stated in this thesis.

2.1.2. Remote working vs. office-based working

As information capabilities technologies (ICTs) have rapidly advanced, remote working, also referred as teleworking, telecommuting, virtual work (Haddon & Brynin, 2005) has increased as ICTs have enabled the possibility of remote working. Remote working represents a fundamental shift in how organizations have historically conducted their businesses (Chong et al., 2020).

Several researchers have reported that remote workers experience higher employee satisfaction, due to the many benefits of remote working such as flexibility concerning work arrangements (Madsen, 2011; Kroll et al., 2017; Possebnriede et al., 2016). Other benefits that have been reported include increased work-life balance, elimination of wasted commuting time, reduction in expensive office space, flexible working time and improved geographical coverage (Nickson & Siddons., 2012; Lundberg & Lindfors, 2002; Kowalski & Swanson, 2005). However, in later years there has been a growing number of research suggesting more negative effects associated with remote working as well (Hilbrecht et al., 2008). It appears that the additional time freed up from the flexible working arrangements and elimination of commuting did not lead to more time spent on family and leisure. Instead, the time was spent on household chores (Wheatley, 2012). This finding was coherent with other research suggesting that there is a high risk of collapsing boundaries between home and work when working remotely which reduces the restorative effects of home (Hartig et al., 2007).

2.1.3. Remote working during the Covid-19 pandemic

The Covid-19 pandemic has forced employers across the globe to change working practices towards a more flexible or fully remote environment at an unprecedented rate (CIPD, 2021). The concept of remote working is not something new, but previously it was primarily an exception for “ideal workers” to accommodate certain needs that might be related to family or other reasons – it was not the “normal” way to work offered to everyone (Meiksins et al., 2002). Due to the Covid-19 pandemic, a tremendous shift has occurred in the nature of remote working. Having previously been viewed as a form of

flexible policy or a perk, the pandemic has given rise to large share of forced or involuntary remote workers and where remote working has become the 'new normal' (Franken et al., 2021).

Since it is possible to argue that we are very much still in the middle of the pandemic at the time of writing, naturally there is little validated theory explaining remote working in the context of the pandemic. However, there has been a number of scientific and higher-level studies conducted by i.e., governments and various interest groups that can be interesting to consider.

In the Stockholm area of Sweden, it is estimated that roughly 60 percent to 80 percent of employees have been working from home during the whole or parts of the pandemic (Bolander et al., 2021). The most pressing issues during this time have been conflicts related to work life balance as people's homes have suddenly transformed into a workplace (Bolander et al., 2021).

Work life balance can be described as having harmony and minimizing role conflict between work life and other life aspect (Bellmann & Hübler, 2021). Kalliath & Brought define the perceived work life balance as the "individual perception that work and non-work activities are compatible and promote growth in accordance with an individual's current life priorities." (Kalliath & Brought, 2008). There has been evidence during the pandemic that there is an extensive variation in how different types of employees are affected in work-life balance terms (Caringal-Go et al., 2021). Some individuals have succeeded more with remote working and some less. Some studies that have touched on these individual differences report on the importance of improving work life balance themselves by engaging in physical crafting, namely, to manage the physical aspects of work such as location, technology, efficiency but also engaging in time and workload management (Gravador & Teng-Calleja, 2018). There has also been evidence suggesting that in times of the pandemic, relational crafting, to manage both work and personal relationships, is important in achieving work life balance. This can be through gaining more autonomy, reducing less important interactions at work and findings ways to socialize (Ingusci et al., 2021). It appears that during the pandemic, due to there being a large share of involuntary remote workers who might not have the pre-requisites

or traits for optimal remote working, importance of self-managing and job crafting increased compared to prior to the pandemic (Caringal-Go et al., 2021).

2.2. Concept II: Job motivation

The second concept concerns the topic of job motivation which is a topic that have received substantial attention in the field of organizational management for decades (Atkinson, 1964). There are several angles to tackle the topic of work-related motivation.

After a thorough literature review, I have chosen to look at motivation from the work design perspective due to its natural overlap with remote working (Parker et al., 2020). I dedicate a chapter on work design in this thesis because remote working can be seen as restructuring the design of work, which serves as an important link between remote working and motivation. It is said that ever since man hunted and gathered, work design has existed (Morgeson et al., 2010). In science, work design first gained influence when Adam Smith described in *The Wealth of Nations* how to achieve efficiency and productivity by dividing labor (Van den Broeck & Parker, 2017). A modern definition explains the concept of work design as the “content, structure, and organization of one’s task and activities” (Parker, 2014). The reason why there has been a growing interest in work design is because the field suggests that work can be altered and re-designed to achieve certain outcomes such as motivation and productivity (Samosir et al., 2021).

2.2.1. Motivation through satisfying hygiene factors and stimulating motivators

Herzberg’s two-factor model is one of the first influential theories that explained the relationship between work design and motivation (Van den Broeck & Parker, 2017). In essence, the main hypothesis Herzberg suggested was that there are certain factors of work that make employees satisfied and motivated as well as certain factors that have the opposite effect (Herzberg, 2017). The model distinguishes between motivators, which are the intrinsic factors that drive employees to superior performance (recognition, responsibility, meaningfulness) and hygiene factors (salary, paid insurance, job security, status) that need to be present in order for employees to not experience dissatisfaction (Farr, 1977). He argued that if the hygiene factors are not present, employees will be dissatisfied and therefore not motivated to perform. His main contribution to the field of

work design was explaining the importance of internal job factors in stimulating employee motivation (Lindsay et al., 1967).

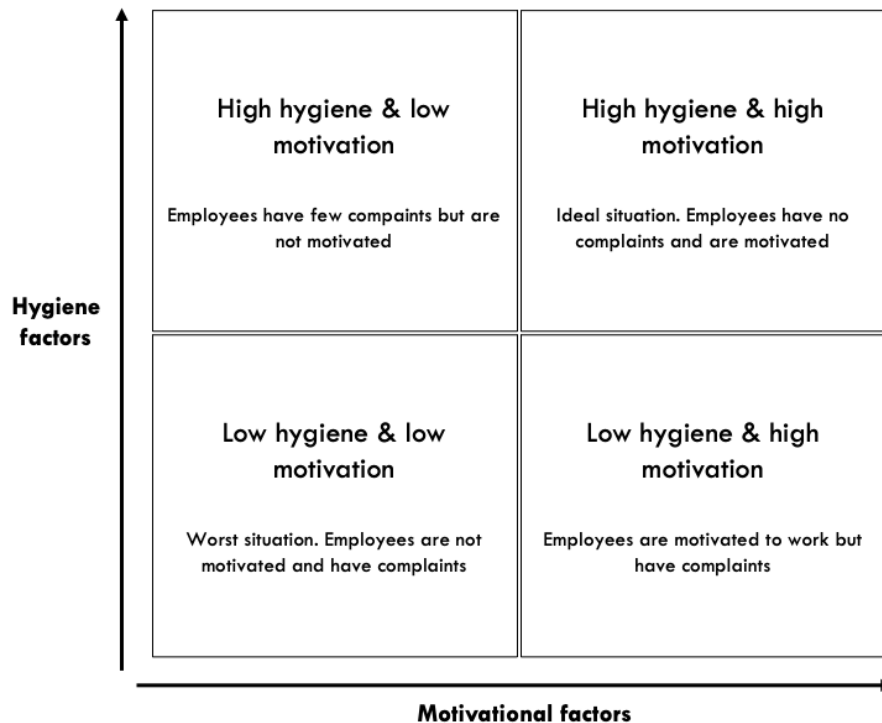


Figure 2. Overview of Herzberg's two factor theory in practice

Although being one of the first major theories in this field making the connection between job characteristics and motivation, it is still a highly regarded theory (Sachau, 2007). However, it is important to point out that the model does not introduce the possibility of individual factors affecting this relationship as it was originally presented. Similar to Maslow's hierarchy of needs, the model assumes that all humans have the same basic needs, in this case, the same hygiene factors and similar motivators (Gawel, 1996).

On the other end of the spectrum of this critique is the Trait Activation Theory (TAT) that can be traced back to 1938 (Murray, 1938) but which was subsequently re-introduced more recently by Tett & Burnett in 2003 as the Personality Trait-Based Model (Tett & Burnett, 2003). They stipulate that an employee's personal traits and workplace situation work harmoniously to create intrinsic satisfaction at work (Haaland & Christiansen, 2006) meaning that to enhance work performance, managers should match employee traits with the appropriate situation (Tett & Burnett, 2003). The theory explaining this relationship suggests that all individuals have various personal traits that can be activated but whether the outcome increases job performance depends on the context.

To exemplify, a highly outgoing employee in a sales role, who interacts well with customers might result in a positive work outcome and as a result their intrinsic satisfaction will also increase. Although this theory fills a gap in Herzberg's two factor theory, explaining individual variance, it lacks in its ability to explain the mechanisms behind how traits affect work behavior. In other words, it explains how the extroverted salesperson will feel more intrinsically satisfied when fulfilling a social desire at work, but it does not account for how those traits will convert into motivational drives to perform at work (Barrick & Mount, 1991).

Numerous work design theories proposed in academic literature have been influenced by the ones that came before them. A response to Herzberg's theory that also partly intertwines the essence of the Trait Activation Theory is Oldham and Hackman's Job Characteristics Theory. Oldham and Hackman's theory explains the relationship between job characteristics and work-related outcomes for employees while also proposing new moderators such as individual differences in line with the TAT. Partly for this reason, the Job Characteristics will be the main underpinning theory in this thesis, as it fills the limiting gaps of previous theories in the field.

2.3. Hypothesis generation and conceptual framework

2.3.1. Connecting remote working with job motivation: The Job Characteristics Model

How remote working affects employees can partly be understood by the Job Characteristics Model, developed by Oldham and Hackman in 1975 (revised in 1980). The theory proposes that certain job characteristics (autonomy, feedback, skill variety, task identity, task significance) affect the level of internal motivation within employees. Thus, by understanding and measuring these characteristics, predictions can be made about employees' job satisfaction and internal motivation. Connecting this theory to the purpose of this thesis, understanding how job characteristics change during remote working can thus in turn predict how job motivation has been affected.

Oldham and Hackman theorized that when the five job characteristics factors are present at work, employees experience certain critical psychological states (experienced meaningfulness of the work, experienced responsibility for the outcomes, knowledge of the results of the work activities) that lead to positive work outcomes (high internal

motivation, high work satisfaction, high quality performance, low absenteeism/turnover). The theory proposes that the factors *skill variety*, *task identity*, and *task significance* enhance the critical psychological state *Experienced meaningfulness of the work*. Autonomy at work enhance the *Experienced responsibility* for the outcomes and finally, receiving *feedback* increase the feeling of having *Knowledge of the results of the work activities*. When a jobholder experiences these three psychological states, they will feel good about themselves and their job which will influence them to perform well at work, thus motivation will be achieved.

Oldham and Hackman captured the essence of their theory in an instrument, the Job Diagnostic Survey (JDS), designed to assess, measure, and predict motivation in employees based on the job characteristics (Hackman & Oldham, 1974). The short version of the survey consists of 15 questions related to autonomy, feedback, skill variety, task identity and task significance which together generate an average Motivating Potential Score (MPS). The unique index predicts employee's motivation at work by focusing on the set of job characteristics (Hackman & Oldham, 1974).

The authors of the theory further introduced *employee growth need strength* as a moderator and defined it as “the strength of a person's need for personal accomplishment, learning, and development”. The moderator acts as a parameter that takes individual differences into consideration. They further argue that there is a strictly positive relationship between the five job characteristics being present and positive work outcomes if the employee is oriented towards personal development and growth. Figure 3. Illustrates the above described relationship proposed by Oldham and Hackman.

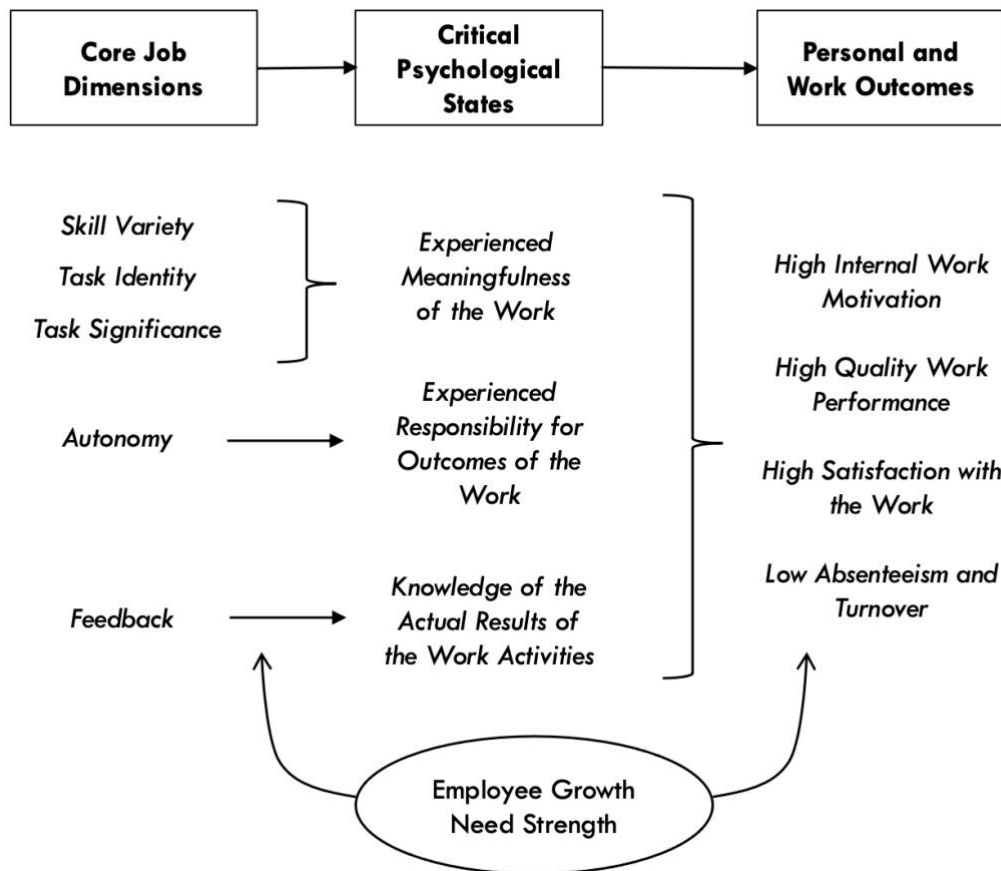


Figure 3. Illustration of Oldham and Hackman's Job Characteristics Model explaining the relationship between five job dimensions and personal/work outcomes as moderated by employee growth need strength.

This theory has been widely accepted and is one of the most prominent theories within the field of work design research. In 1987, the theory was assessed and validated by Fried and Ferris in a meta-analysis, founding strong correlation between the proposed relationships, namely between job characteristics and the critical psychological states as well as the work/personal outcomes (Fried & Ferris, 1987). In later years, research conducted by Singh et al. (2016) supported the theory showing that high levels of motivation are related to high dimensions of job characteristics (Singh et al., 2016). Remote working mainly affects autonomy and feedback compared to face-to-face work (Oldham & Hackman, 2005). These two factors separately have a larger effect on motivation compared to changes in task identity, task significance and skill variety (Oldham & Hackman, 1975). Based on that reasoning, the thesis will mainly focus on the autonomy and feedback parameters. Further explanation and reasoning behind the

relationship between the two variables (autonomy and feedback) will further be presented.

2.3.2. Job characteristic: Autonomy

Oldham and Hackman define autonomy as the “degree to which the job provides substantial freedom, independence and discretion to the employee in scheduling the work and in determining the procedures to be used in carrying it out.” (Oldham & Hackman, 1975). Remote working has often been associated with increased flexibility as remote workers have more freedom in planning their day-to-day activities and routines (Sardeschmuk et al., 2012). Remote workers often have more freedom to choose where they work, how they work and even what to wear on a daily basis (Gajendran et al., 2007). This freedom can lead to the remote worker feeling more responsibility and accountability over their work (Oldham & Hackman, 1976). Khan et al., confirm these theories about remote working and autonomy in a study where he found that remote working positively influenced performance due to increased autonomy (Khan et al., 2018).

Thus, the following hypothesis is brought forward:

H1: Remote workers will experience *increased* autonomy as an effect of working remotely during the pandemic compared to before the pandemic when working at the office

2.3.3. Job characteristic: Feedback

Feedback is defined as the “degree to which carrying out the work activities required by the job provides the individual with direct and clear information about the effectiveness of his or her performance.” (Oldham & Hackman, 1975). In a recent study by Wang et al., one of the biggest challenges with remote working during the pandemic was communication (Wang et al., 2020). When remote working, ICT-mediated communication is the only form available, which their study found was less effective than face-to-face communication (Wang et al., 2020). When there is less opportunity for informal information sharing due to working remotely, feedback and evaluation can become more formalized, and employees receive less ad hoc feedback (Olson, 1982). The

feedback itself might also change during remote working, where employees are more often evaluated based on results and not by observations of their work process (Olson, 1982).

Since remote working makes monitoring more difficult and informal information sharing decreases, the following hypothesis is proposed:

H2: Remote workers will experience *decreased* feedback as an effect of working remotely during the pandemic compared to before the pandemic when working at the office

2.3.4. Individual differences

In the earliest version of the JCT, the moderator *growth need strength* was introduced. The authors of the theory have since discussed that further focus should be made to this parameter, taking more individual dimensions into consideration (Oldham & Hackman, 2007).

Historically, a large part of the remote working population has self-selected that way of working, in contrast to the pandemic-induced remote working we have seen lately - implying that there might be individual differences that make some people more equipped to remote working and some less, which has so far not yet been captured by research (Anderson & Kelliher, 2020). In a study conducted by Nicholson et al. the authors found that self-motivation within individuals is the most important trait in succeeding with remote working (Nicholson et al., 1997). Further, it has been suggested that individuals who work remotely must have good time management skills and organizational skills (Turban et al., 1995) implying that there is an increased need for skills related to self-discipline. This is supported in a more recent study where Wang et al., found that self-discipline was a significant moderator of the relationship between remote working and performance (Wang et al., 2020). Self-discipline is therefore hypothesized to be a significant moderator of the relationship between remote working and motivation.

Another important dimension that has been brought up earlier is the individual's need for social interactions at work. Changes and limitations to social interaction affects individuals differently since everyone have different needs and preferences for social interaction (Steverink & Lindenberg, 2006). In a recent study, social isolation was found to be a predictor for lower work satisfaction during the Covid-19 pandemic (Toscano & Zappalà, 2020). They suggest that social isolation sequentially led to increased stress, which in turn led to lower productivity and lower work satisfaction. It is also important to consider not only limited social interactions but also how social interactions have changed during the pandemic. Remote working can negatively affect the quality of social interaction, as more conversations are being held virtually and not face-to-face which is a less stable environment filled with threats of technical and security issues (Olson & Olgrim, 2020; Wu & Chen, 2020).

Based on the aforementioned theories on self-discipline and social need, the following hypothesis is presented:

H3: Self-discipline and social need moderates the relationship between remote working and motivation

2.3.5. Remote working and effect on perceived motivation

There has been vast research conducted on remote working and its effect on work satisfaction and productivity. The results have so far been dispersed which has been previously discussed. Focusing on recent studies on pandemic-induced remote working, research has suggested that although remote working has in previous literature been praised for improving work-life balance, research during the pandemic has showed that overworking has been a substantial challenge to remote workers as the lines between work and home becomes blurred (Björntoft et al., 2020). There has been an increased reporting on longer working hours, and interference of work in the personal lives of the employees causing increased stress (Ferdou et al., 2020). A recent study focused on Latin America, found that remote working during the pandemic increased perceived work stress and reduced work satisfaction (Sandoval-Reyes et al., 2021). Remote working appeared to cause an increase in work-related stress which acted as a partial mediator between remote work and job satisfaction. Similarly, employee engagement has been found to be one of the most difficult challenges during remote working, with high-level

surveys reporting that 60 percent to 80 percent of employees rarely feel engaged which can partly be due to isolation and loneliness (Pattnaik & Jena, 2020).

Thus, the following and final hypothesis is proposed:

H4: Perceived motivation during the pandemic when remote working is *lower* than perceived motivation before the pandemic when working at the office

2.4. Overview of hypothesis generation and conceptual framework

H1: Remote workers will experience *increased* autonomy as an effect of working remotely during the pandemic compared to before the pandemic when working at the office

H2: Remote workers will experience *decreased* feedback as an effect of working remotely during the pandemic compared to before the pandemic when working at the office

H3: Self-discipline and social need *moderates* the relationship between remote working and motivation

H4: Perceived motivation during the pandemic when remote working is *lower* than perceived motivation before the pandemic when working at the office

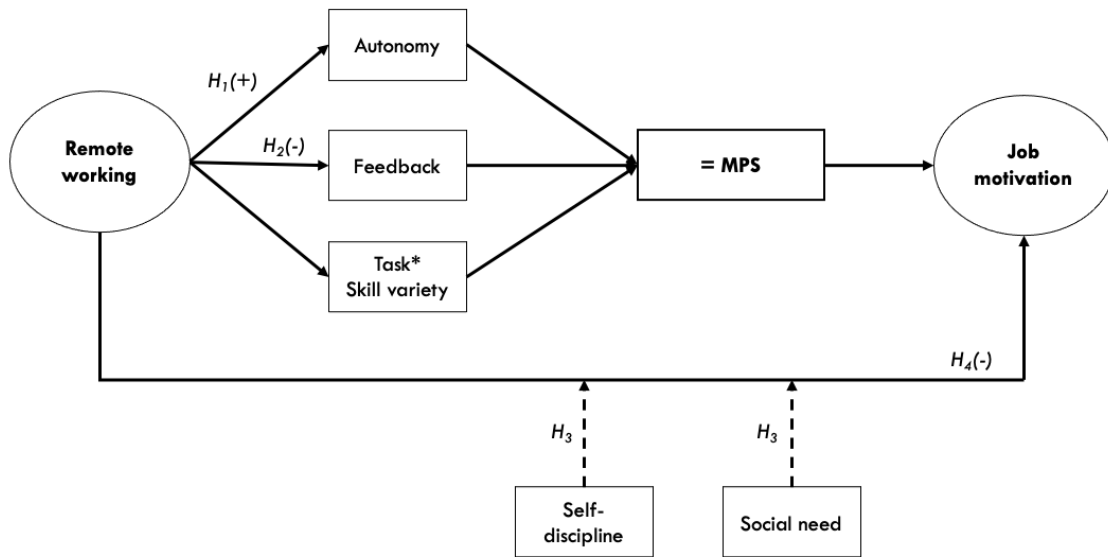


Figure 4. Conceptual framework over study design variables. *Task identity and task significance. Note that MPS is a construct based on autonomy, feedback, task* and skill variety thus the “=”.

2.5. Critical discussion of the Job Characteristic Theory

It is no surprise that it is difficult for theories to fully reflect on reality and the Job Characteristic Theory (JCT) is no exception. An obvious point of criticism that can be questioned in this thesis is the context and time that the theory was developed during. JCT is now more than 30 years old and although still highly influential in modern research (Demirkol & Nalla, 2018), we cannot neglect the fact that the design and view of work has changed during these times (Schroeder et al., 2021). New technologies, new industries and new roles have all shaped the work that we are accustomed to today, which then might not be reflected in the JCT. One evident dimension that is not mentioned in the JCT is for example the social aspect of work and how that affects job motivation. It can be argued that when work switched from manufacturing into being more service-oriented, the importance of the social dimension increased (Qi et al., 2018). The authors of the theory themselves have acknowledged a need to investigate the role of the social dimension in the model further, as well as how increased prevalence of ICT integration in work-settings affect the model (Miner, 2005). However, various modern studies still confirm that the core of the JCT and its predictive power on human behavior at work is still intact, years after the theory was born, hinting that perhaps humans at the core have not changed as much as we might believe.

3. Method

3.1. Research approach

The aim with the study is to understand how remote working during the Covid-19 pandemic affects employees' motivation. For this purpose, I have selected a deductive, quantitative approach to conduct the research. This is in line with the positivist stance I approach my research with. Connecting back to the purpose of the thesis, a positivist approach is the most suitable as I want to be able to generalize my findings to a larger scale such as the Swedish remote working population which is in line with the purpose of this method (Cohen, 2011).

3.1.1. Motivation of research paradigm

As with all research paradigms, there are several drawbacks with the positivist approach with some potentially affecting my thesis in particular. Hammersley pointed out that it is essentially impossible to measure human emotional phenomena such as attitudes, thoughts, and intentions with the positivist approach because these cannot be explicitly observed in an objective way (Hammersley, 2013). This shortcoming can be directly related to my thesis as I am studying human attitude in the form of motivation towards remote working, and it can be argued that everyone experiences remote working differently.

Motivation itself can also be abstract as it might appear different for all individuals (Mathieu et al., 1997), and I bear this in mind when constructing my research approach and what data I am collecting. The questions related to the Job Diagnostic Survey (that is used to measure motivation) does not ever mention the construct motivation. I acknowledge the abstract dimension of motivation and how everyone might interpret that term differently which is why I mitigate for this effect in my research design by using Oldham and Hackman's Job Diagnostic Survey. Their questions are only related to the Job Characteristics and is designed and tested to fit in a survey-based format. At the end of the survey, there is a free-text option where respondents can clarify, shed light, or give more context to their answers. This have given the data some flavor that I have taken into consideration in the discussion part of the thesis.

Johnson and Onwuegbuzie further mention limitations to the fundamental ideas of positivism, namely that generalizing a population may neglect a lot of truth about local contexts that can only be revealed through individuals understanding and interpretation (Johnson & Onwuegbuzie, 2004). Since the subject of motivation can be considered a very mature subject, with several widely accepted theories, one may wonder why I did not choose an interpretivist approach that would capture the local context that Johnson & Onwuegbuzie mention. To remind the reader, the purpose is to understand the effects remote working has had on the motivation of employees during the pandemic. I am interested in understanding the effect on a generalizable level which is one of the core strengths with the positivist approach (Cohen, 2007). Again, data collected in interpretivist studies cannot be generalized due to its heavy reliance on personal viewpoints and values (Dudovskiy, 2018).

3.2. Data collection

A cross-sectional study was conducted to gather quantitative data using a Qualtrics survey consisting of 38 questions whereas 15 of them consisted of a short version of the Job Diagnostic Survey (Hackman & Oldham, 1974). Respondents were asked to indicate their agreement or disagreement to various statements on a 7-point Likert scale. Higher numbers indicated higher agreement to the statement where 1 was the lowest and 7 the highest. Further, the Job Diagnostic Survey was designed in a way that each question repeated itself asking the respondent to first answer from the perspective of before the pandemic when working at the office and then answering the same question again but from the perspective during the pandemic when remote working. The aim with this set-up was to compare the answers in two time periods thus mimicking a longitudinal design which is more likely to suggest cause-and-effect relationship than a cross-sectional study (IWH, 2015). The reason for not conducting a longitudinal study in the first place was due to time-related limitations of this master thesis.

The survey was reviewed by a diverse and independent group of individuals and pilot-tested on a small sample consisting of seven individuals. Feedback mostly concerned some unclear wording and phrases in the Job Diagnostic Survey which was then adjusted for before the final version was sent out (see appendix 7.1.2). The survey was sent out

on the 7th of October 2021 via social media platforms (LinkedIn and Facebook) and circulated for a month before closing on the 5th of November 2021. Due to the target group being office-based full-time employees who switched to remote working during the pandemic, LinkedIn was suitable due to it being a career-oriented platform. For Facebook, I sent it out on my personal account as well as targeted some groups with themes related to work/families/communities.

A total of 234 respondents contributed to the study, completely anonymously, voluntarily and without any compensation except the promise that 10SEK would be donated to charity after completion of the survey. Furthermore, data was collected in complete accordance with GDPR regulations.

3.3. Participants

The target group for this study was Swedish office-workers who due to the pandemic, worked remotely for most of the time. Respondents were asked questions related to their country of employment, degree of remote working during the pandemic and degree of office-based working prior to the pandemic. Respondents who did not match the desired characteristics (worked remotely prior to the pandemic and/or did not work remotely during the pandemic) were later excluded from the results.

After elimination, the final sample consisted of 151 individuals out of the 234 respondents who completed the survey, whereas 66 percentage were female, 33 percentage were male, and 1 percentage identified as other or declined to answer. A full summary of the participants can be seen in **Table 1**.

Table 1. Summary of demographic characteristics of study participants

		Frequency	Share
Gender	Femae	99	66%
	Male	50	33%
	Other/decline to answer	2	1%
Age	<20 years	0	0%
	20-30 years	28	19%
	31-40 years	30	20%
	41-50 years	52	34%
	>50 years	41	27%
Industry	Education	7	5%
	Business services	24	16%
	Financial services	45	30%
	Media & Communications	10	7%
	Consumer goods	6	4%
	IT	22	15%
	Healthcare	34	23%
	Utilities	1	1%
	Other	2	1%
Business title	Entry-level	61	40%
	Individual contributor	13	9%
	Manager	52	24%
	C-suite	23	15%
	Other	2	1%
Tenure	<1 year	14	9%
	1-3 years	44	29%
	3-5 years	30	20%
	5-10 years	32	21%
	10+ years	21	21%

3.4. Measures

3.4.1. Motivating potential score

The motivating potential score was measured using the short version of the Job Diagnostic Survey consisting of 15 questions related to the five core dimensions of work: skill variety, task identity, task significance, autonomy, and feedback. Table 2. illustrates which questions on the survey relates to what job characteristic (see appendix 7.1.2 for

full survey). Respondents were asked to indicate agreement or disagreement to statements on a 7-point Likert scale where 7 was the highest level of agreement and 1 the lowest.

Table 2. Conceptuality of the core dimensions measuring MPS and relatedness to survey items

Job Characteristics	Conceptualization
Skill variety (Item 1,2,3)	Degree to which the employees have the scope of using different skills and talents to complete a variety of work activities
Task identity (Item 4,5,6)	Degree to which a job requires completion of a whole or identifiable piece of work, such as doing something from beginning to end.
Task significance (Item 7,8,9)	Degree to which the job has a substantial impact on the organization.
Autonomy (Item 10,11,12)	Degree that the employees have freedom in scheduling the work, determining the procedures and the methods of work.
Feedback (Item 13,14,15)	Degree where the extent to which performing a job provides an employee with clear information about his or her effectiveness.

The job motivating potential score (MPS) was calculated using the average score of all job characteristics:

$$MPS = \frac{\text{Skill variety} + \text{Task identity} + \text{Task significance}}{3} \times \text{Autonomy} \times \text{Feedback}$$

Equation 1. Formula for calculating Motivation Potential Score (MPS)

In theory, the formula implies that the lowest motivation potential a job can score is 1 ($MPS = \frac{1+1+1}{3} \times 1 \times 1$) and the highest is 343 ($MPS = \frac{7+7+7}{3} \times 7 \times 7$).

3.4.2. Perceived motivation

To measure perceived motivation, I adapted a question from Mertler's Job Motivation and Satisfaction Survey (Mertler, 2002) (see appendix. 7.1.2). Respondents had to compare their perceived motivation before the pandemic with their perceived motivation during the pandemic when remote working by answering the questions: "How motivated did you feel at work before the pandemic when working at the office?" as well as "How motivated did you feel at work during the pandemic when working remotely?".

Respondents could rank their perceived motivation on a 7-point Likert scale where 1 corresponded to “extremely low motivation” and 7 to “extremely high motivation”.

3.4.3. Perceived self-discipline

To measure self-discipline, I added a question to the survey asking respondents to rank their perceived self-discipline on a 7-point Likert scale (see appendix. 7.1.2) through the survey item “How would you rank your self-discipline?”. 1 indicated “extremely bad” and 7 indicated “extremely good”. In order to ensure a common understanding of the concept of self-discipline, thus making it comparable across the sample later, I also added provided respondents with a definition of self-discipline.

3.4.4. Social need

Similarly, to the measure self-discipline, I added a question asking respondents to rank their perceived social need for interaction at work on a 7-point Likert scale (see appendix. 7.1.2) through the survey item “How would you rank your need for social interaction at work?”. 1 indicated “extremely low” and 7 indicated “extremely high”. A definition of the term was provided to the respondents and pilot-testing of the survey revealed that the question was comprehensible and purpose-fulfilling.

3.5. Strategy of analysis

Collected data was analyzed using IBM SPSS version 27 software. Before analysis of data, reverse coded items (negatively stated items) in the survey had to be recoded into positive scoring. This was completed by computing new variables in SPSS and then transforming them, reversing the scale (1=7, 2=6, 3=5, 4=4, 5=3, 6=2, 7=1). This is a pre-requisite in order to compare across items, compute the MPS and run the Cronbach’s alpha test of internal consistency.

To understand the effect that pandemic-induced remote working had on the autonomy, feedback and MPS parameters, a Wilcoxon signed rank test was used to measure if the difference in mean, before and after treatment, was statistically significant. Since data surrounding the variables were collected from the perspective of two time periods (before and during the pandemic) for the same individual, I end up with dependent samples. A Wilcoxon Signed Rank Test (also known as a paired samples Wilcoxon test)

is an alternative to paired samples t-test, but whereas the paired samples t-test assumes normality, the Wilcoxon test is a non-parametric test (Newbold et al., 2012). The reasoning behind the choice of test is underpinned by the assumptions and nature of the data (Nayak, 2011). Because the variables in the survey were measured using a Likert scale which is an ordinal scale that is discrete and bounded (Joshi et al., 2015), data cannot by nature be normally distributed (Newbold et al., 2012). This further implies that a non-parametric test is appropriate to analyze the data.

3.5.1. Method for hypothesis testing

To compare if there is a difference in distribution between variables *Autonomy_BP*, *Autonomy_DP*; *Feedback_BP*, *Feedback_DP*; *MPS_BP*, *MPS_DP* and *Mot_BP*, *Mot_DP* a Wilcoxon signed rank test will be conducted with the following assumptions for the null hypothesis (Table 3.), alternative hypothesis and decision rule (Table 4.).

Table 3. Overview of null hypothesis

Hypothesis	Null hypothesis
H1	$H_0: \mu_{Autonomy_BP} - \mu_{Autonomy_DP} = 0$
H2	$H_0: \mu_{Feedback_BP} - \mu_{Feedback_DP} = 0$
H4	$H_0: \mu_{MPS_BP} - \mu_{MPS_DP} = 0$
H4	$H_0: \mu_{Mot_BP} - \mu_{Mot_DP} = 0$

The null-hypothesis states that the difference in means for the variables is equal – there is no difference between mean before the pandemic and mean during the pandemic.

Table 4. Overview of alternative hypothesis and decision rule

Hypothesis	Alternative hypothesis	Decision rule
H1	$H_A: \mu_{Autonomy_BP} - \mu_{Autonomy_DP} \neq 0$	Reject H_0 if $P < 0.05$
H2	$H_A: \mu_{Feedback_BP} - \mu_{Feedback_DP} \neq 0$	Reject H_0 if $P < 0.05$
H4	$H_A: \mu_{MPS_BP} - \mu_{MPS_DP} \neq 0$	Reject H_0 if $P < 0.05$
H4	$H_A: \mu_{Mot_BP} - \mu_{Mot_DP} \neq 0$	Reject H_0 if $P < 0.05$

The alternative hypothesis states that there is a difference between the variables as the difference in mean between them is not zero. Finally, the decision rule that the level of significance (two-tailed test) must be less than 0.05, indicates if the difference is statistically significant. This level of significance was chosen as it is an appropriate significance threshold that is widely used in the field (Di Leo & Sardanelli, 2020).

3.5.2. Method for testing moderating effects

A moderator analysis is used to determine if the hypothesized moderators (self-discipline and social need) are significant predictors for MPS and perceived motivation. The standard method of determining such relationship is through a multiple regression analysis (Aguinis, 2004). For this study, four different multiple linear regression analyses will be conducted for the dependent variable before pandemic (BP) and during the pandemic (DP). The independent variables that will be tested to see if they are significant coefficients are self-discipline (β_{SD}) and social need (β_{Social}) (see equations. 2, 3, 4, 5).

$$MPS_{BP} = \beta_0 + \beta_{SD} + \beta_{Social} + \varepsilon$$

Equation 2. MPS before pandemic as dependent variable

$$MPS_{DP} = \beta_0 + \beta_{SD} + \beta_{Social} + \varepsilon$$

Equation 3. MPS during pandemic as dependent variable

$$Mot_{BP} = \beta_0 + \beta_{SD} + \beta_{Social} + \varepsilon$$

Equation 4. Perceived motivation before pandemic as dependent variable

$$Mot_{DP} = \beta_0 + \beta_{SD} + \beta_{Social} + \varepsilon$$

Equation 5. Perceived motivation during pandemic as dependent variable

In order to find out if the association between the dependent and independent variables has been significantly altered across the various regressions, a test of the equality of regression coefficients will be conducted, which is a common practice in statistics today (Riley, 2009). To test if there is equality of coefficients between equation 1 and 2, and between equations 2 and 3, a Chi-Squared test will be conducted. An overview of the method for the hypothesis testing can be seen in Table 5.

Table 5. Overview of setup for hypothesis testing of Equality of regression coefficients

Dependent variable	Coefficient	Null hypothesis	Decision rule
MPS_{BP}	β_{SD}	$\beta_{SD(BP)} - \beta_{SD(DP)} = 0$	Reject H_0 if $p > 0.05$
Mot_{BP}	β_{SD}	$\beta_{SD(BP)} - \beta_{SD(DP)} = 0$	Reject H_0 if $p > 0.05$
MPS_{DP}	β_{Social}	$\beta_{Social(BP)} - \beta_{Social(DP)} = 0$	Reject H_0 if $p > 0.05$
Mot_{DP}	β_{Social}	$\beta_{Social(BP)} - \beta_{Social(DP)} = 0$	Reject H_0 if $p > 0.05$

3.6. Data quality

3.6.1. Reliability

Reliability is an important way to assess the quality of the measurement procedure because in order for the study to be valid, the procedure to collect data must first be reliable (Cohen et al., 2017). Cronbach's alpha is a reliable test to check for internal consistency among Likert-coded items in a survey to see if they measure the same higher-level measure (Gliem, 2003; Bryman & Bell, 2011). Performing a Cronbach alpha test on the three items related to autonomy revealed a high internal consistency ($\alpha=0.87$). The results were similar for feedback ($\alpha=0.88$), task identity ($\alpha=0.78$), task significance ($\alpha=0.77$) and skill variety ($\alpha=0.81$). This indicates a high to robust internal consistency (Taber, 2018). For more detailed data on the test, I refer to appendix 7.2.

3.6.2. Validity

The main instrument used in this thesis was the Job Diagnostic Survey (JDS), which has many dimensions to it that increases validity. Firstly, the JDS uses multiple-indicator measures meaning that it uses multiple indicators to measure one concept. All job characteristics have three related questions whereas one of them is reverse coded. This increases the face validity of the survey as it minimizes overreliance on one single indicator as a measure for the dependent variable (Bryman & Bell, 2011). The practice of using reverse coded items (the reversed form of positively worded items) is a commonly used practice that is meant to reduce response bias (Alvarez et al., 2018). Criticism has been directed to reverse coded items, suggesting that there inevitably becomes a requirement for a certain level of language interpretation skills that can create bias in the responses (Hughes, 2009). To assess for the validity for these reverse coded items, the survey was first pilot tested on a diverse group of individuals (both native and not native English speakers). Before the final survey was sent out, validity of the language, interpretation and specificity of the survey had been deemed high.

4. Results and analysis

4.1. Descriptive Statistics and Survey Items

The Job Motivating Potential has been calculated using the following Equation 1:

$$MPS = \frac{\text{Skill variety} + \text{Task identity} + \text{Task significance}}{3} \times \text{Autonomy} \times \text{Feedback}$$

Descriptive statistics of the results can be seen in Table 6.

Table 6. Descriptive statistics of MPS and related job characteristics

	Minimum		Maximum		Mean		Std. Deviation	
	Before	During	Before	During	Before	During	Before	During
Pandemic timeline								
Skill variety	3.67	3.00	7.00	7.00	5.82	5.66	.92	.98
Task identity	2.00	2.00	7.00	7.00	5.00	4.95	1.24	1.19
Task significance	1.67	1.67	7.00	7.00	5.04	5.03	1.15	1.14
Autonomy	2.00	2.33	7.00	7.00	5.55	5.74	.99	.97
Feedback	1.33	1.33	7.00	7.00	4.76	4.66	1.17	1.23
MPS	25.93	30.25	343.00	343.00	144.32	143.39	61.24	61.05
Valid N	151							

Descriptive statistics reveal that there is only a minor change in mean MPS before and after the pandemic (144.32 compared to 143.39) resulting in a 0.93 decrease in mean MPS during the pandemic. However, looking at individual job characteristics there is a larger effect on change of mean before and during the pandemic. Mean autonomy increased from 5.55 to 5.73 resulting in a 0.18 increase and feedback decreased from 4.76 to 4.66 resulting in a 0.10 decrease. Mean task significance and mean task identity remained relatively intact (-0.01 and -0.05 respectively) while mean skill variety showed a somewhat larger decrease of 0.16.

4.2. Comparison of means

A Wilcoxon signed-rank test was used to test if there was a significant change in the variables between the dependent samples. Results of the hypothesis testing can be seen in Table 7.

Table 7. Test statistics for Wilcoxon Signed Rank Test

	<i>Autonomy_BP- Autonomy_DP</i>	<i>Feed_BP-Feed_DP</i>	<i>MPS_BP-MPS_DP</i>	<i>Mot_BP-Mot_DP</i>
Z	-4.35	-3.03	-.28	-3.28
P-value	<.001*	.002*	.779	.001*
r	0.35	0.25	0.03	0.27

*P-value<0.05 (significance threshold)

4.3. MPS

The job motivating potential (MPS) is composed as an average of the variables *Autonomy*, *Feedback*, *TaskId*, *TaskSig* and *Skill*. As seen in Table 7, no significant change between MPS before the pandemic and during the pandemic was found ($z = -0.28, p = .779$). In other words, the results lead us to accept the null hypothesis, that there is no difference in mean between the two distributions.

Looking at the variables creating the MPS, Table 8 shows that there was not any significant change in the job characteristic task identity and task significance, but there was significant change in the skill variety characteristic.

Table 8. Wilcoxon Signed Rank Test on MPS variables

	<i>Skill_BP- Skill_DP</i>	<i>TaskId_BP- TaskId_DP</i>	<i>TaskSig_BP- TaskSig_DP</i>	<i>Feedback_BP- Feedback_DP</i>	<i>Autonomy_BP- Autonomy_DP</i>
Z	-3.83	-1.365	-.924	-4.35	-3.03
P-value	<.001*	.17	.355	<.001*	.002*
r	0.35	0.25		0.35	0.25

4.4. H₁: Remote working effect on autonomy

As can be seen in Table 7 there is a statistically significant positive difference in autonomy before the pandemic and during the pandemic when working remotely, $z = -4.35, p = < 0.001$. The effect size according to Rosenthal (1994) can be considered medium ($r = 0.35$). Based on the decision rule, we therefore reject the null hypothesis that there is not a change between autonomy before the pandemic and autonomy when remote working during the pandemic.

This indicates that the mean autonomy increased during remote working compared to working at the office prior to the pandemic and the effect can be considered medium in size (Rosenthal, 1994).

4.5. H₂: Remote working effect on feedback

A Wilcoxon Signed Rank Test revealed that there was a significant decrease in feedback before the pandemic and during the pandemic when remote working, $z = -3.03, p = < 0.002$ with a medium effect size of $r = 0.25$. This indicates that the null hypothesis is rejected, and results point to a significant change in the mean of the feedback variable.

4.6. H₃: Relationship between Self-discipline, Social need, and motivation

4.6.1. Correlation table of variables

Table 9. provides results from the Pearson correlation test on the variables before the pandemic while Table 10. is the corresponding results from variables during the pandemic when remote working. As expected, the job characteristics are statistically significantly correlated with MPS. No multicollinearity was found between self-discipline and social need for interaction.

Table 9. Correlation matrix variables before pandemic

		MPS_BP	Autonomy_BP	Feed_BP	Skill_BP	Taskid_BP	TaskSi_BP	SD	Social
MPS_BP	Pearson Correlation	1	.666**	.812**	.509**	.415**	.507**	.268**	.044
	Sig. (2-tailed)		.000	.000	.000	.000	.000	.001	.592
Auto_BP	Pearson Correlation	.666**	1	.254**	.397**	.192*	.278**	.231**	-.044
	Sig. (2-tailed)	.000		.002	.000	.018	.001	.004	.589
Feed_BP	Pearson Correlation	.812**	.254**	1	.267**	.243**	.266**	.174*	.085
	Sig. (2-tailed)	.000	.002		.001	.003	.001	.032	.298
Skill_BP	Pearson Correlation	.509**	.397**	.267**	1	-.066	.540**	.200*	.134
	Sig. (2-tailed)	.000	.000	.001		.421	.000	.014	.101
Taskid_BP	Pearson Correlation	.415**	.192*	.243**	-.066	1	.091	.112	-.119
	Sig. (2-tailed)	.000	.018	.003	.421		.269	.171	.144
TaskSi_BP	Pearson Correlation	.507**	.278**	.266**	.540**	.091	1	.159	.029

	Sig. (2-tailed)	.000	.001	.001	.000	.269	.051	.725
SD	Pearson Correlation	.268**	.231**	.174*	.200*	.112	.159	1
	Sig. (2-tailed)	.001	.004	.032	.014	.171	.051	.728
Social	Pearson Correlation	.044	-.044	.085	.134	-.119	.029	-.029
	Sig. (2-tailed)	.592	.589	.298	.101	.144	.725	.728

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

Table 10. Correlation matrix variables during pandemic

		MPS_DP	Autonomy_DP	Feed_DP	Skill_DP	Taskid_DP	TaskSi_DP	SD	Social
MPS_DP	Pearson Correlation	1	.582**	.813**	.479**	.374**	.504**	.286**	.023
	Sig. (2-tailed)		.000	.000	.000	.000	.000	.000	.776
Auto_DP	Pearson Correlation	.582**	1	.151	.268**	.100	.233**	.164*	-.103
	Sig. (2-tailed)	.000		.065	.001	.221	.004	.044	.209
Feed_DP	Pearson Correlation	.813**	.151	1	.260**	.223**	.290**	.180*	.063
	Sig. (2-tailed)	.000	.065		.001	.006	.000	.027	.440
Skill_DP	Pearson Correlation	.479**	.268**	.260**	1	-.095	.523**	.263**	.115
	Sig. (2-tailed)	.000	.001	.001		.248	.000	.001	.160
Taskid_DP	Pearson Correlation	.374**	.100	.223**	-.095	1	.029	.153	-.088
	Sig. (2-tailed)	.000	.221	.006	.248		.721	.061	.280
TaskSi_DP	Pearson Correlation	.504**	.233**	.290**	.523**	.029	1	.189*	.064
	Sig. (2-tailed)	.000	.004	.000	.000	.721		.020	.436
SD	Pearson Correlation	.286**	.164*	.180*	.263**	.153	.189*	1	-.029
	Sig. (2-tailed)	.000	.044	.027	.001	.061	.020		.728
Social	Pearson Correlation	.023	-.103	.063	.115	-.088	.064	-.029	1
	Sig. (2-tailed)	.776	.209	.440	.160	.280	.436	.728	

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

4.6.2. MPS before the pandemic

A multiple linear regression analysis was performed in order to predict MPS before the pandemic based on self-discipline and social need. We found a statistically significant regression ($p=0.003$) but only the variable self-discipline was a significant predictor ($p<.001$) as social need was not a significant coefficient ($p=0.515$).

See appendix 7.3 for full result section on regression analyses data.

4.6.3. MPS during the pandemic

A significant regression was found ($p < 0.002$). As with MPS before the pandemic, only the variable self-discipline was a significant predictor for the regression ($p < .001$) whereas social need not a statistically significant coefficient ($p = 0.690$).

4.6.4. Motivation before the pandemic

A statistically significant regression was found ($p < .001$). Both the variables self-discipline ($p < .001$) and social need ($p = .001$) was statistically significant predictors for the regression.

4.6.5. Motivation during the pandemic

A statistically significant regression was found ($p < .001$). Both the variables self-discipline ($p < .001$) and social need ($p = 0.024$) was statistically significant predictors for the regression.

4.6.6. Test of Equality of Regression Coefficients

Table 11. Result from equality of coefficient test

Dependent variable	Coefficient	Null hypothesis	χ^2 -statistic	P-value
MPS	β_{SD}	$\beta_{SD(BP)} - \beta_{SD(DP)} = 0$	0.064	0.801
Mot	β_{SD}	$\beta_{SD(BP)} - \beta_{SD(DP)} = 0$	15.505	<0.001*
Mot	β_{Social}	$\beta_{Social(BP)} - \beta_{Social(DP)} = 0$	19.549	<.00001*

*P-value < 0.05 (significance threshold)

As shown on Table 11., when testing the coefficients of self-discipline (with MPS before the pandemic as dependent variable) and with self-discipline (with MPS during the pandemic as dependent variable), we accept the null hypothesis that there is not a difference between the predictive power of the coefficients in each regression. In other words, self-discipline predicts MPS before the pandemic as much as it does during the pandemic. Social need as a coefficient for MPS was not tested for equality as it was previously deemed to not be a significant coefficient for the model.

In contrast, the self-discipline coefficient was found to be significantly different in the perceived motivation before the pandemic regression compared to during the pandemic ($p < 0.001$). Self-discipline as a coefficient seemed to predict perceived motivation more during the pandemic compared to before the pandemic. Similar results were found for

the social need coefficient ($<.00001$) indicating that social need predicts perceived motivation to a higher degree during the pandemic when remote working compared to before the pandemic.

4.7. H₄: Remote working effect on perceived job motivation

As shown in Table 7, there was a statistically significant difference between perceived motivation before the pandemic and during the pandemic when remote working ($p<0.001$). The size of the difference can be interpreted as medium high ($r=0.27$) (Rosenthal, 1994).

4.8. Overview of hypothesis testing

Below is the condensed qualitative description of the results of the hypothesis tests concluding the proposed hypotheses.

H₁: Autonomy

The mean autonomy during the pandemic was statistically significantly higher than mean autonomy before the pandemic when working at the office ($p<0.001$). **H₁ is supported.**

H₂: Feedback

The mean feedback during the pandemic was statistically significantly higher than the mean feedback before the pandemic when working at the office ($p<0.002$). **H₂ is supported.**

H₃: Self-discipline and Social need

A multiple regression analyses showed that for perceived motivation, both self-discipline and social need was found to be significant coefficients while only self-discipline was a significant coefficient for MPS. **H₃ is only partly supported.**

H₄: Perceived job motivation

Perceived job motivation was tested using the Wilcoxon Signed Rank Test. Results showed that the perceived job motivation was lower during the pandemic when working remotely compared to before the pandemic when working at the office. This relationship was statistically significant ($p=0.001$). **H₄ is supported.**

Table 12. Overview of hypotheses and results

H ₁	Remote workers will experience <i>increased</i> autonomy as an effect of working remotely during the pandemic compared to before the pandemic when working at the office	Supported
H ₂	Remote workers will experience <i>decreased</i> feedback as an effect of working remotely during the pandemic compared to before the pandemic when working at the office	Supported
H ₃	Self-discipline and social need moderate the relationship between remote working and motivation	Partly supported*
H ₄	Perceived motivation during the pandemic when remote working is <i>lower</i> than perceived motivation before the pandemic when working at the office	Supported

*Self-discipline and social need moderated relationship for both perceived motivation, while only self-discipline moderated for MPS

5. Discussion

5.1. Summary of main findings

In this thesis, the research question – How is employee motivation affected by remote working during the Covid-19 pandemic? – has been explored by surveying 151 office-working employees who switched working set-up from on-site to remote working during the pandemic. The concept of employee motivation was studied from two different measures: the Motivating Potential Score (MPS), developed by Oldham and Hackman (1975) and through self-reported perceived motivation. The results have indicated a complex relationship between the MPS, perceived motivation and remote working. In the following chapter, main findings and interpretation of results will be presented and discussed.

5.1.1. Autonomy

In line with Khan et al.'s findings on the positive relationship between remote working, autonomy and job performance, results indicated that autonomy increased during remote working compared to on-site working before the pandemic.

5.1.2. Feedback

Findings from this study reveal that employees experience a lower degree of feedback in carrying out their work activities when remote working. These findings can be explained by the theory proposed by Olson (1982), that information sharing become more formalized during remote working thus giving employees less cues about their job performance. It can also be a combined effect from not only decreased amounts of feedback but also a decrease in the quality of feedback. As Wang et al. proposed, the ICT-mediated communication might reduce the efficiency of communication compared to face-to-face communication (Wang et al., 2020).

5.1.3. Motivating Potential Score (MPS) and Perceived motivation

Interestingly, in absolute terms, the MPS was lower during the pandemic than before, but this difference was not statistically significant. We (me, and you – the reader) can therefore not state that motivation measured in terms of MPS has changed as a result of remote working. According to the Job Characteristic Theory, MPS is a moderator of

perceived motivation which if the theory holds, would indicate that we should find a positive correlation between MPS and the measure of perceived motivation. This was not the case. Instead, we found a statistically significant decrease in perceived motivation during remote working compared to on-site working before the pandemic. The results are not cohesive with previous theoretical propositions.

This is because the MPS is composed of the measures; autonomy, feedback, task identity, task significance and skill variety – of which we can first look at changes in these. Results indicated, in line with the theory proposed by Khan et al. and Oldham & Hackman, that remote working induced a change in autonomy and feedback (autonomy increased and feedback decreased). However, we could also see a statistically significant decrease in skill variety during the pandemic compared to before. This decrease in skill variety might be caused by remote working's effect on i.e., decelerated creativity, skill-sharing across the organization and spontaneous learning as proposed by Olson (1982). However, the aggregated impact of the decrease in skill variety and feedback did not give rise to a change in MPS. This might suggest that Oldham and Hackman's Job Characteristic Model is lacking in its capabilities to predict motivation in an environment of crises or external disruption to an organization, which is what a pandemic can be described as.

In contrast to previous remote working studies, we have also seen an enormous acceleration of ICT capabilities, enabling a smooth and near seamless remote working experience. This might explain that employees have experienced little disruption to job characteristics when transitioning to a remote working set-up. As a result, the decline in motivation would not be captured in the job characteristic-dependent measure of MPS. To understand this further, we must compare MPS and perceived motivation to see in what ways they might differ, which the proposed moderators of the study can aid us in.

5.1.4. Self-discipline and Social need as moderators

The above conjecture is further supported when examining the moderating effects of the MPS and perceived motivation separately. Firstly, we found that both the variables Self-discipline and Social need was significant predictors for perceived motivation but only Self-discipline predicted MPS. In line with previous criticism directed towards the Job Characteristics Model, it seems like the Job Diagnostic Survey was unable to capture the

effect of the individual dimension of social need, a dimension that apparently predicted the measure perceived motivation.

When testing the equality of regression coefficients, we found that although self-discipline predicted MPS, there was not a statistically significant change in the explanatory power in self-discipline when remote working compared to on-site working. It is possible to interpret this result as those individuals who have higher self-discipline do not necessarily experience more motivation when remote working compared to on-site working, instead they have generally higher motivation independent on the working set-up. However, for perceived motivation, both self-discipline and social need had a statistically significant change in predictive power for remote working compared to on-site working. It seems that for perceived motivation, people with higher self-discipline perform better in a remote working environment compared to employees with lower self-discipline when switching to a remote working environment. The same relationship but reversed was found for employees with high social need. They might be more prone to experience lower motivation during remote working compared to on-site working due to their higher social need.

When comparing between MPS and perceived motivation it becomes clear that, in contrast to Oldham and Hackman's theory, they do not capture the same dimensions and parameters. This is an important finding as the Job Characteristic Theory is one of the most influential theories in the field of work design. In the following sections I will discuss further implications of these findings.

5.2. Conclusion

This study found that employee perceived a decrease in motivation during remote working compared to on-site working before the pandemic. From a work-design perspective, it appeared that during remote working, feedback decreased which caused a lower motivation, partly mitigated by an increase in autonomy. Effects on perceived employee motivation was also predicted by individual's self-discipline at work and social need for interaction at work. Individuals with higher self-discipline had an increased perceived motivation at work while individuals with high degree of social need became less motivated when remote working. Together, these findings have aided us in

answering how employee motivation has been affected by remote working during the Covid-19 pandemic.

5.3. Managerial and practical implications

One of the most used tools recommended for managers to assess employee motivation is the Job Diagnostic Survey (JDS). In this study, I have found that the JDS have limitations in predicting motivation when employees are remote working during the pandemic. This is an important finding because it can aid managers, who are interested in understanding how their employees are experiencing in terms of motivation during remote working, in diagnosing motivation in more reliable way. Further, findings can also help business leaders and managers make decisions regarding work design and the role of remote working going forward. If the corporate culture is such that i.e., feedback, skill-sharing and social interaction is important for the success of the organization, then findings from this study can help organizations optimize the remote working set-up if remote working is necessary.

Finally, from an employee perspective, findings from this study have shed more light on the importance on individual differences in shaping the remote working experience in terms of motivation. This can aid employees when engaging in job crafting to reflect on personal traits such as need for social interaction and other drivers at work to increase their motivation at work.

5.4. Theoretical contributions

One the core findings connected to the theory underpinning this study, the Job Characteristics Theory, is that it has several limitations in predicting motivation in a remote setting during the Covid-19 pandemic. By only focusing and improving the job characteristics when working remotely will not necessarily increase motivation as there seemed to be a disconnect between MPS and perceived motivation. The theory needs additional dimensions to explain the complexity of perceived motivation in a remote setting for the modern working population. I have found that need for social interaction at work is a significant predictor for perceived motivation, a moderator that is not captured in the JCT developed by Oldham and Hackman. This finding can contribute to

the modernization and development of the very much influential theory as well as to the entire field of work design.

5.5. Limitations and future research

One apparent limitation of this study is that the results rely on a longitudinal study design, but data was not collected during two separate period of times. Respondents were asked questions related to their experience before the pandemic and then directly after, the same questions but with the focus on during the pandemic. Reliability of the results are therefore dependent on how well respondents recall the time before the pandemic at the moment of responding to the survey. Now, given natural constraints of a master thesis, it would not have been possible to conduct the study in a true longitudinal fashion. However, for future research conducted with a similar research design as this, some control questions could be added to check if respondents perceive that they have the ability to respond to all questions in a representative way.

Secondly, my intention with the study was to explore effects on motivation through a work design perspective which naturally delimitates the scope of the thesis. However, I believe that there is a lot of emerging research pointing to other perspectives that can be relevant for this research question. To exemplify, further research can focus more on the softer side of an organization that is not immediately connected to work design and job characteristics, such as leadership style of management and culture as antecedents for job motivation in a remote setting. Further focus on the individual differences as moderators for the relationship can also shed more light on the complexity of this field.

In this study, based on previous theories regarding remote working, autonomy and feedback have been the sole focus. These were deemed to be the most impactful job characteristics in the era of remote working, but this conclusion must be further validated. My results reveal that task significance and task identity seemed to be statistically insignificant during remote working compared to on-site working, but this was not the case for skill variety. Given the results of decreased feedback, it would not surprise me if remote working can also create challenges for learning and using a variety of skills at work. It would be interesting for future studies to dive deeper in the scope of shared learning, communication, and skill-learning in a remote setting.

5.6. Final words from the author

The topic of job motivation as well as remote working are two large subjects with several possible angles to take a stance from. Combine that with the uncertainty of the extraordinary context that is the Covid-19 situation we are finding ourselves in today and the task at hand can become overwhelming. What the future holds for ways of working at traditionally office-based jobs cannot be determined through a survey or some interviews alone. However, what we can do is to focus on smaller pieces of the puzzle that together paints a picture. Regardless of how small or large my contribution has been through this thesis; I do hope that I have sparked some new thought and ideas for you as a reader.

Sincerely,
Isabelle He

Stockhom, December 5th, 2021

6. References

- Adedoyin, O., Soykan, E. (2020). Covid-19 pademic and online learning: the challenges and opportunities. *Interactive Learning Environments*. Doi: <https://doi.org/10.1080/10494820.2020.1813180>
- Aguinis, H. (2004). *Regression analysis for categorical moderators*. New York: Guilford Press.
- Alvarez, S. J. Pedrosa, I. Lozano, L. Garcia-Cueto, E. Cuesta, M. Muniz, J. (2018). Using reversed items in Likert scales: A questionable practice. *Psicothema*, Vol. 30, issue 2 (149-158). Doi: 10.7334/psicothema2018.33
- Atkinson, J.W. (1964). *An introduction to motivation*. Van Nostrand.
- Bahrami MA, et al., Job Motivating Potential Score and Its Relationship with Employees' Organizational Commitment among Health Professionals, *Osong Public Health Res Perspect* (2016), <http://dx.doi.org/10.1016/j.phrp.2016.04.001>
- Barrick, M. R.; Mount, M. K. (1991). "The theory of purposeful work behavior: The role of personality, higher-order goals, and job characteristics". *Personnel Psychology*. 44: 1–26. doi:10.1111/j.1744-6570.1991.tb00688.x.
- Bellmann, L. and Hübler, O. (2021), "Working from home, job satisfaction and work–life balance – robust or heterogeneous links?", *International Journal of Manpower*, Vol. 42 No. 3, pp. 424-441. <https://doi.org/10.1108/IJM-10-2019-0458>
- Björntoft S, Hallman DM, Mathiassen SE, Larsson J, Jahncke H. (2020). *Occupational and Individual Determinants of Work-life Balance among Office Workers with Flexible Work Arrangements*. *Int J Environ Res Public Health*. 2020 Feb 22; 17(4).
- Bloom, N. Liang, J. Roberts, J. Ying, Z.J. (2015). Does working from home work? Evidence from a Chinese experiment*. *The Quarterly Journal of Economics*, 165-218. Doi:10.1093/qje/qju032
- Bolander, P. Sumelius, J. Werr, A. (2021). A remote possibility. Preprint from "Sweden Through the Crisis". Stockholm School of Economics. Accessed 21/10-21 at: <https://www.hhs.se/contentassets/21bbbcc559c34f6da902bdb50e727598/a31.pdf>
- Boutmaghzoute, Hajar and Moustaghfir, Karim. (2021). 'Exploring the Relationship Between Corporate Social Responsibility Actions and Employee Retention: A Human Resource Management Perspective'. 1 Jan. 2021 : 1 – 13.
- Brem, A. Viardot, E. Nylund, P. A. (2021). Implications of the coronavirus (COVID-19) outbreak for innovation: Which technologies will improve our lives?, *Technological Forecasting and Social Change*, Volume 163. Doi: <https://doi.org/10.1016/j.techfore.2020.120451>.

Caringal-Go, J.F., Teng-Calleja, M., Bertulfo, D.J., Manaois, J.O. (2021). *Work-life balance crafting during COVID-19: exploring strategies of telecommuting employees in the Philippines, Community, Work & Family*, DOI: 10.1080/13668803.2021.1956880

Chong, S., Huang, Y., & Chang, C.-H. (D.). (2020). Supporting interdependent telework employees: A moderated-mediation model linking daily COVID-19 task setbacks to next-day work withdrawal. *Journal of Applied Psychology*, 105(12), 1408–1422. <https://doi.org/10.1037/apl0000843>

CIPD (2016), *Flexible Working Practices*, <https://www.cipd.co.uk/knowledge/fundamentals/relations/flexible-working/factsheet> (accessed 20 September 2021).

Cohen, L. Manion, L. Morrison, K. (2017). *Validity and Reliability. Research methods in Education*, 8th edition, Routledge. ISBN: 9781315456539

Cohen, L., Manion, L., & Morrison, K. (2011). *Research methods in education*. London: Routledge.

CRN. Michael Dell: “Yes, remote working is absolutely here to stay”. (2021). Accessed 22/10 at: <https://www.crn.com/slide-shows/mobility/michael-dell-yes-remote-working-is-absolutely-here-to-stay-/1>

Demirkol, I.C., Nalla, M.K. Predicting job satisfaction and motivation of aviation security personnel: a test of job characteristics theory. *Secur J* 31, 901–923 (2018). <https://doi.org/10.1057/s41284-018-0137-2>
Design Theories: The Rise of Relational and Proactive Perspectives. The Academy of

Di Leo, G., Sardanelli, F. (2020). Statistical significance: *p* value, 0.05 threshold, and applications to radiomics—reasons for a conservative approach. *Eur Radiol Exp* 4, 18. Doi: <https://doi.org/10.1186/s41747-020-0145-y>

Dudovskiy, J. (2018). *The ultimate guide to writing a dissertation in business studies: A step-by-step assistance*. Business research methodology.

Farr, R. M. (1977). On the nature of attributional artifact in qualitative research: Herzberg's two-factor theory of work motivation. *Journal of Occupational and Organizational Psychology*, Vol. 50, Issue 1. Doi: <https://doi.org/10.1111/j.2044-8325.1977.tb00353.x>

Ferdou T., Ali M., French E. Use of flexible work practices and employee outcomes: The role of work-life balance and employee age. *J. Manag. Organ.* 2021
doi: 10.1017/jmo.2020.44

Folkhälsomyndigheten. (2020). Personer över 70 bör begränsa sociala kontakter tills vidare. Accessed 27/9-21 at: <https://www.folkhalsomyndigheten.se/nyheter-och-press/nyhetsarkiv/2020/mars/personer-over-70-bor-begransa-sociala-kontakter-tills-vidare/>

Folkhälsomyndigheten. (2021). Arbete hemifrån. Accessed 27/9-21 at: <https://www.folkhalsomyndigheten.se/smittskydd-beredskap/utbrott/aktuella-utbrott/covid-19/skydda-dig-och-andra/arbete-hemma/>

Fonner, K.L, Roloff, M.E. (2010). Why teleworkers are more satisfied with their jobs than are office-based workers: When less contact is beneficial. *Journal of applied communication research*, 38(4), 336-361.

Forbes. Goldman Sachs tells employees to return to the office by July 14, as wall street pushed back on the work-from-home trend. (2021). Accessed 21/10 at: <https://www.forbes.com/sites/jackkelly/2021/05/05/goldman-sachs-tells-employees-to-return-to-the-office-by-july-14-as-wall-street-pushes-back-on-the-work-from-home-trend/?sh=36db60ab4000>

Franken, E., Bently, T., Shafaei, A., Farr-Wharton, B., Onnis, L., Omari, M. (2021). Forced flexibility and remote working: opportunities and challenges in the new normal. *Journal of Management & Organization*, 1-19. doi:10.1017/jmo.2021.40

Fried, Y., & Ferris, G. R. (1987). The validity of the Job Characteristics Model: A review and meta-analysis. *Personnel Psychology*, 40(2), 287–322. <https://doi.org/10.1111/j.1744-6570.1987.tb00605.x>

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. <https://doi.org/10.1097/JOM.0000000000002236>

Gawel, Joseph E. (1996) "Herzberg's Theory of Motivation and Maslow's Hierarchy of Needs,". *Practical Assessment, Research, and Evaluation*: Vol. 5 , Article 11. DOI: <https://doi.org/10.7275/31qy-ea53>

Gliem, J. (2003). Calculating, interpreting, and reporting Cronbach's alpha reliability coefficient for likert-type scales. *Midwest Research to Practice Conference in Adult*.

Grant, A. M. (2008). The significance of task significance: Job performance effects, relational mechanisms, and boundary conditions. *Journal of Applied Psychology*, 93(1), 108–124. <https://doi.org/10.1037/0021-9010.93.1.108>

Grant, Adam & Parker, Sharon. (2009). 7 Redesigning Work Design Theories: The Rise of Relational and Proactive Perspectives. *The Academy of Management Annals*. 3. 317-375. 10.1080/19416520903047327.

Greenville-Cleave, B. (2021). Can CEO's really make a difference to the world? Accessed 22/10 at: <https://www.ceotodaymagazine.com/2021/08/can-ceos-really-make-a-difference-to-the-world/>

Haaland, S. Christansen, N. D. (2006). Implications of trait-activation theory for evaluating the construct validity of assessment center ratings. *Personnel Psychology*: Vol. 55, Issue 1. Doi: <https://doi.org/10.1111/j.1744-6570.2002.tb00106.x>

Hackman, J. Oldham, G. (1974). *The Job Diagnostic Survey: An instrument for the Diagnosis of Jobs and the Evaluation of Job Redesign Projects*. Yale University, New Haven, Department of Administrative Sciences.

Haddon, L. Brynin, M. (2005). The character of telework and the characteristics of teleworkers. *Journal of new Technology, work and employment*, Vol. 20, issue 1. Doi: <https://doi.org/10.1111/j.1468-005X.2005.00142.x>

Hartig, T., Kylin, C. and Johansson, G. (2007), "*The telework tradeoff: stress mitigation vs constrained restoration*", *Applied Psychology: An International Review*, Vol. 56 No. 2, pp. 231- 253.

Herzberg, F. (2017). *The Motivation to Work*. Transaction Publishers, New Brunswick (USA), London (UK).

Hilbrecht, M., Shaw, S.M., Johnson, L.C. and Andrey, J. (2008), "*I'm home for the kids: contradictory implications for work-life balance of teleworking mothers*", *Gender, Work and Organisation*, Vol. 5 No. 15, pp. 455 - 471.

Hill, E., Ferris, M., Mårtinson, V. (2003). Does it matter where you work? A comparison of how three work venues (traditional office, virtual office, and home office) influence aspects of work and personal/family life. *Journal of Vocational Behavior*, 63, 220-241. Doi:10.1016/S0001-8791(03)00042-3

Hill, E.J., Weiner, S. (2003). Work/life balance policies and programs. In J. E. Edwards, J. C. Scott, N. S. Raju (Eds.), *The human resources program-evaluation handbook*. Newbury Park: Sage
<https://interruptions.net/literature/Fonner-JApplCommRes10.pdf>
<https://oxfordre.com/psychology/view/10.1093/acrefore/9780190236557.001.0001/acrefore-9780190236557-e-15>

Hughes, G. D. (2009). The impact of incorrect responses to reverse-coded survey items. *EBSCO, Research in the Schools*, Vol. 16, Issue 2, p.76-88.

Ingusci, Emanuela & Signore, Fulvio & Giancaspro, Maria & Amelia, Manuti & Molino, Monica & Russo, Vincenzo & Zito, Margherita & Cortese, C.G.. (2021). *Workload, Techno Overload, and Behavioral Stress During COVID-19 Emergency: The Role of Job Crafting in Remote Workers*. *Frontiers in Psychology*. 12. 655148. 10.3389/fpsyg.2021.655148.

IWH (Institut for Work & Health). Cross-sectional vs. longitudinal studies. (2015). Accessed 4/11-21 at: <https://www.iwh.on.ca/what-researchers-mean-by/cross-sectional-vs-longitudinal-studies>

Joshi, Ankur & Kale, Saket & Chandel, Satish & Pal, Dinesh. (2015). Likert Scale: Explored and Explained. *British Journal of Applied Science & Technology*. 7. 396-403. 10.9734/BJAST/2015/14975.

Kalliath, T., & Brough, P. (2008). *Work-life balance: A review of the meaning of the balance construct*. *Journal of Management & Organization*, 14(03), 323–327. <https://doi.org/10.1017/s1833367200003308>

Kowalski, B.K. and Swanson, J.A. (2005), "*Critical success factors in developing teleworking programs*", *Benchmarking: An international Journal*, Vol. 12 No. 3, pp. 236-249.

Kroll, C., Doeblner, P. and Nüesch, S. (2017), "Meta-analytic evidence of the effectiveness of stress management at work", *European Journal of Work and Organizational Psychology*, Vol. 26 No. 5, pp. 677-693.

Lindsay, C. A., Marks, E., & Gorlow, L. (1967). The Herzberg Theory: A critique and reformulation. *Journal of Applied Psychology*, 51(4, Pt.1), 330–339. <https://doi.org/10.1037/h0024868>

Lok, Peter & Crawford, John. (2004). The effect of organisational culture and leadership style on job satisfaction and organisational commitment. *Journal of Management Development*. 23. 321-338. 10.1108/02621710410529785.

Lundberg, U. and Lindfors, P. (2002), "Psychophysiological reactions to telework in female and male white-collar workers", *Journal of Occupational and Health Psychology*, Vol. 7 No. 4, pp. 354-364.

M.M Kelly. (1998). The work-at-home revolution. *The Futurist* (November–December), pp. 28-32

Madsen, S.R. (2011), "The benefits, challenges, and implication of teleworking: a literature review", *Journal of Culture and Religion*, Vol. 1 No. 1, pp. 148-158. *Management Annals*, 3:1, 317-375. Doi: <http://dx.doi.org/10.1080/19416520903047327>

Mathieu, J.E. Martineau, J.W. (1997). Individual and Situational Influences in Training Motivation. Psychology Press, 1st Edition. ISBN: 978464806662.

Mertler, Craig. (2002). *Job Satisfaction and Perception of Motivation among Middle and High School Teachers*. American Secondary Education. 31.

Miner, J. B. (2005). *Organizational Behaviour 1. Essential theories of motivation and leadership*. M.E. Sharpe, Inc., New York, United States of America.

Molla, R. (2021). Just because you can work from home doesn't mean you'll be allowed to. *Recode*. Accessed 25/10-21 at: <https://www.vox.com/recode/22387529/working-from-home-return-to-office-remote-work>

Morgeson, F. P. Dierdorff, E. C. Hmurovic, J. L. (2010). Work design in situ: Understanding the role of occupational and organizational context. *Journal of Organizational Behavior*, Vol. 31, Issue 2 (3). Doi: <https://doi.org/10.1002/job.642>

Müller, Simon M., Georg F. Mueller, Alexander A. Navarini, and Oliver Brandt. 2020. "National Publication Productivity during the COVID-19 Pandemic—A Preliminary Exploratory Analysis of the 30 Countries Most Affected" *Biology* 9, no. 9: 271. <https://doi.org/10.3390/biology9090271>

Murray, H.A. (1938). *Explorations in personality*. Oxford Univ. Press.

Nayak, B. K., & Hazra, A. (2011). How to choose the right statistical test?. *Indian journal of ophthalmology*, 59(2), 85–86. <https://doi.org/10.4103/0301-4738.77005>

Neves-Pereira, M. S. (2021). Creativity and remote teaching in pandemic times: from the unpredictable to the possible. University of Brasilia, Brazil. Creativity, Vol. 8, issue 1. Doi: 10.2478/ctra-2021-0006

Newbold, P. Statistics for Business and Economics: Global edition. 8th edition. (2012). Pearson Education.

Nickson, D. Siddons, S. (2012). Remote working: linking people and organizations. Butterworth-Heinemann. Routledge, New York, USA.

O'Kane, P., Walton, S., & Ruwhiu, D. (2020). Remote Working during COVID19 (Work Futures Otago Reports No. 4). Department of Management, University of Otago. Retrieved from <http://hdl.handle.net/10523/10211>

Oldham, G. R., & Hackman, J. R. (2005). How job characteristics theory happened. In The Oxford handbook of management theory: The process of theory development, 151-170.

Oldham, G., Hackman, R. 2010. Not what it was and not what it will be: The future of job design research. Journal of Organizational Behavior, 31, 463-479. Doi: 10.1002/job.678

Olsen, C. R., & Øgrim, T. I. (2020). *Mange ansatte kan ikke ha hjemmekontor*.

Olson, 1982. New information technology and organizational culture. Management Information Systems Quarterly, 6 (1982, December), pp. 71-92

Pakdel, B. (2013). The historical context of motivation and analysis theories individual motivation. International Journal of Humanities and Social Science. Vol 3. No, 18.

Palumbo, R. (2020), "Let me go to the office! An investigation into the side effects of working from home on work-life balance", International Journal of Public Sector Management, Vol. 33 No. 6/7, pp. 771-790. <https://doi.org/10.1108/IJPSM-06-2020-0150>

Parker, S. (2014). Beyond motivation: Job and work design for development, health, ambidexterity, and more. Annual Review of Psychology, Vol. 65, Issue 1.

Parker, S. K. Knight, C. Keller, A. (2020). Remote Managers Are Having Trust Issues. Harvard Business Review, Change management. Accessed 15/11-21 at: <https://netfamilybusiness.com/wp-content/uploads/2020/08/Remote-Managers-Are-Having-Trust-Issues.pdf>

Pham, Lan. (2018). A Review of key paradigms: positivism, interpretivism and critical inquiry.. 10.13140/RG.2.2.13995.54569.

Possenriede, D., Hassink, W.H. and Plantenga, J. (2016), "Does temporal and locational flexibility of work increase the supply of working hours? Evidence from The Netherlands", IZA Journal of Labor Policy, Vol. 5 No. 1, pp. 1-34

Qi, J., Ellinger, A.E. and Franke, G.R. (2018), "Work design and frontline employee engagement", *Journal of Service Theory and Practice*, Vol. 28 No. 5, pp. 636-660. <https://doi.org/10.1108/JSTP-04-2017-0061>

R.E Kraut. Telecommuting: The trade-offs of home work. *Journal of Communication*, 39 (1989), pp. 19-47

Ramlall, Sunil. (2004). A review of employee motivation theories and their implications for employee retention within organizations. *Journal of American Academy of Business*. 5. 52-63.

Riley, F. R. C. Testing the equality of regression coefficients and pooling methodology from multiple samples when the data is multicollinear. The University of Texas at Arlington.

Robbins, S. (1993). *Organizational Behavior* (6 ed.). Englewood Cliffs: Prentice-Hall.
Sachau DA. (2007). Resurrecting the Motivation-Hygiene Theory: Herzberg and the Positive Psychology Movement. *Human Resource Development Review*. 2007;6(4):377-393. doi:10.1177/1534484307307546

Samosir, J. Paramaatha, D. N. Karnati, N. Madjid, S. A. Haryono. (2021). Promoting work effectiveness: The impact of job design and work motivation. *Journal of Tianjin University Science and Technology*, Vol. 54, Issue 06/21. Doi: <https://doicatalog.org/19.4102/jtus.v54i6.3452>

Schroeder, A. N., Bricka, T. M., & Whitaker, J. H. (2021). Work design in a digitized gig economy. *Human Resource Management Review*, 31(1), Article 100692. <https://doi.org/10.1016/j.hrmr.2019.100692>

Shahzadi, I. Javed, A. Pirzada, S. S. Nasreen, S. Khanam, F. (2014). Impact of employee motivation on employee performance. *European Journal of Business and Management*. Vol. 6, Issue 23. ISSN: 2222-283

Shin, B. Omar A. El Sawy, Olivia R. Liu Sheng & Kunihiro Higa (2002) Telework: Existing Research and Future Directions, *Journal of Organizational Computing and Electronic Commerce*, 10:2, 85-101, DOI: 10.1207/S15327744JOCE1002_2

Staniscuaski, F., Kmetzsch, L., Soletti, R. C., Reichert, F., Zandonà, E., Ludwig, Z., Lima, E. F., Neumann, A., Schwartz, I., Mello-Carpes, P. B., Tamajusuku, A., 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, 663252. <https://doi.org/10.3389/fpsyg.2021.663252>

Steverink, N., & Lindenberg, S. (2006). Which social needs are important for subjective well-being? What happens to them with aging? *Psychology and Aging*, 21(2), 281–290. <https://doi.org/10.1037/0882-7974.21.2.281>

Taber, K.S. (2018). *The Use of Cronbach's Alpha When Developing and Reporting Research Instruments in Science Education*. *Res Sci Educ* 48, 1273–1296. <https://doi.org/10.1007/s11165-016-9602-2>

Tett, R. P., & Burnett, D. D. (2003). A personality trait-based interactionist model of job performance. *Journal of Applied Psychology*, 88(3), 500–517.
<https://doi.org/10.1037/0021-9010.88.3.500>

Toscano F, Zappalà S. (2020). *Social Isolation and Stress as Predictors of Productivity Perception and Remote Work Satisfaction during the COVID-19 Pandemic: The Role of Concern about the Virus in a Moderated Double Mediation*. *Sustainability*. 2020; 12(23):9804. <https://doi.org/10.3390/su12239804>

Van den Broeck, Anja & Parker, Sharon. (2017). Job and Work Design.
10.1093/acrefore/9780190236557.013.15.

Wang, B. Liu, Y. Qian, J. Parker, S. (2020). Achieving effective remote working during the Covid-19 pandemic: A work design perspective. *Journey of applied psychology*, Vol. 70, Issue 1. Doi: <https://doi.org/10.1111/apps.12290>

Wheatley, D. (2012), “Good to be home? Time use and satisfaction levels among home-based teleworkers”, *New Technology, Work & Employment*, Vol. 27 No. 3, pp. 224-241.

Wu, H., & Chen, Y. (2020). The Impact of Work from Home (WFH) on Workload and Productivity in Terms of Different Tasks and Occupations. In C. Stephanidis, G. Salvendy, J. Wei, S. Yamamoto, H. Mori, G. Meiselwitz, F. F.-H. Nah, & K. Siau (Eds.), *HCI International 2020 – Late Breaking Papers: Interaction, Knowledge and Social Media* (pp. 693–706). Springer International Publishing. https://doi.org/10.1007/978-3-030-60152-2_52

7. Appendix

7.1. Survey

7.1.1. Introduction to survey sent out to respondents

Hello!

I am a master student at the **Stockholm School of Economics**. I am conducting a study as part of my master thesis in Business & Management on **how remote working during the pandemic has affected employees' relationship to work** and I would like to know your experiences working remotely in contrast to working at the office.

This survey will take no more than **10 minutes** to complete.

This survey is completely voluntary; your individual answers are completely anonymous and will be kept confidential and compliant with GDPR regulations.

Contributions to Rosa bandet

October is Breast Cancer Awareness Month. For every completed response, I will donate **10SEK** to Bröstcancerförbundet (Breast Cancer Association) to support breast cancer patients.

If you have any questions you may contact me via email at 24267@student.hhs.se. Thank you for dedicating your time to contribute to my research!

Best,
Isabelle He

7.1.2. Survey

In this part of the survey, you will be asked to answer questions related to your job. Each question requires you to answer from two perspectives:

1. From the perspective **before** the pandemic when you worked at a **physical office**
2. From the perspective **during** the pandemic when you worked **remotely**

Kindly answer the 15 questions honestly and frankly.

Before the pandemic, where did you work?

- ☐ Mostly at the physical office
- ☐ Mostly remotely

During the pandemic, where did you work?

- ☐ Mostly remotely (1)
- ☐ Mostly at the physical office (2)

JDS starts

(1) How much variety is there in your job? That is, to what extent does the job require you to do many different things, using a variety of your skills and talents?

	Very little (The job requires me to do the same routine things over and over again) 1	2	3	4	5	6	Very much (The job requires me to do different things, using a number of different skills and talents) 7
Before pandemic at physical office (1)	☐	☐	☐	☐	☐	☐	☐
During pandemic when remote working (2)	☐	☐	☐	☐	☐	☐	☐

The job requires me to use a number of complex or high-level skills.

(2) How accurate is the statement in describing your job?

	Very inaccurate 1	2	3	4	5	6	Very accurate 7
Before pandemic at physical office (1)	☐	☐	☐	☐	☐	☐	☐
During pandemic when remote working (2)	☐	☐	☐	☐	☐	☐	☐

The job is quite simple and repetitive.

(3) How accurate is the statement in describing your job?

	Very inaccurate 1	2	3	4	5	6	Very accurate 7
Before pandemic at physical office (1)	☐	☐	☐	☐	☐	☐	☐
During pandemic when remote working (2)	☐	☐	☐	☐	☐	☐	☐

I do a complete task from start to finish. The results of my work are clearly visible and identifiable.

(4) How accurate is the statement in describing your job?

	Very inaccurate 1 (1)	2 (2)	3 (3)	4 (4)	5 (5)	6 (6)	Very accurate 7 (7)
Before pandemic at physical office (1)	☐	☐	☐	☐	☐	☐	☐
During pandemic when remote working (2)	☐	☐	☐	☐	☐	☐	☐

The job provides me with the chance to completely finish the pieces of work I begin.

(5) How accurate is the statement in describing your job?

	Very inaccurate 1	2	3	4	5	6	Very accurate 7
Before pandemic at physical office (1)	☐	☐	☐	☐	☐	☐	☐
During pandemic when remote working (2)	☐	☐	☐	☐	☐	☐	☐

(6) The job is arranged so that I **do not** have the chance to do an entire piece of work from beginning to end. How accurate is the statement in describing your job?

	Very inaccurate 1	2	3	4	5	6	Very accurate 7
Before pandemic at physical office (1)	☐	☐	☐	☐	☐	☐	☐
During pandemic when remote working (2)	☐	☐	☐	☐	☐	☐	☐

(7) In general, how significant or important is your job? That is, are the results of your work likely to significantly affect the lives or well-being of other people?

	Not very significant; the outcomes of my work are not likely to have important effects on other people 1	2	3	4	5	6	Highly significant; the outcomes of my work can affect other people in very important ways 7
Before pandemic at physical office (1)	☐	☐	☐	☐	☐	☐	☐
During pandemic when remote working (2)	☐	☐	☐	☐	☐	☐	☐

This job is one where a lot of people can be affected by how well the work gets done.

(8) How accurate is the statement in describing your job?

	Very inaccurate 1	2	3	4	5	6	Very accurate 7
Before pandemic at physical office (1)	☐	☐	☐	☐	☐	☐	☐
During pandemic when remote working (2)	☐	☐	☐	☐	☐	☐	☐

JDS9 The job is quite simple and repetitive.

(9) How accurate is the statement in describing your job?

	Very inaccurate 1	2	3	4	5	6	Very accurate 7
Before pandemic at physical office (1)	☐	☐	☐	☐	☐	☐	☐
During pandemic when remote working (2)	☐	☐	☐	☐	☐	☐	☐

(10) How much autonomy is there in your job? That is, to what extent does your job permit you to decide on your own how to go about doing your work?

	Very little; the job gives me almost no personal say about how and when the work is done 1	2	3	4	5	6	Very much; the job gives me almost complete responsibility for deciding how and when the work is done 7
Before pandemic at physical office (1)	☐	☐	☐	☐	☐	☐	☐
During pandemic when remote working (2)	☐	☐	☐	☐	☐	☐	☐

The job gives me considerable opportunity for independence and freedom in how I do the work.

(11) How accurate is the statement in describing your job?

	Very inaccurate 1	2	3	4	5	6	Very accurate 7
Before pandemic at physical office (1)	☐	☐	☐	☐	☐	☐	☐
During pandemic when remote working (2)	☐	☐	☐	☐	☐	☐	☐

The job denies me any chance to use my personal initiative or judgment in carrying out the work.

(12) How accurate is the statement in describing your job?

	Very inaccurate 1 (1)	2 (2)	3 (3)	4 (4)	5 (5)	6 (6)	Very accurate 7 (7)
Before pandemic at physical office (1)	☐	☐	☐	☐	☐	☐	☐
During pandemic when remote working (2)	☐	☐	☐	☐	☐	☐	☐

(13) To what extent does doing the job itself provide you with information about your work performance? That is, does the actual work itself provide clues about how well you are doing - aside from any feedback coworkers or supervisors may provide?

	Very little; the job itself is set up so I could work forever without finding out how well I am doing 1	2	3	4	5	6	Very much; the job is set up so that I get almost constant feedback as I work about how well I am doing 7
Before pandemic at physical office (1)	☐	☐	☐	☐	☐	☐	☐
During pandemic when remote working (2)	☐	☐	☐	☐	☐	☐	☐

Just doing the work required by the job provides many chances for me to figure out how well I am doing.

(14) How accurate is the statement in describing your job?

	Very inaccurate 1	2	3	4	5	6	Very accurate 7
Before pandemic at physical office (1)	☐	☐	☐	☐	☐	☐	☐
During pandemic when remote working (2)	☐	☐	☐	☐	☐	☐	☐

The job itself provides very few clues about whether or not I am performing well.

(15) How accurate is the statement in describing your job?

	Very inaccurate 1	2	3	4	5	6	Very accurate 7
Before pandemic at physical office (1)	☐	☐	☐	☐	☐	☐	☐
During pandemic when remote working (2)	☐	☐	☐	☐	☐	☐	☐

JDS ends

How would you rank your self-discipline?

	1	2	3	4	5	6	7	
Extremely bad	☐	☐	☐	☐	☐	☐	☐	Extremely good

How would you rank your need for social interaction at work?

	1	2	3	4	5	6	7	
Extremely low	☐	☐	☐	☐	☐	☐	☐	Extremely high

How satisfied were you with your job prior to the pandemic when working at the physical office?

	1	2	3	4	5	6	7	
Extremely dissatisfied	☐	☐	☐	☐	☐	☐	☐	Extremely satisfied

How satisfied were you with your job during the pandemic when **remote working**?

	1	2	3	4	5	6	7	
Extremely dissatisfied	☐	☐	☐	☐	☐	☐	☐	Extremely satisfied

How motivated did you feel at work **before the pandemic when working at the office**?

	1	2	3	4	5	6	7	
Extremely unmotivated	☐	☐	☐	☐	☐	☐	☐	Extremely motivated

How motivated did you feel at work **during the pandemic when working remotely**?

	1	2	3	4	5	6	7	
Extremely unmotivated	☐	☐	☐	☐	☐	☐	☐	Extremely motivated

7.2. Chronbach's alpha test of internal consistency

7.2.1. Autonomy

Reliability statistics

Cronbach's alpha	Mean	N of items
0.790	0.786	3

Item statistics

Item	Mean	Std. Deviation	N
10	5.2848	1.3134	151
11	5.2914	1.27326	151
12	6.0596	1.2123	151

7.2.1. Feedback

Reliability statistics

Cronbach's alpha	Mean	N of items
0.884	0.886	3

Item statistics

Item	Mean	Std. Deviation	N
13	4.5894	1.3917	151
14	4.5762	1.3683	151
15	5.1060	1.4290	151

7.2.1. Task significance

Reliability statistics

Cronbach's alpha	Mean	N of items
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0.773	0.761	3
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Item statistics

Item	Mean	Std. Deviation	N
7	4.4106	1.6300	151
8	4.7152	1.5465	151
9	6.0066	1.2082	151

7.2.1. Task identity

Reliability statistics

Cronbach's alpha	Mean	N of items
0.770	0.779	3

Item statistics

Item	Mean	Std. Deviation	N
4	4.8146	1.5722	151
5	5.0066	1.4944	151
6	5.1584	1.7220	151

7.2.1. Skill variety

Reliability statistics

Cronbach's alpha	Mean	N of items
0.807	0.818	3

Item statistics

Item	Mean	Std. Deviation	N
1	5.7682	1.1221	151
2	5.8278	1.0817	151
3	5.8742	1.2874	151

7.3. Regression analyses

7.3.1. MPS before the pandemic as dependent variable

Model summary

R	R ²	Adjusted R ²	Std. Error of the Estimate
.273	0.075	.062	59.308071

ANOVA

	Sum of Squares	Df	Mean square	F	Sig.
Regression	42058.781	2	21029.391	5.978	.003
Residual	520593.413	148	3517.523		
Total	562652.194	150			

Coefficients

	Unstandardized B	Coefficients Std. Error	Standardized Coefficients Beta	T	Sig.
Constant	50.302	30.086		1.672	0.097
Self discipline	14.914	4.370	.270	3.413	<.001
Social need	2.226	3.409	.052	.653	.515

7.3.1. MPS during the pandemic as dependent variable

Model summary

R	R²	Adjusted R²	Std. Error of the Estimate
.287	0.083	.070	58.87585

ANOVA

	Sum of Squares	Df	Mean square	F	Sig.
Regression	46164.342	2	23082.171	6.659	.002
Residual	513022.064	148	3466.365		
Total	559186.405	150			

Coefficients

	Unstandardized B	Coefficients Std. Error	Standardized Coefficients Beta	T	Sig.
Constant	48.671	29.866		1.630	.105
Self discipline	15.779	4.338	.286	3.637	<.001
Social need	1.354	3.384	.032	.400	.690

7.3.1. Perceived motivation before the pandemic as dependent variable

Model summary

R	R²	Adjusted R²	Std. Error of the Estimate
.372	.138	.127	1.031

ANOVA

	Sum of Squares	Df	Mean square	F	Sig.
Regression	25.264	2	12.632	11.876	<.001
Residual	157.425	148	1.064		
Total	182.689	150			

Coefficients

	Unstandardized B	Coefficients Std. Error	Standardized Coefficients Beta	T	Sig.
Constant	2.869	.523		5.483	<.001
Self discipline	.277	.076	.279	3.637	<.001
Social need	.197	.059	.254	3.331	.001

7.3.1. Perceived motivation during the pandemic as dependent variable

Model summary

R	R²	Adjusted R²	Std. Error of the Estimate
.395	.156	.144	1.129

ANOVA

	Sum of Squares	Df	Mean square	F	Sig.
Regression	34.762	2	17.381	13.641	<.001
Residual	188.575	148	1.274		
Total	223.338	150			

Coefficients

	Unstandardized B	Coefficients Std. Error	Standardized Coefficients Beta	T	Sig.
Constant	3.484	.573		6.085	<.001
Self discipline	.385	.083	.350	4.628	<.001
Social need	-.148	.065	-.173	-2.289	0.024