Stockholm University

Health of self-employed workers

Capturing heterogenity, complexity, and temporal patterns

Louise E. Bergman

Doctoral Thesis in Psychology at Stockholm University, Sweden 2025

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Academic dissertation for the Degree of Doctor of Philosophy in Psychology at Stockholm University to be publicly defended on Thursday 15 May 2025 at 10.00 in Lärosal 31, hus 4, vån 2, Campus Albano, Albanovägen 12.

Abstract

The self-employed are a relatively small, but important group of workers. They contribute to society and its economy through growth, innovation, and job-creation. Self-employed work is characterised by working for oneself; it is associated with high levels of autonomy, but also uncertainty about income, high demands, and sometimes lack of social context at work. This may lead to strenuous work situations and thus impaired health, which over time can affect work negatively, in a reciprocal relationship where health and work affect each other. Despite the importance of self-employed workers, health and the unique circumstances of self-employed work are still understudied. Further, while they are a diverse group, this heterogeneity has seldom been considered in earlier research.

This thesis investigates health in terms of wellbeing, illbeing, and self-rated health in relationship to work and demographic characteristics, entrance into, and exit out of self-employment, thereby taking the heterogeneity of self-employed workers into account. The thesis comprises three studies based on survey data to: compare mental illbeing in self-employed workers, organisationally-employed workers, and those combining the two types of work (Study I); study the health of workers engaging in self-employment over time (Study II); and compare wellbeing and its relationship to experiences of work in self-employed and organisationally-employed workers (Study III). In all studies, advanced statistical methods using the Bayesian approach were applied to accurately model the complexity of the longitudinal or multilevel data.

In Study I, we found that illbeing in self-employed, organisationally-employed workers and combinators does not substantially differ. In Study II we demonstrate that workers engaging in self-employment belong to four distinct health profiles, which they also mostly maintain over time. Furthermore, entrance into and exit out of self-employed work, and work characteristics, but not demographic characteristics, are related to these health profiles of the self-employed. Lastly, in Study III, we found that experience of self-determination and meaning during the performance of work tasks have stronger associations with wellbeing than employment type (self-employed or organisationally employed).

In summary, this thesis shows that there are few substantial differences in illbeing between organisationally-employed workers, self-employed workers, and combinators. Further, and perhaps explaining some of these results, there is variation in the health of self-employed workers, both between different individuals, and over time, indicating that heterogeneity among self-employed workers is substantial. Lastly, also further explaining why health differences between workers of different employment forms are small, differences in wellbeing between self-employed and employed workers can be explained by the tasks that these workers perform during the day, beyond that of their employment form.

This thesis shows the importance of taking aspects of health, time, heterogeneity of workers, and assessment of these into account to gain more in-depth understanding of the interrelations between health and self-employed work.

Keywords: *Self-employment, entrepreneurship, health, wellbeing, illbeing, self-rated health, work environment, work characteristics.*

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To my children,
who remind me
everyday
to be curious and
openminded.

Abstract

The self-employed are a relatively small, but important group of workers. They contribute to society and its economy through growth, innovation, and job-creation. Self-employed work is characterised by working for oneself; it is associated with high levels of autonomy, but also uncertainty about income, high demands, and sometimes lack of social context at work. This may lead to strenuous work situations and thus impaired health, which over time can affect work negatively, in a reciprocal relationship where health and work affect each other. Despite the importance of self-employed workers, health and the unique circumstances of self-employed work are still understudied. Further, while they are a diverse group, this heterogeneity has seldom been considered in earlier research.

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Sammanfattning på Svenska

Egenföretagare är en relativt liten, men viktig grupp av arbetare. De bidrar till samhället och dess ekonomi genom tillväxt, innovation och jobbtillfällen. Egenföretagande kännetecknas av att arbeta för egen räkning och är förknippat med hög grad av autonomi men också osäkerhet kring inkomst, höga krav och ibland avsaknad av socialt sammanhang på arbetsplatsen. Detta kan leda till ansträngda arbetssituationer och därmed försämrad hälsa över tid, och försämrad hälsa kan påverka arbetet negativt i ett ömsesidigt förhållande däe hälsa och arbete påverkar varandra. Trots egenföretagarnas betydelse är deras hälsa och deras unika arbetsförhållanden fortfarande understuderade. Vidare, fast egenföretagare är en heterogen grupp tas denna heterogenitet sällan i beaktande i forskning.

Denna avhandling undersöker hälsa i termer av välbefinnande, psykisk ohälsa och egenskattad hälsa i relation till arbete och demografiska egenskaper, samt att starta och avsluta egenföretagande. Avhandlingen tar därmed hänsyn till egenföretagarnas heterogenitet. Den består av tre studier baserade på enkätdata med mål att: Jämföra psykisk ohälsa mellan egenföretagare, organisationsanställda och kombinatörer (Studie I), studera övergripande hälsa över tid hos personer som arbetar som egenföretagare (Studie II), och att jämföra välbefinnande och dess relation till arbetsupplevelser mellan egenföretagare och organisationsanställda (Studie III). I samtliga studier användes avancerade statistiska metoder med en Bayesiansk ansats för att modellera komplexiteten i longitudinella data eller data på olika nivåer på ett noggrant sätt.

I Studie I fann vi att psykiska ohälsa hos egenföretagare, anställda och kombinatörer inte skiljer sig nämnvärt. Studie II visar att personer som är egenföretagande tillhör fyra distinkta hälsoprofiler, vilka de också tenderar att stanna i över tid. Vidare så är inträde till och utträde ur egenföretagande samt arbetsförhållanden, men inte demografiska egenskaper, relaterade till dessa hälsoprofiler. Slutligen i Studie III fann vi att upplevelser av självbestämmande och mening i utförandet av arbetsuppgifter har starkare samband med välbefinnande än anställningsform (egenföretagare eller anställd i organisation).

Sammanfattningsvis visar denna avhandling att det finns små skillnader i psykisk ohälsa mellan anställda, egenföretagare och kombinatörer. Vidare, och möjligen som en förklaring till dessa resultat, finns det variation i hälsa

hos egenföretagare, både mellan olika individer och över tid. Detta indikerar att heterogeniteten inom gruppen av egenföretagare är framträdande. Slutligen, och ytterligare förklarande varför hälsoskillnader mellan olika anställningsformer är små, kan skillnader i välbefinnande mellan egenföretagare och anställda förklaras av de arbetsuppgifter som utförs under dagen, snarare än anställningsformen i sig.

Denna avhandling visar vikten av att beakta flera aspekter av hälsa, tid, arbetares heterogenitet, och mätegenskaper vid studier av egenföretagande och hälsa för att få en djupare förståelse för sambandet mellan hälsa och egenföretagande.

Summary of studies

This doctoral thesis is based on the following studies:

I. Bergman, L. E., Bernhard-Oettel, C., Bujacz, A., Leineweber, C., and Toivanen, S. (2021). Comparing depressive symptoms, emotional exhaustion, and sleep disturbances in self-employed and employed workers: Application of approximate Bayesian measurement invariance. *Frontiers in Psychology*, *11*, 598303.

All authors collaborated in a research project that investigates self-employment and health. LB had the idea for the manuscript. All authors collaborated on discussing and structuring the idea and the manuscript. LB did all the analyses with assistance from AB. LB did the main part of the writing together with CB-O. All authors read, commented on, and added to the manuscript, and approved its final version.

II. Bergman, L. E., Bujacz, A., Leineweber, C., and Toivanen, S., Bernhard-Oettel, C. (2024). Are you in or are you out? A longitudinal person-centred study of health and entrance and exit into self-employment. *Business Research Quarterly, XX*.

All authors collaborated in a research project that investigates self-employment and health. LB had the idea for the manuscript. All authors collaborated on discussing and structuring the idea and the manuscript. LB did all the analyses with assistance from AB. LB did the main part of the writing. All authors read, commented and added to the manuscript, and approved its final version.

III. Bergman, L. E., Bernhard-Oettel, C., and Bujacz, A. (submitted). You do not have to become self-employed to feel engaged: Comparing self-determination, meaningful work, and work engagement in self-employed and employed workers with a task and person level approach.

LB and AB had the idea for the manuscript. All authors collaborated on discussing and structuring the idea and the manuscript. LB did all the analyses with assistance from AB. LB did the main part of the writing. All authors read, commented on, and added to the manuscript, and approved its final version.

Acknowledgements

> "*It's a dangerous business, Frodo, going out your door. You step onto the road, and if you don't keep your feet, there's no knowing where you might be swept off to."*
>
> — Bilbo Baggins, *The Lord of the Rings* by J.R.R. Tolkien

Just like Frodo, I had to heed Bilbo's advice during my years as a doctoral student, as I tend to be swept away by new, interesting subjects, methods, or analyses, leaving what I was working on unfinished. I am incredibly proud that I have managed to stay focused and complete my thesis, and I owe my thanks to many people for helping me reach this point.

First of all, I would like to thank my parents, Cecilia and Anders Bergman, who, despite not having sought higher education themselves, have supported me and my academic journey since my very first day of school. They instilled in me the importance of a good education, encouraged my curiosity and natural tendency to ask questions. They also supported me when teachers thought I questioned too much. They spent countless hours with me after school, explaining what the teachers could not, making sure I kept up with my peers. So thank you, Mum and Dad, as I definitely wouldn't be here without you.

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To my current teachers, my fantastic team of supervisors, a huge thank you. I have been incredibly fortunate to have Claudia Bernhard-Oettel as my main supervisor, as there could have been no better match for me. I have told Claudia this many times, and she always protests, but here in my acknowledgements she cannot, so I will take the opportunity to write: Claudia,

you are an amazing supervisor. You possess what I have learned is an uncommon combination of both deep knowledge of your field and exceptional teaching skills. You have not only taught me how to be a researcher but also many other important skills such as navigating academia and balancing life and work, ultimately helping me become a better researcher.

I am not usually a fan of equating work with family, but a doctorate is quite unique in terms of work, and my supervisors might best be described as my academic family. Claudia, my (very young) academic mother; Aleksandra Bujacz, my cool older sister; and then my two aunts, Constanze Leineweber and Susanna Toivanen. Since I started working with Aleksandra, two years before beginning my doctoral studies, she has encouraged my interest in methods and statistics, challenging my knowledge and intellect every day. I have aspired to be like her ever since. Constanze, with her extensive knowledge of the SLOSH database and insight about assessing health, has always provided thoughtful feedback on my work, and Susanna, besides being an expert of self-employed work and health, has constantly reminded me and others of the importance of research in this field and cheered me on. So a huge thanks to my fantastic team of supervisors, I hope to collaborate with you in the future too!

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Mia Boberg Winlöf, for listening to and supporting me throughout these years. Lastly, a huge thank you to all who have supported me through out these years but there are no room to mention here.

Louise E. Bergman
April, 2025
Haninge

Contents

Abbreviations

APA	American Psychological Association
CFA	Confirmatory factor analysis
CFI	Comparative fit index
CMV	Common method variance
DRM	Day-reconstruction method
ERI	Effort-reward imbalance model
HLM	Hierarchical linear modelling
JDC	Job demands control model
JDCS	Job demands control support model
JD-R	Job demands-resources model
LPA	Latent profile analysis
LTA	Latent transition analysis
MI	Measurement invariance
MLM	Multilevel modelling
MLR	Multiple linear regression
RMSEA	Root-mean-square error of approximation
SDT	Self-determination theory
SEM	Structural equation modelling
SLOSH	Swedish longitudinal occupational study of health
SRH	Self-rated health
TLI	Tucker–Lewis index
WHO	World Health Organization

Introduction

Governments encourage citizens to start-up businesses and become self-employed, and why shouldn't they? It keeps unemployment rates down (Cribb & Xu, 2020), contributes to innovation (Binder & Blankenberg, 2020), and it is a common assumption that self-employed workers are healthier than organisationally-employed workers (Stephan, 2018). While the first two advantages of self-employment appear to be true, a closer examination reveals that the health of self-employed workers is a far more complex concept than first assumed (Binder & Blankenberg, 2020; Stephan, 2018; Williamson, Gish, & Stephan, 2021). Therefore, a more thorough investigation into the relationship between self-employment and health is warranted. First, though, we might ask why the health of self-employed workers is so important to begin with.

In Sweden, one out of ten citizens has a registered company (Ekonomifakta, 2024). However, the number of self-employed workers varies in Europe, with the largest group in Greece, where one third of workers are self-employed (OECD, 2024). In total, self-employed workers in the European Union (EU), constitute around 33 million people, accounting for 14% of total employment rates (Eurostat, 2024). Thus, self-employed workers represent a considerable portion of the workforce, and given their contribution to society, it is vital to gain in-depth understanding of their health and its relationship to their work.

Health is closely related to work, an activity that most spend a large part of their waking hours engaging in. The work of the self-employed is often described in positive terms because of the freedom self-employment provides (Stephan, 2018; Wiklund, Nikolaev, Shir, Foo, & Bradley, 2019). However, self-employment may pose challenges in term of, for example, income restrictions (Acs, Åstebro, Audretsch, & Robinson, 2016), lack of boundaries between work and health (Bozzon & Murgia, 2021), and lack of peer support (Stephan, 2018). Thus, the relationship between self-employed work and health is not always a positive one. Indeed, several reviews of research of the health of self-employed workers indicate that the health benefits ascribed to self-employment seem to be restricted to positive aspects of health in terms of wellbeing, while self-employed workers actually experience higher levels of illbeing than other workers (Binder & Blankenberg, 2020; Stephan, 2018; Williamson et al., 2021). Thus, the relationship between self-employment and

health is not as clear-cut and straight forward as has commonly been assumed. There may be various reasons for this.

First, self-employed workers are not as homogenous a group as has been assumed in many previous studies. Self-employed workers are as heterogenous as organisationally-employed workers. For example, they are active in all kinds of sectors (Statistiska centralbyrån, 2024), can be solo self-employed or have companies with employees (Nikolova, Nikolaev, & Boudreaux, 2023), and may have become self-employed through opportunity or necessity (Larsson & Thulin, 2019). Consequently, the characteristics of their work in terms of demands they experience, effort they need to put into work, resources available, rewards they receive, and fulfilment of their needs may vary greatly between different self-employed workers.

Overall, assuming that self-employed workers are a homogenous group for whom general conclusions about health can be drawn might not present the whole picture, and may only represent a certain subset of self-employed workers.

Research gap 1: *Self-employed workers have mainly been studied as one homogenous group, without accounting for their heterogeneity.*

Second, many previous studies have adopted both a narrow and shallow view on health. Just as self-employed workers are a diverse group, health is a diverse concept that can be defined in many ways, and a complex concept, with many potential influences.

Health does not only involve absence of disease and infirmity, but also includes positive aspects, such as wellbeing (World Health Organization, 1948). An individual's perception of their health is the sum of their wellbeing and illbeing, but also goes beyond this, as the person makes judgements based on their own situation (Fayers & Sprangers, 2002). Thus, health is a complex concept and cannot be captured through just a single aspect of it.

The health of self-employed workers has mostly been studied from one perspective of health, or even one variable, at a time, without taking interactions between different aspects of health into account, nor the mechanisms behind it. Hence, a crucial gap in existing research on the health of self-employed workers is the examination of how different aspects of health interact with each other and with work circumstances in self-employment.

Research gap 2: *The health of self-employed workers has not yet been comprehensively studied, including various aspects such as wellbeing, illbeing, and self-rated health.*

Third, most conclusions regarding the health of self-employed workers relies on results from cross-sectional studies. However, an important aspect of work and health is time, as both of them develop and fluctuate (Roe, 2008).

Work and workers are dynamic – workers learn and gain experience, get promoted, switch jobs, and may transition between organisational work and self-employed work (Levesque & Stephan, 2019). Similarly, health changes over time, both over a day and over many years, depending on which aspect of health is indicated (Sonnentag, 2012). These changes are related not only by work but also by various life factors such as periods of illness and recovery.

Consequently, while cross-sectional studies offer some insight into the relationship between self-employed work and health, they do not capture how self-employed work and health covary, their reciprocal relationship over time, or how they are influenced by other factors. While some studies of the health of self-employed workers exist, the dynamics of these have yet to be examined.

Research gap 3: *The relationship between self-employed work and health is understudied with respect to the aspect of time, both in the long term and short term.*

Fourth, and last, it might be pertinent to focus on the investigation of the measurement properties of health assessment of self-employed workers. A recent debate of the replication and credibility of psychological research has raised the importance of proper assessment of psychological phenomena (Elson, Hussey, Alsalti, & Arslan, 2023; Iliescu et al., 2024). While some aspects of health are commonly general for the entire population it might still be useful to scrutinise assessment tools used to assess self-employed workers.

The American Psychological Association, commonly seen as setting the standards for psychological testing, suggests that validity evidence is collected for a specific purpose, and a specific group of respondents (American Educational Research Association, American Psychological Association, & National Council of Measurement in Education, 2014). This implies that researchers need to collect new validity evidence every time the purpose or context of the scale alters. One such context is type of work, and a such of purpose is comparison of different groups of workers.

Studies have explored a plethora of different aspects and variables of health, and it might be worth closely scrutinising the assessment of some of these aspects in order to gain deeper understanding of their properties, as well as to gather validity evidence.

Research gap 4: *The assessments used when studying the health of self-employed workers may benefit from investigation of their properties.*

In summary, these four aspects of research − treating self-employed workers as a heterogenous group, adopting a broader view of health, considering time, and investigating properties of assessment tools − need more nuanced and in-depth research.

Aims of the thesis

The general aim of this thesis is to study the health and work of self-employed workers from new perspectives by taking 1) heterogeneity, 2) the definition of health, 3) time, and 4) assessment into consideration.

More specifically, I address four overarching research questions through the three studies included in my thesis:

1. *What differences in health can be found among self-employed workers when their heterogeneity is considered?*
2. *What insights can be gained about the health of self-employed workers when different aspects of health are taken into account?*
3. *How does the health of self-employed workers develop when both long-term and short-term perspectives are considered over time?*
4. *What are the assessment properties of the assessment tools used when studying health in self-employed workers?*

Theoretical background

This thesis focuses on the relationship between self-employed work and health. In the following section, I first define the concept of work, including a brief summary of the history of self-employed work, forms of work studied in this thesis, and then theories of work characteristics. Second, I discuss the concept of health, with a summary of the evolution of the definition of health as used in this thesis, and the aspects of health included. Thirdly, I link self-employed work and health, with a focus on heterogeneity, aspects of health, and time.

Work

Work encompasses various activities aimed at achieving specific goals, involving mental or physical effort to produce goods, provide services, or complete tasks (Merriam-Webster dicitionary, 2024). While work may be defined from different perspectives, including for example domestic work, in this thesis I only include work that is conducted to support oneself and one's family, and securing basic necessities like food, shelter, and healthcare (Jahoda & France, 1979). This kind of work leads to some kind of external, most often monetary, reward. While work is foremost conducted to support oneself, secondary motivations include experiences of contributing to society, personal development, and providing structure to life (Jahoda & France, 1979). Work is a significant part of life, influencing health and vice versa (ILO & World Health Organization, 1995). It is essential both for individual sustenance and societal progress.

Here, I will present a brief history of work, followed by a description of different forms of employment today.

History of work

The history of work dates back to the beginning of human civilisation, playing a key role in technological, economic, and societal changes (Ackroyd, 2006). In prehistoric times, work centred on hunting, gathering, and agriculture, essential for survival and the foundation of societal organisation (Diamond &

Ordunio, 1999). While individuals did not perceive themselves that way, early workers were essentially self-employed.

As societies evolved, specialised roles and professions like craftsmen and traders emerged, leading to a more pronounced division of labour (Diamond & Ordunio, 1999). In medieval Europe, most workers were farmers, initially self-employed but later working under the feudal system, which resembled a form of employment (Diamond & Ordunio, 1999). Craftsmen formed guilds, blending self-employment with collective organisation (Ogilvie, 2014).

From the 16th to 18th centuries, work evolved with the rise of capitalism in Europe. While rural workers were mostly self-employed or serfs, merchants and traders gained prominence in cities, and early forms of organisational employment emerged (Weber, 1905). The Industrial Revolution in the 18th century brought mechanisation and mass production, leading to the rise of factories and a major shift from agrarian to industrial economies. This marked a significant change, as many people moved from rural areas to work in factories (Brynjolfsson & McAfee, 2014; Hobsbawm, 2010).

In the 20th century, the service sector expanded significantly, with the rise of professions in fields such as finance, healthcare, education, and information technology. During this period, there was a noticeable rise in corporations, which became major employers, and there was a significant increase in professionalisation and white-collar jobs. While many workers had become organisationally employed during industrialisation, it was in the 20th century this form of employment truly became the norm (Ackroyd, 2006).

At the last stage of this brief historic review, at the end of the 20th and start of 21st century, technological innovations such as computers and the internet further revolutionised the way work was conducted, enabling remote work, automation, and globalisation of labour markets (Brynjolfsson & McAfee, 2014; Näswall, Hellgren, & Sverke, 2008). During this period, there was a surge in alternative employment forms: start-ups and entrepreneurship provided a rise in self-employment again. Today, self-employed workers have become a driving force behind economic growth and innovation, with more people being self-employed, although nowhere near as many as before the start of the 20th century (Hedenus & Nergaard, 2021).

In sum, forms of self-employment used to be the most common form of work, even though workers would not have called themselves that, but later there was a shift towards organisational employment. Today, though, self-employment is on the rise again.

Forms of work today

Today, work is organised in various employment forms, ranging from what we think of as traditional employment in companies and organisations, to self-employment and combinations of these. In this thesis, I have chosen to discuss these forms of work and employment based on three categories: 1)

organisationally-employed work, 2) self-employed work (Stephan, 2018), and 3) a combination of these employment forms (Solesvik, 2017).

Organisational employment

Today, organisational employment is the norm in Western society (Ackroyd, 2006). An organisationally-employed worker refers to an individual who is formally employed by an organisation or company under a contractual agreement. This agreement outlines the terms and conditions of employment, including job responsibilities, compensation, benefits, working hours, and other relevant provisions (Rubery, 2006).

The standard organisational employment form is a permanent (open-ended) contract for full-time work. However, in addition to this, there is a plethora of non-standard employment forms that organisations can use to contract workers. This includes part-time work (that is, working less than 30 or 35 hours/week), as well as various forms of temporary employment (e.g., working on a project-based contract, or as a substitute to fill in for a permanent employee; Bernhard-Oettel, De Cuyper, Murphy, & Connelly, 2017). In this thesis, all workers with these types of organisational employment are categorised as one group of organisationally-employed workers.

Self-employment

Self-employment is work where an individual operates their own business or works independently without being formally employed by an organisation. Self-employed workers earn their living by selling their goods or services to customers, often on a contractual basis (Hedenus & Nergaard, 2021).

The self-employed have a unique freedom to shape their work and career, but also less predictability and continuity than an organisationally-employed worker (Obschonka & Silbereisen, 2015). While self-employment provides the freedom to organise tasks, time schedules, and the utilisation of one's skills, the uncertainty of work may result in greatly varying income (Acs et al., 2016; Bernhard-Oettel, Bergman, Leineweber, & Toivanen, 2024). Further, self-employed workers often lack boundaries between work and life (Bozzon & Murgia, 2021), lack peer support, and sometimes have responsibility for employees (Stephan, 2018). Thus, self-employment comes with both pros and cons.

When it comes to who these workers are, those self-employed with a registered company in Sweden, EU, and OECD are on average more often male (OECD/European Commission, 2023; Statistiska centralbyrån, 2024), and older (OECD/European Commission, 2023). However, there is a trend towards closing the gender gap, and while the barriers are sometimes large, younger people are more often becoming self-employed, and thus the profile of self-employment is becoming more diverse (OECD/European Commission, 2023).

Overall, the variation of self-employed workers is large, both in terms of who they are and what they do, and thus the average self-employed worker does not represent the group as a whole.

Combining employments

Individuals can also combine organisational work and self-employed work, most often working part time at each job (Folta, Delmar, & Wennberg, 2010). Thus, they have two different employment forms at the same time, e.g., working either 50% at each, 80/20%, or working to a limited extent in self-employment on contracts on top of regular, employed work. Often in research, workers in this group are categorised in whichever work – organisational or self-employed – they spend the most time in. However, their situation is uniquely distinct from the work of both organisationally and self-employed workers. In this thesis, these workers are referred to as 'combinators'.

Combinators experience the working conditions of both employed and self-employed workers, and also need to find a way to balance their two (or more) jobs. Difficulties might arise in the form of day-to-day balancing of time and resources (Murgia & Pulignano, 2019).

Combinators typically have higher education, and possess more skills, knowledge, and experience than those partaking in only one type of work. They are more often active in knowledge-intensive and innovative industries (Folta et al., 2010; Petrova, 2012). Some of them have the intention to leave organisational employment and become fully self-employed, while others are content with combining both employment forms (Solesvik, 2017; Thorgren, Sirén, Nordström, & Wincent, 2016).

In conclusion, these workers are different enough when it comes to work circumstances to warrant research as their own group, separate from organisational and self-employed workers.

Theories of work characteristics

The characteristics of work may be explained from many different perspectives, each utilising different concepts and theories. In my studies, I based the research questions on the Job demands-control model (JDC)/Job demands-resource model (JD-R), the Effort reward imbalance model (ERI), and Self-determination theory (SDT), with the goal to gain a more multifaceted understanding of work than just one theory might provide. Combining different theories is especially helpful in the context of self-employment, where a traditional view of work environment as something that an employer determines and influences, is not applicable. JDC/JD-R, and ERI are work psychology models, where JDC/JD-R focuses on work characteristics and their relationship with performance and health, while ERI

focuses solely on health. SDT is a psychological theory universal to human life, not only work, with a focus on health and optimal functioning.

The three theories may be seen as existing on a continuum from JDC/JD-R which are models of only work circumstances, via ERI, which combines aspects of work and personal experiences, to SDT which focuses solely on personal experience. JDC/JD-R may be categorised as theories of balance, where a state of equilibrium of external factors is optimal, and SDT a theory of harmony, where agreement and combability between elements, fulfilling one's needs is optimal. ERI maybe placed somewhere in between (Christensen, Saksvik, & Karanika-Murray, 2017).

Further, work can be viewed from different perspectives; a macro perspective of an employer or network of relationships with other (clients, contractors etc), the micro perspective of an individual worker and their personal preferences and individual health, as well as task perspective, acknowledging the variety of different tasks completed by a worker, which can be more or less rewarding and more or less difficult. The theories may complete each other, and provide deeper understanding of the relationship between self-employment and health, viewing work and health from different perspectives.

Below I describe each theory accordingly.

Job demand control & Job demand-resources

The job demand control model (JDC) assesses strain and stress factors at work (Karasek, 1979). According to JDC, jobs classify into four types with different levels of strain. In jobs with high demand and low control, so called high-strain jobs, risk of fatigue, anxiety, depression, and physical illness is high. However, in active jobs, where both demand and control are high, workers generally experience less strain and higher levels of wellbeing and motivation. Equally healthy are workers in low-strain jobs, which are characterised by low demands and high control. Finally, there is the passive job, which has low demands and lack of control, which demotivates and leads to strain and health risks. To answer critiques received, the model has been extended with social support, which in the workplace may moderate the adverse impact of high-strain jobs (JDCS model, see Johnson & Hall, 1988).

The job demand recourses model (JD-R) was first introduced by Demerouti, Bakker, Nachreiner, and Schaufeli (2001) as an alternative to JDC, and who critiqued the model as being too restricted to a limited set of predictors. JD-R seeks to explain the relationship between work characteristics, employee health, and performance. JD-R suggests that strain is a response to imbalance between demands on the individual worker and the resources they have to deal with those demands (Demerouti et al., 2001). Job demands have been a popular concept in theories of work characteristics when studying negative outcomes of work (e.g., burnout, illbeing, and stress), but

JD-R differs from these previous models in that it has a stronger focus focuses on positive outcomes such as wellbeing.

In JD-R, physical, psychological, social, or organisational aspects of work can either require effort or skills – *demands* – or help achieve goals or reduce demands – *resources*. In this model, the control and support presented in JDCS are included in resources. Demands to perform can come from the employer or the worker themself, and resources can be either workplace resources, e.g., physical and social resources at the workplace, or personal resources, e.g., personality traits. If resources exceed demands, the worker will experience motivation, high work engagement, and good performance (Demerouti et al., 2001). However, if demands exceed resources, the worker will experience job strain. If job strain is prolonged, the worker will suffer from health impairments (Demerouti et al., 2001). Indeed, the relationship between work demands, resources, and health have been confirmed in a meta study (Nielsen et al., 2017). However, a recent meta-analysis has not found support for the interactive model, but some support for the additive model (Gonzalez-Mulé, Kim, & Ryu, 2021, 2021). Nevertheless, JD-R provides a comprehensive framework for understanding the relationship between job characteristics, employee health, and performance.

Effort reward imbalance

ERI is a theoretical framework in occupational health psychology that examines the relationship between work characteristics in terms of effort expended at work and rewards received, and the impact of these on employee health. As such, it is similar to JD-R, but there are some central differences.

ERI postulates that employees invest *effort* in their work and, in return, expect *rewards* (Siegrist, 1996; Siegrist, Siegrist, & Weber, 1986; Siegrist et al., 2004). Effort is the employee's perception of the strain caused by various job demands and responsibilities from the employer, such as interruptions, overtime, and obligations. Reward are the opportunities that the job offers, such as salary, esteem, job security, and job promotion. Of these rewards, esteem is the respect, recognition, and feedback the worker gets from one's supervisor and colleagues. Job security is the security the worker experiences with regard to their job and work situation, and lastly, job promotion is a worker's experience of development of competence and career opportunities (Siegrist, Wege, Pühlhofer, & Wahrendorf, 2009). Thus, ERI focuses more on experiences regarding what is given by the worker and what is received in terms of reward, in comparison to JD-R, which focuses on experiences of demands and available resources, that in turn may lead to strain.

In ERI, a third component interacts with effort and reward: *overcommitment*. Overcommitment is the disposition to respond to the imbalance by excessive engagement and a desire to be in control. ERI has three basic assumptions: 1) the extrinsic: an imbalance between high effort

and low reward increases the risk of reduced health; 2) the intrinsic: overcommitted employees are at greater risk of reduced health; and 3) the interaction/moderation: overcommitment affects effort-reward imbalance, giving the highest risk of reduced health (Siegrist, 1996; Siegrist et al., 2004). Accordingly, ERI suggests an interaction between extrinsic and intrinsic factors at work.

The relationships described by ERI have been confirmed in meta studies (Harvey et al., 2017; Van Vegchel, De Jonge, Bosma, & Schaufeli, 2005), as well as in longitudinal studies (Hinsch, Spanier, Radoschewski, & Bethge, 2019; Håkansson, Gard, & Lindegård, 2020; Leineweber, Eib, Bernhard-Oettel, & Nyberg, 2020).

With regard to self-employment, effort and reward may be a fruitful approach. However, parts of this theory are closely related to the work characteristics of organisationally-employed workers, with a heavy focus on supervisors and job security in terms of dependence on an employer, but self-employed workers have neither supervisor nor employer (Stephan, 2018). Nevertheless, part of ERI is highly relevant: self-employed workers still experience efforts, e.g., responsibilities, interferences, and changes in work, and rewards, e.g., income, acknowledgement from clients, and autonomy.

Self-determination theory

SDT is a universally applicable theory that focuses on intrinsic experiences in all aspects of human life. This contrasts with the predominant approach in work psychology research, as theories most commonly used focus solely on work aspects. SDT emphasises the degree to which a person's behaviour is self-motivated, and posits that every individual harbours a fundamental need for self-determination. When this need is met, optimal functioning is fostered, contributing to enhanced health and overall wellbeing (Deci, Olafsen, & Ryan, 2017; Deci & Ryan, 1985a; Harvey et al., 2017; Ryan & Deci, 2000; Ryan, Sheldon, Kasser, & Deci, 1996).

SDT postulates that there are three basic psychological needs: the needs for *autonomy*, *competence*, and *relatedness*. Needs regarding autonomy pertain to the psychological requirement for self-direction, signifying that individuals are the initiators of their own actions (Deci & Ryan, 1985b). Needs related to competence involve the innate desire to apply one's capabilities and skills, actively seeking and mastering challenges deemed optimal for personal growth (Deci & Ryan, 1985a). Lastly, needs for relatedness encompass the need for emotional closeness and connection with others (Baumeister & Leary, 1995; Ryan, 1995). An individual's work can either fulfil these needs or not.

The theoretical link between self-determination and work health can be found in intrinsic motivation. Intrinsic motivation involves engaging in activities that inherently captivate individuals' interest, without the need for

external, separable consequences. This motivation leads humans to participate in behaviours, such as those at work, which satisfy their basic needs, subsequently resulting in heightened engagement in these activities (for an in-depth exploration, see Deci et al., 2017).

The link between SDT and health has been confirmed in a meta study (Ng et al., 2012). With regard to work, a review by Deci et al. (2017) refers to research supporting links between motivation and the dual concerns of performance and health in organisations. In summary, the fact that this theory is universal to all humans and all context, is its strength. Further, SDT is most likely the easiest of the three theories of this thesis when it comes to generalise both up to the organisational or work environment level as there are no assumptions based on organisational employment. However, it may also in some cases be too general for specific context, in which theories of work characteristics may be more appropriate.

Health

Health is one of the most important aspects to human life, as it affects everything we do and experience, and, ultimately, bad health may lead to early death (Collaborators & Ärnlöv, 2020). Health is a complex and broad concept, defined differently across various fields, and even in different studies within psychology. Therefore, one need to clarify what one is referring to when studying health. In this thesis, I will adhere to the definition of the World Health Organization (WHO), and the biopsychosocial model of health.

Below follows first an overview of the development of the idea and definition of health, and then the different aspects that I focus on in my studies.

Evolution of the definition of health

Historically, health has long been seen as a state of normal functioning of a person who is free from disease and disorder. While humans have reflected upon and studied health for as long as we have existed, the body-mind dualism introduced by René Descartes in the 17th century has greatly influenced the long-dominant biomedical model of health (Lovallo, 2015).

The traditional biomedical model states that being healthy is having a body that functions like a smooth-running machine, and that disease and disorder impair this function (Lovallo, 2015). Thus, according to this model, the definition of health is dichotomous; a person is either healthy or not (Ogden, 2019). In this model, the focus is on illness coming from the body, and as such, mental states are not related to the body. Consequentially, disease is seen as a pathological process whereby the body should be treated, not the mind (Lovallo, 2015).

The idea of health as absence of disease and disorder was long the dominant definition of health. However, this view has had competition from a more holistic perspective on health, including quality of life (Nordenfelt, 2007), and in 1948, WHO diverged from the classical definition of health, stating that health is a state of:

> "*complete physical, mental, and social well-being, and not merely the absence of disease and infirmity*". (World Health Organization, 1948)

This definition has been celebrated as innovative, as it includes aspects of wellbeing, not only illness. The notion of 'complete' wellbeing should be interpreted as a notion of holistic health, and not perfect health (Schramme, 2023). However, this definition has been criticised as vague and non-measurable. Therefore, in 1984, WHO chose to revise its definition, by saying that health is:

> "*the extent to which an individual or group is able to realize aspirations and satisfy needs and to change or cope with the environment. Health is a resource for everyday life, not the objective of living; it is a positive concept, emphasising social and personal resources, as well as physical capacities*". (World Health Organization, 1984)

An advantage of this definition is that it does not exclude the injured and chronically and terminally ill from experiencing positive aspects of health (Kotha, Jadad, & Hu, 2015). Furthermore, when defining health as the ability to maintain optimal functioning and recover from disease and injury, it is quantifiable through self-assessment.

WHO's definition of health does not compare well with the traditional biomedical model, and more modern models have emerged (Lovallo, 2015). The *biopsychosocial model* integrates biological, psychological, and social factors: 1) the biological part of the model represents genetics, viruses, bacteria, and structural defects that may aid or impair an individual's health; 2) the psychological part represents cognition, emotions, and behaviour that may function as personal resources or deficits; and 3) the social part represents social norms, pressure to change behaviour, and social values, which relate to social resources or deficits (Ogden, 2019). Thus, this model introduces a connection of body, mind, and environment, and states that they affect each other in a reciprocal manner. Further, the biopsychosocial model of health rejects the idea that health is dichotomous, but rather exists on a continuum (Ogden, 2019), and as a multifaceted concept, thus making it compatible with WHO's definition.

In sum, WHO's latest definition of health is complex, yet simple enough to both capture the phenomena of health, and to make it assessable, and the

biopsychosocial model helps to explain how body, mind, and environment interact.

Aspects of health in this thesis

As stated, health is a broad concept, and it would be practically impossible to address all its facets in one thesis. Therefore, I have limited my research to focus mainly on psychological aspects of health. When focusing on these psychological aspects, and still utilising WHO's broad definition of health, it is crucial to consider several aspects of health together. Hence, for this thesis, I have chosen three aspects that capture central elements of health: wellbeing, illbeing, and self-rated health, all of which are described in separate sections below.

Wellbeing

Wellbeing refers to the state of being comfortable, healthy, and happy, and encompasses various dimensions of physical, mental, emotional, and social wellbeing. It reflects a person's overall quality of life and sense of fulfilment, satisfaction, and vitality. Psychological wellbeing includes factors such as positive mental health, emotional resilience, emotional stability, self-awareness, and cognitive abilities (Jarden & Roache, 2023).

It is typically distinguished between hedonic and eudaimonic wellbeing (Bujacz, Vittersø, Huta, & Kaczmarek, 2014; Huta & Waterman, 2014). Within the hedonic approach, wellbeing is defined as maximised happiness (Kahneman, 1999), which is thought of as the amount of positive affect and the absence of negative affect in a person's life (Feldman, 2010). Some researchers also include life satisfaction, and the three aspects – positive affect, negative affect, and life satisfaction – make up what is usually called subjective wellbeing (Diener, Scollon, & Lucas, 2009).

In the eudaimonic approach to wellbeing, pleasant feelings and favourable evaluations do not fully capture a 'good life' (Feldman, 2010; Huta & Waterman, 2014). Instead, wellbeing also includes positive functioning, for example experiences of purpose, meaning, being interested and engaged, and fulfilling one's potential and aspirations (Bakker, Schaufeli, Leiter, & Taris, 2008; Vittersø, Oelmann, & Wang, 2009). Research indicates that the most beneficial approach to wellbeing is through pursuing both hedonic and eudaimonic wellbeing (Huta & Ryan, 2010).

In addition to bringing individuals satisfaction and making them feel good, experiences of wellbeing are beneficial for health and longevity, particularly in relation to cardiovascular, immune, and endocrine systems (Diener, Oishi, & Tay, 2018). Individuals experiencing wellbeing tend to lead healthier lives and have better social relationships (Diener et al., 2018). This ties in with WHO's definition of wellbeing as a part of health, and the idea of physical,

social, and psychological aspects affecting each other as suggested by the biopsychosocial model. Thus, wellbeing is an important aspect of health, both in its own regard, and its relationship with other aspects of health.

Illbeing

Research on health and wellbeing has traditionally and predominantly focused on (the absence of) negative aspects, typically by assessing the presence of symptoms of illbeing, such as stress or depression (Diener, Suh, Lucas, & Smith, 1999). As evident from the previous section, wellbeing encompasses more than just the absence of illbeing. For example, not being depressed is not the same as experiencing happiness, contentment, or feeling energised. Thus, distinguishing between these two aspects can provide insights into health. Therefore, in this thesis, I use the term illbeing to clearly differentiate between the presence of symptoms of illbeing and indicators of wellbeing.

Illbeing refers to a state of poor mental, emotional, or physical health. It encompasses a range of negative outcomes and experiences that individuals may encounter, including distress, discomfort, dissatisfaction, and dysfunction in various aspects of life (Ogden, 2019). Illbeing includes physical symptoms, diseases, and disabilities, but in this thesis, I will focus on the psychological aspects.

Individuals experiencing psychological illbeing may struggle with persistent negative emotions, intrusive thoughts, and impaired cognitive functioning. Illbeing can also involve emotional distress, including feelings of sadness, anger, frustration, hopelessness, and loneliness. It may be characterised by a lack of emotional resilience, difficulty in regulating emotions, and a sense of emotional numbness or detachment (World Health Organization, 2014).

In this thesis, I have focused on illbeing in terms of four mental health problems: 1) stress, a non-specific perceived response to demands (Åkerstedt et al., 2015); 2) emotional exhaustion, a state characterised by profound fatigue and depletion, and a sense of being burned out (Melamed, Kushnir, & Shirom, 1992; Shirom, 1989; Shirom & Melamed, 2006); 3) depressive symptoms, encompassing feelings of sadness, low energy levels, lack of interest, and excessive worrying (Magnusson Hanson, Westerlund, et al., 2014); and 4) sleep disturbances, including difficulties falling asleep, restless sleep, and premature awakening (Nordin, Åkerstedt, & Nordin, 2013).

Thus, not only is the individual affected by illbeing, but also society. Overall, illbeing is an important aspect of health, and to assess in its own right.

Self-rated health

The concept of self-rated health (SRH) is useful when studying comprehensive concepts of health, such as the one defined by the WHO. Further, it also captures all aspects of the biopsychosocial model (Ogden,

2019), as it does not exclude any parts of health, effectively asking the individual to appraise their own health. In this thesis, I distinguish self-rated health to separate it from more specific aspects of health, such as wellbeing and illbeing.

Self-rated health is an assessment of health by the individual themself. This assessment is made up of physical, psychological, and social dimensions, representing the individual's personal perception of their health, and the individual themself weighs in and combines the various dimensions when making this assessment (Committee on Health and Behavior, 2001; Fayers & Sprangers, 2002). These experiences provide a comprehensive perspective that considers both positive and negative dimensions of health (Bujacz, Eib, & Toivanen, 2019; Wikman, Marklund, & Alexanderson, 2005). In a person's judgment of their health, they take all these experiences into account, and make a collected judgment of their own health status.

Many studies, including meta studies, confirm the usefulness of a single item assessment when it comes to overall health (DeSalvo, Bloser, Reynolds, He, & Muntner, 2006). Self-rated health has been found to be a strong predictor of morbidity and mortality (Benyamini & Idler, 1999; Mossey & Shapiro, 1982).

In summary, self-rated health provides a comprehensive and inclusive framework for understanding health that goes beyond the dichotomy of positive and negative health. It acknowledges the complexity of health as a multidimensional concept influenced by many factors, and emphasises the importance of promoting health for all individuals.

Understanding the relationship between self-employed work and health

Thus far, research has provided us with some knowledge of health of self-employed workers. On average, self-employed workers experience both better health, primarily in terms of wellbeing, and worse health, in terms of some illbeing variables, than organisationally-employed workers. In the following section I present research that delves into this inconsistency, with a focus on the first three research questions of this thesis: heterogeneity of health of self-employed workers, the complexity of the concept of health, and the temporal aspects of work and health. I have a special focus on the theories of work characteristics utilised in this thesis – JDC/JD-R, ERI, and SDT, both when it comes to empirical findings, and how they can contribute to further understanding of the health of self-employed workers.

Heterogenous health among self-employed workers

As has been noted, self-employed workers are a highly heterogenous group, and studying them in terms of averages fails to accurately portray their health. When trying to take heterogeneity into account, researchers have mainly focused on different, predefined groups of self-employed workers from a variable perspective. These studies concentrate primarily on job satisfaction, and do indeed find differences in different groups of self-employed workers. For example, job satisfaction in self-employment seems to be higher among women when compared to men (Litsardopoulos, Saridakis, & Hand, 2021), in those with persistent self-employment in comparison to other career patters (Koch, Park, & Zahra, 2021), and in self-employed workers driven by opportunity rather than necessity (Larsson & Thulin, 2019). Studying meaningful work, Nikolova et al. (2023) found that self-employed workers with employees experience their work as more meaningful, but also more stressful than those without employees. Thus, differences in health within the group of self-employed workers have been found.

A few studies have a special focus on separating combinators from fully self-employed workers. Ardianti, Obschonka, and Davidsson (2022) found that combinators have distinct health patterns separated from both self-employed and organisationally-employed workers in terms of mental strain, work satisfaction, and life satisfaction, which seems to be explained by both self-selection and the unique aspects of their work. However, when replicating this study Stephan, Demir, Lasch, Vossen, and Werner (2023) found that combining self-employment with organisational-employment was negatively related to work and life satisfaction in their sample. Further, Kuske, Schulz, and Schwens (2024) found that the unique strains of combining also seem to constrain the workers' ability to transform experiences into skills that would protect health, which might explain impairments in health. However, in a study of long-term sickness, Bouwhuis et al. (2017) found no differences between self-employed workers and combinators, which might be explained by the heterogeneity within both groups of workers, even when separating out combinators. In sum, studies of health of combinators have inconclusive findings.

Besides focusing on different groups of self-employed workers, many studies on health, particularly in terms of job satisfaction and illbeing, try to address heterogeneity of self-employed workers by including demographic characteristics such as gender, age, and educational level as control variables. However, results from these studies are often contradictory (Dawson, 2017; Nguyen & Sawang, 2016; Solomon, Nikolaev, & Shepherd, 2022). In conclusion, how differences in health among self-employed workers can be unravelled is still not clear. However, some clues may be found in studies examining the mechanisms behind varying health in this group.

Studies of the mechanisms of health developments in self-employed workers address heterogeneity inexplicitly, but do not separate self-employed workers into different groups. Here, a plethora of studies, predominantly with a focus on wellbeing, come with different suggestions regarding what covaries or causes differences in the health of self-employed workers. As a few examples, these studies suggest different personal assets, such as psychological functioning (Nikolova, 2019), values in terms of beliefs about wellness (Patel & Wolfe, 2020), or levels of self-care (Schmitt & Prasastyoga, 2024), or different social factors, for example aspects of conflict between family and work (Bozzon & Murgia, 2021; Hagqvist, Toivanen, & Bernhard-Oettel, 2018; McDowell et al., 2019) and enrichment between family and work (Nguyen & Sawang, 2016). These studies find support for the factors studied and their relationship with the health of self-employed workers, but only to some degree.

The theories of work characteristics used in this thesis – JDC/JD-R, ERI and SDT– might provide some insights to the heterogeneity of the health of self-employed workers. These theories may be especially beneficial as they consider work and health of self-employed workers as more complex than specific business, personal, or social circumstances, as the studies mentioned so far do. Indeed, through explaining the mechanisms behind differences in health with these theories, researchers have found some explanations to the heterogeneity of self-employed workers' health.

Researchers using JD-R have found that self-employed workers with an excess of demands and lack of resources experience emotional exhaustion (Kattenbach & Fietze, 2018; Obschonka et al., 2023), and that those with low demands and high resources experience work engagement (Dijkhuizen, Gorgievski, van Veldhoven, & Schalk, 2016; Laguna, Razmus, & Żaliński, 2017; Obschonka et al., 2023) and job satisfaction (Kattenbach & Fietze, 2018; Kleine-Stegemann, Hensellek, Senyard, Jung, & Kollmann, 2024). Further, by combining resources, self-employed workers can face the high demands of their work to increase job satisfaction (Kleine-Stegemann et al., 2024). Thus, differences in the health of self-employed workers vary with their experience of demands and resources, similar to organisationally-employed workers.

With regard to SDT and the health of self-employed workers, many studies focus on satisfaction with regard to autonomy. These studies indicate that satisfaction of the need for autonomy are connected to higher wellbeing in terms of work satisfaction (Lange, 2012; Prottas, 2008) and engagement (Mabunda Baluku, Balikoowa, Bantu, & Otto, 2020; Schummer, Otto, Hünefeld, & Kottwitz, 2019), and lower levels of illbeing in terms of stress (Prottas, 2008). Mabunda Baluku et al. (2020) also found a similar relationship between wellbeing in terms of engagement and fulfilment of the needs for competence and relatedness. Thus, fulfilment of the need for self-determination varies in self-employed workers and, consequently, so too does

their health. With regard to ERI, research has yet to utilise this theory when studying the mechanisms behind differences in the health of self-employed workers.

Overall, the studies mentioned thus far provide evidence that the health of self-employed workers is complex, and that many aspects of life and work covary with their health. A shortcoming of these studies is that they mostly focus on single aspects of health, and most of them focus on specific aspects of wellbeing in terms of job satisfaction and general wellbeing. Thus, gaps with regard to both the extent of the variation in health, as well as other aspects of health, remain.

Turning the perspective completely, it might be fruitful to start from the health of individuals themselves, taking a person-centred approach. In a few initial studies, researchers have proceeded from the heterogeneity of health itself, showing that the wellbeing (Bujacz et al., 2019; Gish, Guedes, Silva, & Patel, 2022), self-rated health, and illbeing (Bernhard-Oettel et al., 2024) of self-employed workers varies beyond just good or bad health, finding complex patterns and interactions between different health variables. These novel studies provide evidence that different health variables and aspects vary together in different patterns, not just at different levels. They also provide some insight into covariates of health in terms of personal (e.g. skills, personality, and demographics) and business (e.g. income and dependency of clients) circumstances, linking their results to previous studies of mechanisms behind differences in the health of self-employed workers. Thus, beginning from health itself seems pertinent to understanding the heterogeneity of self-employed workers' health.

In conclusion, researchers have thus far started to build an understanding of the heterogeneity of the health of self-employed workers, but it is incomplete in several aspects, such as understanding the mechanisms behind the heterogeneity, as well as how health actually varies among them, not just when it comes to different levels of specific aspects of health.

Depth and breadth of different aspects of self-employed workers' health

As first noted in this thesis, a common misconception is that self-employed workers exclusively experience better health than their organisationally-employed counterparts. Yet, as has been noted, health is a complex concept, and sweeping assumptions about it is difficult; thus, a closer investigation of the health of self-employed workers is warranted. First, the statement that self-employed workers are healthier than others is only half true as self-employed workers, on average, experience better wellbeing, but worse illbeing than organisationally-employed workers (Binder & Blankenberg, 2020). To understand this discrepancy, both a deep-dive into the specific mechanisms

behind the health of self-employed workers is needed, and zooming out to understand the interactions of different aspects of health, such as wellbeing, illbeing, and self-rated health.

A deeper understanding of the mechanisms behind wellbeing

What can be seen from the studies researching different aspects of health is that, as stated previously, while self-employed workers seem to experience higher levels of different aspects of wellbeing, they also experience more illbeing, primarily in terms of stress. This has also been confirmed in reviews (Binder & Blankenberg, 2020; Stephan, 2018). Stephan, Rauch, & Hatak (2023), in their meta study, found that self-employed workers experiences higher levels of both hedonic and eudaimonic wellbeing, especially in terms of work and life satisfaction (aspects of hedonic wellbeing) than organisationally-employed workers. They also found that the illbeing in terms of stress and emotional exhaustion, and mental illbeing of self-employed workers is more complex, and dependent on institutional context, in that if rule of law regarding business is weak, the self-employed workers suffer more than organisationally-employed workers. In comparison, when rule of law is strong, they suffer less. This meta study provides evidence that self-employed workers can experience both wellbeing and illbeing at the same time.

Studies utilising JDC and JD-R have tried to explain why self-employed workers differ from organisationally-employed workers. With regard to JDC, Stephan (2018) concluded in a review that self-employed workers seem to have higher demands in terms of greater levels of uncertainty, responsibility, and complexity, but also more resources in terms of autonomy and job control than organisationally-employed workers. Stephan argues that this give a clue to the discrepancy of self-employed workers having both better wellbeing and worse illbeing than organisationally-employed workers, as high demands may be connected to worse illbeing, and more resources to better wellbeing. Further, JDC and JD-R have been good approaches for understanding illbeing in particular, but when it comes to wellbeing, SDT may contribute to greater understanding.

Self-employed work may, more often, be a self-motivated choice, as organisational-employment is the standard form of work (Stephan, Tavares, et al., 2020). Further, self-employed work tends to be boundaryless (Stephan, 2018). Thus, as SDT is centred around motivation and is not limited to work, this theory may provide unique insights into work characteristics and the health of self-employed workers. Studies utilising SDT confirm that high fulfilment of the three basic needs leads to higher wellbeing in self-employed workers; in terms of job satisfaction (Lanivich, Bennett, Kessler, McIntyre, & Smith, 2021; Padilla-Angulo, Lucia-Casademunt, & Gómez-Baya, 2024), subjective vitality (Shir, Nikolaev, & Wincent, 2019; Stephan, Tavares, et al., 2020), and happiness (Shir et al., 2019). However, thus far, only a few studies

research why self-employed workers experience more wellbeing than organisationally-employed workers.

The few studies of why self-employed workers experience more wellbeing than organisationally-employed workers generally focus on different aspects of eudaimonic wellbeing. These suggest, for example, higher levels of job control (Bujacz, Bernhard-Oettel, Rigotti, & Lindfors, 2017), better problem solving (B. N. Nikolaev, Lerman, Boudreaux, & Mueller, 2023), and enhanced requirement for personal innovation (Warr & Inceoglu, 2018) as mechanisms behind higher levels of eudaimonic wellbeing in self-employed workers.

Stephan, Tavares, et al. (2020) found that higher levels of wellbeing, in terms of subjective vitality, a form of eudaimonic wellbeing, in self-employed workers in comparison to organisationally-employed workers is explained by higher levels of meaning in the work that self-employed workers experience. Further, Lanivich et al. (2021) found that self-employed workers experience higher levels of job satisfaction than organisationally-employed workers related to higher levels of self-determination (in terms of autonomy and resource induced coping, related to competence).

In sum, researchers have made some attempts to understand the mechanisms behind better wellbeing in self-employed workers.

Different aspects of health and their interactions

A key challenge to understanding the complexity of self-employed workers' health is the varied definitions and aspects of health used in these studies. Some focus on mortality rates (Toivanen, Griep, Mellner, Vinberg, & Eloranta, 2016) or self-rated health (Sewdas et al., 2018), while others examine illbeing, such as stress (Bernhard-Oettel et al., 2019; Jamal, 2007; Sikora & Saha, 2009) or mental health issues (Stephan et al., 2023; Williamson et al., 2021). Conversely, studies on wellbeing explore job satisfaction (Fritsch, Sorgner, & Wyrwich, 2019; Litsardopoulos, Saridakis, Georgellis, & Hand, 2023; Sánchez-Sánchez & Namkee, 2018) or general wellbeing (Bujacz et al., 2017; Bujacz et al., 2019; Stephan, Tavares, et al., 2020). These varied approaches make synthesis challenging, and highlight the complexity of health among self-employed workers.

When synthesising research of health in self-employed workers it might be useful to categorise health into the three different aspects defined in this thesis; wellbeing, illbeing, and self-rated health. Observing previous research, it becomes evident that most studies examine variables of health within the same aspect. For example, a study may include different aspects of wellbeing, such as work satisfaction and meaning (Bujacz et al., 2019), engagement and work satisfaction (Dijkhuizen et al., 2016), or different aspects of illbeing, such as stress and mental illbeing (Patel, Wolfe, & Williams, 2019). These provide

knowledge of how variables within an aspect of health covary, but not between different aspects of health.

It is more uncommon for studies to include variables from different aspects, for example wellbeing and illbeing, together. These studies mentioned generally focus on variables that seem to have an underlying association with these aspects of health. They suggest different underlying factors, for example, financial distress, which has a negative association with wellbeing in terms of life satisfaction and quality of life, and illbeing in terms of depression and diagnoses (Berrill, Cassells, O'Hagan-Luff, & van Stel, 2021). Further, as another example, the belief that one's work creates social value is associated positively with wellbeing in terms of work satisfaction and experiences of meaning, and negatively with illbeing in terms emotional exhaustion (Brieger, De Clercq, & Meynhardt, 2021). Finally, self-care is positively related to wellbeing in terms of vitality, and negatively to illbeing in terms mental health (Schmitt & Prasastyoga, 2024).

Regarding theories, Kattenbach and Fietze (2018) − utilizing JD-R − found that demands lead to exhaustion, and resources to job satisfaction (with one exception of cognitive workload), and vice versa in self- employed workers just as in organisationally-employed workers. Delving deeper into the relationship of wellbeing and illbeing variables, Obschonka et al. (2023) found that high demands and high resources of self-employed work led to high work engagement and, as a consequence, resilience against emotional exhaustion.

With regard to SDT, Padilla-Angulo et al. (2024) found that wellbeing in terms of job satisfaction, combined with the satisfaction of self-determination and entrepreneurial motivation, play a role in explaining subjective wellbeing and illbeing in self-employed workers. Wolfe and Patel (2019) used ERI to explain the positive relationship between stress and autonomy with imbalance in effort and reward, and especially overcommitment, leading to excessive work. Apart from these studies, research utilising SDT and ERI in this context are scarce.

Overall, research of different aspects of health of self-employed workers sheds some light on why the discrepancies in health exist; while they seem to have more demands in terms of stressors, they also have more resources and opportunity to fulfil their basic psychological needs. Thus, the self-employed may experience more illbeing because of the demands, but also more wellbeing because of the resources available to them and the opportunity to fulfil their basic psychological needs. As a consequence, they may also be able to avoid illbeing, utilising the resources they have. However, few studies integrate several aspects of health, and these have only just begun to bring understanding of its complexity.

With its unique perspectives integrating extrinsic and intrinsic aspects of work characteristics, ERI may provide understanding of how the perceived imbalance between the effort expended in self-employed work and the rewards received can contribute to employee stress, strain, and health

problems, and the aspect of overcommitment might be particularly relevant to self-employed work. These workers are at a higher risk of working excessively (Balducci et al., 2020), are at high risk of experiencing difficulties in detaching from work (Taris, Geurts, Schaufeli, Blonk, & Lagerveld, 2008), and appear to have an 'obsessive passion' towards work (Stroe, Wincent, & Parida, 2018). As a result, overcommitment may be highly prevalent among this group of workers.

To conclude, research to explore the interactions between different aspect of the health of self-employed workers is in its infancy, and warrants further investigation.

Temporal patterns of self-employed work and health

Time is a crucial aspect of work and health, and yet it is understudied in applied work health psychology (Levesque & Stephan, 2019). No form of psychological construct can be defined without reference to time, and time is critical to understanding these constructs (Roe, 2008). When it comes to work and health, both are subject to temporal patterns. Temporal patterns refer to how a construct or phenomena varies over time (Roe, 2008). Both work and health may have short-term and long-term variations, and when taking this into account, the relationship between work and health may best be described as reciprocal.

Long-term and short-term temporal patterns of work and health

First, work may change in several ways over time. Work characteristics vary, both during a day as one switches between tasks, with the seasons, as some businesses are in higher demand at some times of the year, and one may switch jobs. Second, health can also vary. Some aspects are more stable over time, such as chronic diseases, but others, such as physical pain in terms of, for example, a headache, or affects, such as for example feelings of happiness or anger, which may vary greatly over a day (Roe, 2008). Further, some aspects of health, such as flu outbreaks or allergies, are connected to certain seasons of the year. Thus, both work and health may vary over a day, a year, and a lifetime, depending on which aspects of work and health is being studied.

Research indicates that in contrast to the organisationally-employed, the temporal relationship between self-employed work and health seems to entail shorter times between (while still considered as long term) changes in business and health and their effects on each other (Hessels, Rietveld, & Van Der Zwan, 2020). Further, self-employed workers with small businesses seem to experience these effects even faster (Sawang, O'Connor, Kivits, & Jones, 2020). This makes sense as a small business does not have the same buffer for changes in business circumstances or health of the self-employed worker as a larger business.

Most research of self-employed work and health does not take time into account (Levesque & Stephan, 2019; Stephan, 2018). The research that does, mainly focuses on more long-term temporal patterns over months or years (e.g. Arshi, Kamal, Burns, Tewari, & Rao, 2021; Gonçalves & Martins, 2018; Rietveld, Van Kippersluis, & Thurik, 2015). These studies provide important insights into the health of self-employed workers, indicating that their health indeed fluctuates over time in relation to various factors, including work. However, few studies account for the heterogeneity within the group or do not consider different aspects of health comprehensively. The few studies that do so use predefined groups based on gender (Caliendo, Graeber, Kritikos, & Seebauer, 2023; Litsardopoulos et al., 2023), career patterns (Koch et al., 2021), or size of business (Sawang et al., 2020). All these studies focus on work satisfaction. Therefore, there is significant potential to gain further insights from long-term longitudinal research of the health of self-employed workers when it comes to their heterogeneity and the study of a variety of health aspects.

With regard to short-term changes, over days or even hours, very little research of the relationship between health and self-employment exists. However, studies of short-term health in self-employed workers can provide insights to such changes (Levesque & Stephan, 2019). Bujacz et al. (2017) found that wellbeing in terms of work engagement, and work characteristics in terms of creativity, varied more during a day than for organisationally-employed workers, and Sonnentag (2017) found that the wellbeing of self-employed workers in terms of affect varies with changes in work characteristics throughout a day. Apart from these studies, short-term temporal studies of health and self-employed work are scarce. Nevertheless, these results suggest that health and work of self-employed workers vary more than for organisational-employees over longer time periods, but also shorter ones. Thus, it is imperative to study their health during short-term temporal patterns.

Besides general long-term and short-term temporal patterns of health in self-employed workers, work itself may change, as self-employment may not be a life-long career choice, but might occur during a certain period of time and thus has an onset, duration, and end. There is research showing that health and entrance into (Georgellis & Yusuf, 2016; B. Nikolaev, Shir, & Wiklund, 2020; Nikolova, 2019; Stephan, Li, & Qu, 2020), stability of (Koch et al., 2021), and exit out of (Bernhard-Oettel et al., 2019; Nikolova, Nikolaev, & Popova, 2021) self-employment is related. While it has previously been assumed that self-employment is related to better health, these studies indicate that these assumptions might mistakenly be based on the fact that the newly self-employed often experience a surge in wellbeing (Nikolova, 2019; Stephan, Li, et al., 2020). However, it has also been found that workers can experience a surge in health when exiting self-employment (Nikolova et al., 2021). Thus, entrance and exit out of self-employment is an important

temporal aspect to consider when seeking to understand health developments over time.

In conclusion, research on the health of self-employed workers may benefit from taking into account both long-term and short-term temporal patterns, as well as entrance into and exit out of self-employment.

Reciprocity of the relationship between work and health

One aspect that becomes evident when the temporal dynamics of work and health is taken into account is that the relationship between work and health may best be considered as reciprocal. Work and health are both significant parts of our lives and are highly intertwined: work affects health, but health also affects work. Work is often described in terms of its negative impacts on health, but can also be shaped to improve health (Frank et al., 2023). Health may affect work, too, for example through a person's ability to perform at work or even their ability to work at all (which is known as the healthy worker effect – people with impaired health are more often not part of the active workforce to begin with; Li & Sung, 1999).

Health influences work through multiple aspects. A person with better health is more productive and performs more efficiently than an individual with health problems, and poor health can lead to increased absenteeism and sickness presenteeism, both of which can disrupt workflow and result in reduced productivity (Nordenmark, Hagqvist, & Vinberg, 2019). In addition, health may decide what kind of work a person can do, both at the beginning of a career and over time, as health changes. A worker may need to adjust work because of health, maybe by working part time.

The reciprocal nature of work and health can be understood through Engel's (1977) biopsychosocial model of health, which integrates biological, psychological, and social aspects of health, emphasising their interdependent relationships. While self-employed workers share similar biological and psychological aspects with other workers, the social aspects of their work differ. Self-employment often involves greater freedom, flexibility, and responsibility, all of which interact with health (Stephan, 2018).

A self-employed worker with good health may have the energy and motivation to meet the challenges of self-employment, but one with impaired health may not (Hessels et al., 2020; Williamson et al., 2021). Further, the dynamic features of self-employed work can affect health, as a thriving business may lead to better health, and a failing business may lead to impaired health (Laguna & Razmus, 2019). Thus, the relationship is clearly reciprocal, the effects of which may be instant or develop over long time periods.

In addition, the self-employed might be better able to adjust their work effort based on a daily evaluation of their health (e.g., having a cold or headache; Binder & Blankenberg, 2020), but might be more affected than organisational workers when health changes more drastically (Gunia, 2018).

Thus, depending on what aspect of health one is interested in, the time span of temporal relationships may vary greatly.

While many studies examine the relationship between self-employed work and health, and some the effect of self-employed work on health, few look into the effects of health on self-employed work. The few that do mostly study the effects of health on entrance into and exit out of self-employment, finding that wellbeing increases the intention to enter self-employment (Sweida & Sherman, 2020), and that mental illbeing increases the intention (Sardeshmukh, Goldsby, & Smith, 2021), or the risk (Hessels, Rietveld, Thurik, & Van der Zwan, 2018) to exit. However, these studies just consider the intention to enter or exit self-employment, not whether it actually happens.

Considering how self-employed work affects workers' health and vice versa over time, these relationships can create circular or spiral effects. For instance, a person experiencing a negative work environment might develop mental health issues, leading to poor job performance, which in turn worsens their work environment and further impacts their health, creating a negative spiral. This example highlights the complex, reciprocal relationship between work and health, which can be overlooked when viewed as a one-way causal link. Notably, Laguna and Razmus (2019) found a reciprocal relationship between business success and wellbeing among self-employed workers, and Arshi et al. (2021) found a reciprocal relationship between illbeing in terms of stress and different stressors at work. Apart from these two studies, research of the reciprocal relationship is uncommon.

In sum, the relationship between self-employed work and the health of self-employed workers is complex, and taking time and the reciprocal relationship of work and health into account in research will provide important insights into the health of self-employed workers.

Method

This thesis has a special emphasis on collection of validity evidence and thoughtful statistical approaches. In the following sections I describe the methods and statistical analyses I have applied. Here, I also address the fourth research question regarding measurement properties of assessment tools used when studying health in self-employed workers.

First, I address the design of the studies with an overview of them and then a description of the different samples. I then go through the various forms of assessment I have used, and lastly, I discuss the method of analysis I have applied.

Design

I have addressed the general aim and the four general research questions in accordance with the overview in Figure 1. In Study I, we adopted a cross-sectional approach to compare health, focusing on different aspects of illbeing, among self-employed workers, organisationally-employed workers, and combinators. This study examined the heterogeneity of self-employed workers by treating combinators as a distinct group (RQ1), and the properties of health assessment tools (RQ4).

In Study II, we used a longitudinal, person-centred approach to account for heterogeneity of health (RQ1), profiling self-employed workers based on their health status when it comes to wellbeing, illbeing, and self-rated health to observe different combinations of health beyond merely good and bad health (RQ2). The design also allowed observation of changes over time in relationship to personal and work characteristics (RQ3) and scrutiny of assessment properties (RQ4).

Finally, in Study III, we investigated the differences in wellbeing between self-employed and organisationally-employed workers across various tasks within a single day. This study deep dived into wellbeing aspects (RQ2) and considers short-term fluctuations in health within the context of different work tasks (RQ3). In this study, we also scrutinised the assessments properties of the tools used (RQ4).

Study	I	II	III
Focus	Mean differences in health	Profiles of health in relationship to work and personal characteristics	Health and work tasks
Groups			
Self-employed			
Organisationally-employed			
Combinators			
Aspects of health			
Wellbeing		Work satisfaction	Work engagement Meaningful work
Illbeing	Depressive symptoms Emotional exhaustion Sleep disturbances	Depressive symptoms Emotional exhaustion Sleep disturbances Stress	
Self-rated health		Self-rated health	
Time			
Cross-sectional			
Short term			
Long term			
Approach			
Variable-centred	Bayesian analysis		Bayesian, multi-level analysis
Person-centred		Latent transition analysis	

Figure 1. Overview of studies. Grey areas indicate study approach, with additional information in the boxes.

Samples

The studies in this thesis build on two data collections: the first is the Swedish longitudinal occupational study of health (SLOSH), which is collected every other year (Studies I and II), and the other is a data collection of work and health of high-skilled self-employed workers (Study III).

Swedish occupational study of health

The first two studies in this thesis are based on data from the Swedish longitudinal occupational survey of health (SLOSH). SLOSH is a unique longitudinal panel survey of employment and health that facilitates analyses of the connections between labour market participation, the work environment, retirement, and health (Magnusson Hanson et al., 2018).

The SLOSH cohort comprises participants randomly drawn for the Swedish work environment surveys (SWES; since 1989), which in turn is based on the Labour force survey (LFS since 1989). The sample of LFS is stratified based on county, gender, citizenship, and employment in accordance with the employment record. The sample of SWES is then based on those who participated in LFS and were employed at the time. LFS is conducted every year, and SWES every second year by Statistics Sweden (SCB) on behalf of the Swedish work environment authority.

Since the start of SLOSH in 2003, new sub-cohorts from SWES have been followed up successively, and today SLOSH comprises all participants of SWES data collections 2003-2019 (n=57,104). As follows, SLOSH is based on a nationally representative sample of the Swedish workforce. Since 2006, SLOSH has been following this cohort longitudinally, and has collected data every other year since (and from 2022 onwards, every year).

SLOSH includes detailed questions regarding work, life in general, health and wellbeing. These data are also coupled with administrative data from registers regarding, for example, sickness absence and stays at hospital, both retrospectively and prospectively. The studies in this thesis include data from SLOSH 2014-2018, whereby pen and paper questionnaires were sent by mail, and included around 90 questionnaire scales or single items.

Study I included SLOSH-data from 2014, when the questionnaire had 20,316 respondents (response rate 52.6%). Of these, 14,232 were organisationally-employed workers, 1,034 self-employed workers, and 339 combinators; the rest were unemployed for various reasons. As the groups of workers were of unequal size, we matched them for sake of comparison by randomly drawing several sub-samples from organisationally-employed and self-employed workers, and then chose the ones that matched the original data with regard to background variables. Thus, the sub-samples can still be considered nationally representative. As such, comparisons with self-

employed workers were based on a sample of 1,034 participants in each group, and comparison with combinators were based on 339 participants in each group.

Study II included SLOSH-data from 2014, 2016, and 2018. SLOSH was answered by 19,360 in 2016, and 17,841 in 2018 (response rates 50.9%, and 48.2%, respectively). Of these, participants who were self-employed during at least one of the three waves, 2,327 participants, were included in the study. As some of the respondents had not responded to all waves, we selected those who had answered at least one item in each of the six health constructs included in the study in two of the three waves, one of them having to be from 2016. After this, the study ended up with 593 participants.

High-skilled self-employed workers study

The third study of this thesis was based on data from a study of high skilled workers. The aim of this data collection was to gain understanding of work, work environment, health, and wellbeing of high skilled organisationally-employed and self-employed workers.

The participants were recruited in 2013 via professional social networks such as LinkedIn, the Swedish Association of Architects, and the Swedish Joint Committee for Artistic and Literary Professionals. High-skilled workers are defined in accordance with the Swedish Standard classification of Occupations (SSYK; Statistics Sweden, 2012), including 1) legislators, senior officials or managers, 2) professionals, and 3) technicians and associated professions. Participants primarily represented the creative sector, including professionals in art, culture, media, and IT-specialties, and were either self-employed or organisationally-employed workers.

The online questionnaire included 35 questionnaire scales or single items and had three parts: demographics and personal characteristics, a job control questionnaire, and a day-reconstruction questionnaire of work tasks. Prior to beginning the questionnaire, participants provided informed consent.

A total of over 820 participants were invited to participate, although the precise number cannot be specified due to the involvement of an anonymous link shared through a “snowball” recruitment process. Of those invited, 297 participants initiated the survey, resulting in an approximate response rate of 35%.

Study III of this thesis is based on responses from 174 participants, comprising 557 reports from work tasks. Of these, 85 reported self-employment as their primary employment type (49%), and the rest were organisational-employed.

Assessment

The data in this thesis are collected through questionnaires. Studies I and II are based on classic format questionnaires, but Study III is based on the day-reconstruction method (DRM; Kahneman, Krueger, Schkade, Schwarz, & Stone, 2004). DRM enables participants to systematically reconstruct their activities and experiences, and provides participants with a structured framework to recall and document them. This method facilitates access to momentary experiences stored in memory, allowing for reliable estimates of the intensity and variations of affect throughout the day (Dockray et al., 2010).

All three studies included both manifest and latent variables, with an emphasis on ordinal Likert-scales; see Table 1 for exact details.

Construct definitions and operationalisation

Here follows lists of all study constructs. Table 1 provides an overview of the constructs, their reliability, sources, and which study they are a part of.

Employment form

In the studies of this thesis, I have included three categories of employment forms: self-employed workers, organisationally-employed workers, and combinators. The items were formulated as: "*What type of employment/work are you doing?*" with one of the answer options being self-employed in Studies I and II, and "*What type of employment do you have?"* with self-employment as one answer option in Study III. In both surveys, more than one option could be chosen so that the respondent could chose both self-employment and organisational-employment, indicating being a combinator.

Assessments of health

Depressive symptoms encompass a broad range of emotional, cognitive, and physical symptoms, including feelings of sadness, low energy levels, lack of interest, and excessive worrying (Magnusson Hanson, Chungkham, Åkerstedt, & Westerlund, 2014).

Depressive symptoms were assessed with the symptom checklist-core depression (SCL-CD_6) including six items. It was developed to assess and describe occurrence of depressive symptoms, major depression, and changes over time in different populations. SCL-CD_6 uses a small number of core depression characteristics necessary for diagnosis so that the scores sum up to a meaningful severity assessment (Magnusson Hanson, Westerlund, et al., 2014). The respondents rate the items using a 5-point answer format from 1 = "not at all" to 5 = "a lot" (Magnusson Hanson, Westerlund, et al., 2014).

Emotional exhaustion is a state characterised by profound fatigue and depletion, and a sense of being burned out (Melamed et al., 1992; Shirom, 1989; Shirom & Melamed, 2006).

In this thesis the revised sub-scale for emotional exhaustion and fatigue from the Shirom Melamed Burnout Questionnaire (SMBQ) was used to assess emotional exhaustion (Melamed et al., 1992; Shirom, 1989; Shirom & Melamed, 2006; Shirom, Westman, Shamai, & Carel, 1997). The revised version includes six items deemed a sufficient scale for describing emotional exhaustion in the general population (Shirom & Melamed, 2006). Respondents rated these items using a 6-point answer format from 1 = "a few times or never" to 6 = "every day".

Validity evidence for SMBQ has since been collected over a broad set of populations and purposes, including clinical, military, and different working populations, but not specifically in the self-employed.

Meaningful work is defined as the personal, subjective experience that one's work has significance, is worthwhile, useful, and contributes to personal growth (Kahn, 1990; Pratt & Ashforth, 2003; Rosso, Dekas, & Wrzesniewski, 2010; M. F. Steger, 2012).

As there was no existing scale to sufficiently assess momentary meaningful work, the items were based on the Meaning in Life Questionnaire (M. Steger, Frazier, Oishi, & Kaler, 2006). Three items were used to assess meaningful work during a work task, with a unified 7-point response format ranging from 1 = "not at all/never", 4 = "moderately/sometimes", through to 7 = "very much/all the time".

Self-rated health is the individual's assessment of their health, including experiences of both negative and positive health, and aspects beyond this, based on the individual's situation (Bailis, Segall, & Chipperfield, 2003; Benyamini & Idler, 1999; DeSalvo et al., 2006).

In this thesis the single item *How would you rate your general state of health?* was used to assess self-rated health. Respondents rated this item on a 5-point answer format from 1 = "very bad" to 5 = "very good". Many studies, including meta studies, confirm the usefulness of a single item assessment when it comes to overall health (DeSalvo et al., 2006).

Sleep disturbances encompass difficulties falling asleep, restless sleep, and premature awakening (Nordin et al., 2013). Sleep is one of the major means of recovering from stressors (Åkerstedt, Perski, & Kecklund, 2016), and poor sleep has a negative, reciprocal relationship with, amongst other outcomes, mental health (Freeman, Sheaves, Waite, Harvey, & Harrison, 2020).

Here, a sub-scale assessing sleep disturbances from the Karolinska Sleep Questionnaire (KSQ; (Magnusson Hanson, Chungkham, et al., 2014; Magnusson Hanson, Peristera, Chungkham, & Westerlund, 2017; Nordin et

al., 2013) was used. KSQ was developed to describe subjective sleep and sleepiness in a general population (Kecklund & Åkerstedt, 1992). Following an anchor question, respondents rated the four items on a 6-point answer format from 1 = "a few times or never" to 6 = "always/five times a week or more".

Stress is a non-specific perceived response to demands (Åkerstedt et al., 2015). If this exposure is repeated, and the individual is deprived of recovery in-between stressful periods, stress can become a chronic experience.

Stress was assessed using three items, asking how the participants felt during the three preceding months (Åkerstedt et al., 2015). Respondents rated the three items on a 6-point answer format from 1 = "not at all" to 6 = "all the time". The scale assesses symptoms of elevated stress activation over a period of three months and provides a measure of the total stress load, including both work and non-work stressful situations.

Work engagement represents a crucial facet of eudaimonic wellbeing, a fundamental aspiration in human life (Huta & Ryan, 2010; Ryan & Deci, 2001). Work engagement is defined as a positive and fulfilling state of wellbeing at work, where the worker is motivated by the task or subject at hand (Bakker & Demerouti, 2007).

As there was no existing scale to sufficiently assess momentary work engagement, the items were adapted from those of scales used previously to assess engagement as part of positive effects; the SWEBO (Hultell & Gustavsson, 2010), and BEST-scales (Vittersø et al., 2009).

We used four items to assess work engagement during a work task, and a unified 7-point response format ranging from 1 = "not at all/never", 4 = "moderately/sometimes" through to 7 = "very much/all the time".

Work satisfaction, assessed with a single-item, has been studied widely over the decades, indicating that it is a sound assessment of overall work satisfaction, representing an evaluation of one's work, combining both cognitive appraisal and affective reactions derived from that appraisal (Nagy, 2002; Oshagbemi, 1999; Wanous, Reichers, & Hudy, 1997). In this thesis, the single-item *Roughly, how satisfied are you with your work*? was used to assess work satisfaction. Respondents rated this item on an 8-point answer format, from 1 = "very dissatisfied" to 8 = "very satisfied".

Work characteristics

Effort is the employee's perception of the strain caused by various job demands and responsibilities, such as interruptions, overtime, and obligations (Siegrist, 1996; Siegrist et al., 2004).

Overcommitment is the disposition to respond to any imbalance by excessive engagement and desire to be in control (Siegrist, 1996; Siegrist et al., 2004).

Rewards are the opportunities that the job offers – salary, esteem, job security, and career opportunities (Siegrist, 1996; Siegrist et al., 2004). For this scale, items from the ERI short version that worked for self-employed workers were chosen. The items removed regarded items that self-employed workers simply could not answer, for example those about supervisors.

For all three items above from the ERI short version, respondents rated the items on an answer scale from 1 = "completely correct" to 4 = "not correct at all".

The need for self-determination refers to the need for autonomy and competence, (Deci & Ryan, 1985a, 1985b), combined into one variable.

Four items were used to assess satisfaction regarding self-determination during a work task. We used a unified 7-point response format ranging from 1 = "not at all/never", 4 = "moderately/sometimes", through to 7 = "very much/all the time".

As there was no existing scale to sufficiently assess momentary satisfaction of the need for self-determination, the items were based on the Basic Needs at Work scale (Van den Broeck, Vansteenkiste, De Witte, Soenens, & Lens, 2010).

Table 1. List of study health and work characteristics variables.

Variable	Reliability	Reference	Items	Studies
Health assessments				
Depressive symptoms	Ω = .96 (I) S.C. = .55-.62 (II)	(Magnusson Hanson, Westerlund, et al., 2014)	*How much during the last week have you been troubled by?* 1) Lethargy or low energy? 2) Feeling blue? 3) Blaming yourself? 4) Worrying too much? 5) Feeling no interests in things? 6) Everything is an effort?	I, II
Emotional exhaustion	Ω = .94 (I) S.C. = .60-.70 (II)	(Melamed et al., 1999; Shirom & Melamed, 2006)	*Below we describe a number of states that every one of us can experience now and then. Please fill in to what degree you experience these states during a major part of your day:* 1) I feel tired, 2) I feel "fed-up", 3) My "batteries" are "empty", 4) I feel burned out, 5) I feel mentally fatigued, 6) I have no energy for going to work in the morning.	I, II
Meaningful work	Ω = .88 (III)	(Bujacz et al., 2017; M. Steger et al., 2006)	*To what extent during that situation have you felt the following?* 1) What I did was meaningful, 2) What I was doing was valuable, 3) What I was doing was important.	III
Sleep disturbances	Ω = .88 (I) S.C. = .62-.69 (II)	(Nordin et al., 2013)	*How often have you been troubled by the following in the last three months?* 1) Difficulties falling asleep, 2) Repeated awakenings with difficulties falling asleep. 3) Premature (final) awakening, 4) Disturbed/restless sleep.	I, II

Stress	Ω = .84 (II) S.C. = .61-.65 (II)	(Åkerstedt et al., 2015)	1) I have days when I feel wound up all the time, 2) I have days when I feel very pressured all the time, 3) I have days when I feel stressed all the time.	II
Self-rated health	S.C. = .54-.61 (II)		How would you rate your general state of health?	II
Work engagement	Ω = .84	(Bujacz et al., 2017; Hultell & Gustavsson, 2010; Vittersø et al., 2009)	*To what extent during that situation have you felt the following?* 1) Inspired, 2) Energetic, 3) Happy, 4) Engaged.	III
Work satisfaction	S.C. = .36-.47 (II)		Roughly, how satisfied are you with your work?	II
Work characteristics				
Effort	Ω = .88 (II) S.C. = .54-.61 (II)	(Siegrist et al., 1986)	1) I have many interruptions and disturbances in my job, 2) I have constant time pressure due to heavy workload, 3) My workload has increased over the past years.	II
Overcommitment	Ω = .78 (II) S.C.= .62-66 (II)	(Siegrist et al., 1986)	1) Considering all my efforts and achievements, my work prospects are not adequate,2) Considering all my efforts and achievements, my salary/income is unfair, 3) Considering all my efforts and achievements, I do not receive the respect and prestige I deserve at work.	II
Reward	Ω = .58 (II) S.C.= .40-62 (II)	(J. Li, Leineweber, Nyberg, & Siegrist, 2019; Siegrist et al., 1986)	1) As soon as I get up in the morning, I start thinking about work problems, 2) Work rarely lets me go, I even think about it in the evenings, 3) When I get home, I can easily relax and "switch off" from work.	II

Self-determination	Ω = .72 (III) -	(Bujacz et al., 2017; Van den Broeck et al., 2010)	*To what extent during that situation have you felt the following?* 1) I felt free to make my own decisions, 2) I was free to express my ideas and opinions, 3) I had a chance to show how capable I am, 4) I felt that I'm good at what I'm doing.	III

Note: S.C. = Pearson correlation stability coefficients as indication of variation over time.

Table 2. List of employment status variables and background variables.

Variable	Studies
Employment status	
Self-employed	I, II, III
Organisationally employed	I, III
Combinators	I
Background variables	
Age	I, II
Children at home	I, II, III
Country of birth	I
Education	I, II, III
Gender	I, II, III
Married/cohabiting	I, II, III

Analysis

In the studies of this thesis, I have used several different statistical methods to achieve the study results. In accordance with RQ4, regarding the assessment properties of the scales used, it has been important to me to apply statistical techniques in a thoughtful way. Thus, this section begins with a description of this approach, including a discussion of frequentist and Bayesian statistics, as well as variable and person-centred approaches.

After this, there is a section describing the statistical analyses I have used: both traditional variable centred methods using structural equation modelling (SEM), including confirmatory factor analysis (CFA), tests of measurement invariance (MI), and multi-level modelling (MLM), as well as person-centred methods, including latent profile analysis (LTA) and latent transition analysis (LTA).

Analytical approach

As stated in the introduction, it might be productive to focus on investigation of assessment properties of the tools used to assess health in self-employed workers. Beside the application of thoughtful statistical techniques, which are described in the next section, I have also taken a specific approach to analysis of the data.

In this thesis, I have focused on parameter estimation rather than pure hypothesis testing, thus not only asking whether there is a relationship, but also questioning the magnitude of it, and if it is meaningful. In so doing, I have put more focus on practical significance, i.e., what actual difference the results represent in people's lives, than statistical significance. The traditional approach with the use of significance testing has been criticised by many (Cohen, 1994). Instead of using only hypothesis testing, I have followed the suggestions put forward by Amrhein, Greenland, and McShane (2019), suggesting that p-values should not be used in the conventional, dichotomous way, but that we instead embrace uncertainty. Thus, I have, as they suggest, focused on point estimates, or effect sizes, and the potential estimates within the confidence intervals (what they refer to as credibility intervals).

Here follows a description of two of the analytical approaches I have chosen, first with regard to interpretation of probability, then of variable vs person centred approaches.

Frequentist and Bayesian statistics

In this thesis, I have made use of both frequentist and Bayesian interpretation of probability to gain the most information of my data. Practically, these can favourably be used together, as the statistical modes used only have an indirect relation to scientific theory, and in such cases the act of statistical modelling is distinct from the act of theory choice (Markus & Borsboom, 2013).

The frequentist approach presents the established way, which is often the default in statistical analysis programs. It provides an easy, and effective way to conduct statistical analyses. The Bayesian approach, however, may be used where the frequentist methods fail, as these estimators are often better (for example, Markov Chain Monte Carlo; MCMC), which allows for more complex models (Van de Schoot et al., 2014). Thus, combining frequentist and Bayesian will provide both effectivity and most information.

The Bayesian approach has more benefits beside the estimator − the opportunity to add priors to one's model. A prior refers to the initial belief or probability distribution representing one's knowledge or uncertainty about the parameters of a model before observing any data (Van de Schoot et al., 2014). The most common practice of using priors is to either express prior beliefs or prior knowledge. In the studies of this thesis, I have used them to express uncertainty and to create models that are closer to reality, and thus make better estimations of parameters (Asparouhov, Muthén, & Morin, 2015). In the case of these studies, the priors have made it possible to estimate models that would otherwise not have been possible.

Variable vs person centred approaches

In this thesis, I have used both variable and person-centred approaches when analysing my data. The variable centred approach is the traditional one, used almost exclusively when studying the health of self-employed workers. This approach examines relationships between variables across a population, with a goal to identify general patterns, averages, and universal principles. The underlying assumption behind this is that relationships between variables apply similarly to all individuals in the sample (Morin, McLarnon, & Litalien, 2020b).

The person-centred approach, on the other hand, explores patterns or profiles within individuals or subgroups, with the goal to identify distinct groups or typologies that capture meaningful differences among individuals. The underlying assumption to this approach is that the population is heterogeneous, with distinct subgroups having unique patterns of relationships (Nylund-Gibson et al., 2023). The key difference lies in the fact that the variable-centred approach seeks to understand relationships between variables at a general level, while the person-centred approach emphasises identifying and understanding heterogeneity within a population.

The advantages of the classic variable-centred approach lie in its generalisability, as it provides broad, generalisable insights about how variables are related across a population, and may thus be used for identifying predictors of outcomes and testing theoretical models. Further, by pooling data across all individuals, it maximises statistical power to detect relationships. However, this approach also has a risk of overgeneralisation, as it assumes relationships between variables apply equally to all individuals, potentially overlooking subgroup differences. It may also reduce complex phenomena into linear or uniform relationships, missing nuanced interactions (Morin, Bujacz, & Gagné, 2018).

The advantages of the person-centred approach, on the other hand, lies in its ability to capture the diversity within a population by identifying subgroups with distinct patterns and provide a richer understanding of how variables interact within individuals or subgroups. Thus, a person-centred approach may reveal profiles or patterns that might be overlooked in a variable-centred analysis. The shortcomings of a person-centred approach lie in its sample size dependency, reduced generalisability, and the explorative nature of the analyses (Morin et al., 2020b).

In sum, both approaches may be used to provide a more comprehensive understanding of psychological phenomena in a way that using just one of them could not.

Methods of analysis

In this section, I address the specific methods of analyses used in this thesis, including confirmatory factor analysis (CFA), measurement invariance (MI), multi-level modelling (MLM), latent profile analysis (LPA), and latent transition analysis (LTA).

Confirmatory factor analysis

In all the studies in this thesis, I have used CFA, t a statistical technique used to collect validity evidence of a theoretical model that hypothesises the relationships between observed variables and their underlying latent constructs. It helps researchers confirm whether the observed variables are indeed assessing the constructs they are supposed to represent. CFA evaluates how well the observed data fit the hypothesised model by examining the pattern of correlations among variables and comparing it to the model's expected pattern (Berntson, Bernhard-Oettel, Hellgren, Näswall, & Sverke, 2016).

While many of the assessment scales used in the studies of this thesis are well established, none have been used previously to assess these aspects of work and health solely in self-employed workers, and thus this practice was warranted.

We used CFA in all three studies to collect validity evidence of latent scales. In Study I, in which we had special focus on collection of validity evidence for the scales used. In Studies II and III, CFA was part of the analytical ground work, collecting validity evidence for the subsequent analyses.

Measurement invariance

Measurement invariance (MI) is a statistical procedure used to assess whether the measurement properties of a scale or instrument remain consistent across different groups, conditions, or over time. These tests evaluate whether the relationships between observed variables and latent constructs are equivalent across groups (Meredith, 1993). MI is crucial for ensuring that comparisons between groups are meaningful and valid. If MI is not reached, comparison cannot be made, as the groups do not perceive the items the same way (Borsboom, 2006).

The procedure involves comparing nested models with progressively more constraints on parameters. It starts with an unconstrained analysis (configural invariance test; equivalent to conducting a CFA), a model with constrained factor loadings (metric invariance), and finally, a model with constrained factor loadings and item intercepts (scalar invariance). By establishing measurement invariance, researchers can have confidence in comparing scores or latent constructs across different populations or conditions (Asparouhov et al., 2015; Borsboom, 2006).

We used MI in Studies I and III. In these two studies, I compared different groups of workers: self-employed, organisationally-employed, and combinators in Study I, and self-employed and organisationally-employed in Study III. In these studies, MI provided evidence that the groups interpret the scales in the same way, so that differences found are actually due to the experiences each scale is supposed to assess.

Multilevel modelling

Multilevel modelling (MLM), also known as hierarchical linear modelling (HLM) or mixed-effects modelling, is a statistical technique used to analyse data with a hierarchical or nested structure. It is particularly useful when data are organised into multiple levels of analysis, such as individuals nested within groups, or repeated measurements over time (Humphrey & LeBreton, 2019).

In MLM, variation in the outcome variable is partitioned into different levels (e.g., within-group variation and between-group variation), allowing researchers to simultaneously examine both individual-level and group-level effects. This approach is advantageous because it can account for the dependency or clustering of observations within higher-level units, which traditional linear regression models often overlook (Humphrey & LeBreton, 2019).

MLM estimates parameters for both fixed effects (e.g., predictors that apply to all individuals) and random effects (e.g., variation between groups or individuals). By incorporating both fixed and random effects, MLM provides insights into how individual characteristics and group differences influence the outcome variable while appropriately handling the nested structure of the data (Humphrey & LeBreton, 2019).

We used MLM in Study III, which involved repeated measures of work tasks that were nested in individual workers. Using MLM enabled separating effects on personal and task level and an understanding of how these influenced the outcome variables.

Latent profile analysis and latent transition analysis

Latent profile analysis (LPA) is a statistical method used to identify unobserved subgroups, or profiles, within a population based on patterns in multiple observed variables. Unlike traditional, variable-centred approaches, LPA is person-centred, assuming that the population comprises distinct latent profiles, each characterised by unique response patterns (Morin, McLarnon, & Litalien, 2020a). Researchers use LPA to hypothesise and determine the optimal number of latent profiles, assigning individuals to the most likely class based on their responses, thus revealing meaningful subgroups that might not be evident when analysing variables separately (Morin et al., 2020a).

Latent transition analysis (LTA) is the longitudinal version of LPA analysis. In LTA, researchers model the probabilities of transitioning from one latent profile to another across different time points, capturing how individuals change or remain stable in their class membership over time. LTA assumes that the observed categorical variables are indicators of unobserved latent profiles, and incorporates parameters that describe the probabilities of transitioning between classes at each time point (Morin et al., 2020a).

By examining patterns of transitions between latent classes, LTA allows researchers to investigate changes in behaviour, attitudes, or characteristics over time and identify factors that influence these transitions. It can be used to study transitions between states (Morin et al., 2020a), e.g., healthy to unhealthy.

We used LPA and LTA in Study II to capture the heterogeneity of health in self-employed workers, both between different profiles of health, and over time, as well as their relationship to other variables.

Overview of the studies

Study I

Bergman, L. E., Bernhard-Oettel, C., Bujacz, A., Leineweber, C., & Toivanen, S. (2021). Comparing depressive symptoms, emotional exhaustion, and sleep disturbances in self-employed and employed workers: Application of approximate Bayesian measurement invariance. *Frontiers in psychology*, 11, 598303.

Background and aim

Research of differences in the health of self-employed and organisationally-employed workers reach different conclusions (Stephan, 2018), possibly because of differences in methods and poor understanding of how assessment tools work with regard to self-employed workers, and a lack of knowledge about whether the groups are actually comparable. Further, combinators are often left out of these comparisons or assigned to whichever work they spend most time in. Thus, collection of validity evidence of scales assessing common aspects in self-employed workers was warranted. In this study, we aimed to compare averages of mental illbeing in terms of depressive symptoms, emotional exhaustion, and sleep disturbances between organisationally-employed workers, self-employed workers, and combinators. We focused on testing whether the groups of workers interpreted the scales assessing illbeing in a similar way, and assessed in what way mean values in health differed between these groups, both statistically and practically.

Method

The matched sample size SLOSH questionnaire data were representative of the working population in Sweden with regard to background characteristics. First, we used Bayesian CFAs to test the structural relationships within each construct. These indicated adequate fit and provided validity evidence that the items of the scales assess the same construct. We then ran a series of Bayesian MI for each construct, following the stepwise procedure of testing whether the scales assess the same construct in each of the three groups. Lastly, we made

two comparisons, one using the latent factor means, and one using compared observed index variables for the constructs with t-tests, as well as Cohen's D.

Results

When tested for MI, all three constructs had adequate to good fit on the scalar level, and thus, all three groups were comparable on the three constructs, enabling comparisons between the three groups of workers. The self-employed workers reported the lowest level of depressive symptoms, emotional exhaustion, and sleep disturbances. Organisationally-employed workers reported the highest levels of all three groups. Combinators were in between these two groups.

Conclusions

We found that the three groups of workers were comparable on the three constructs of mental illbeing. While we found statistically significant differences, all these were small; the groups of workers likely had little practical differences in mental illbeing. This is probably to do with the large variability within groups that is larger than the variability between groups. Our results shed light on the importance of using CFA and MI to collect validity evidence to test whether the groups are actually comparable, as differences might be inflated by differences in interpretation of assessment scales. In future, we would like to see researchers apply these methods of collecting validity evidence, and see studies of health of self-employed workers focusing on variability of health.

Study II

Bergman, L. E., Bujacz, A., Leineweber, C., Toivanen, S., & Bernhard-Oettel, C. (2024). Are you in or are you out? A longitudinal person-centred study of health and entrance and exit into self-employment. *BRQ Business Research Quarterly*, 23409444241277831.

Background and aim

Few previous studies take into account the heterogeneity of health in self-employed workers, temporal patterns of health and work, or combine different aspects of health. While research has provided some basic understanding of the health of self-employed workers, taking these aspects into account would provide a more complex and dynamic understanding of how characteristics of health of self-employed workers fluctuate and interact. Additionally, work

circumstances in terms of effort, reward, and overcommitment may be a key aspect for explaining differences, interactions, and fluctuations. A particularly interesting feature of self-employed work is entrance into and exit out of self-employment, which previous studies indicate is related to health and work characteristics (Nikolova, 2019; Nikolova et al., 2021; Stephan, Li, et al., 2020). In this study, our aim was to provide better understanding of health in self-employed workers by taking its heterogeneity into account, investigate different aspects of health in terms of wellbeing, illbeing, and self-rated health, observe work characteristics, and study entrance into and exit out of self-employment, as we followed them over time to observe temporal patterns.

Method

The data from three waves of SLOSH questionnaires were representative of the working population in Sweden with regard to background characteristics. After collecting validity evidence of structural relationships between items within scales with CFA, we analysed the data using LPA and LTA. We first established profiles with LPA, and then tested profile similarity over time. Following that, we tested transitions between profiles over time, and lastly, we added demographic characteristics, entrance into and exiting out of self-employment as predictors of transitions, and effort, reward, and overcommitment as covariates. Additionally, we used Chi^2 tests to evaluate whether certain demographic characteristics were more prevalent in any of the health profiles.

Results

We found four profiles of health: 1) *Moderate*, *2) Mentally healthy*, 3) *Relaxed and satisfied*, and 4) *Exhausted and dissatisfied*. The prevalence of all four profiles stayed similar over time and most participants stayed within the same profile over time. When it came to effort, reward, and overcommitment, results were in line with theory, with the healthier profiles having balanced ERI and the unhealthier having more imbalanced ERI. There was no meaningful relationship between health profile membership and demographic characteristics or changes in health profile over time. Most workers were continuously self-employed, and approximately one-tenth entered and one-tenth exited self-employment between each wave. Entrance into and exit out of self-employment predicted health profile membership in the coming wave above and beyond profile membership in the previous wave. Those that entered self-employment between waves were more likely to be members of the Relaxed and satisfied profile in comparison to the Exhausted and dissatisfied profile. In a similar manner, those that exited self-employment were more likely to be members of all other profiles, compared to the Moderate profile.

Conclusions

Our study provides an important contribution to showing and explaining the complex temporal patterns of health in self-employed workers. Their health goes beyond just healthy or unhealthy, and we demonstrate that different aspects of health may be combined into four different patterns. Those who entered self-employment were more likely to report positive health change, and those who left reported changes in all directions away from moderate health, both to better or worse, further indicating the complexity of the relationship between self-employment and health. With the understanding provided by this study, future research could delve deeper into the complexity of health of self-employed workers, beyond comparisons with organisationally-employed workers, single aspects of health, and cross-sectional designs.

Study III

Bergman, L. E., Bernhard-Oettel, C., & Bujacz, A. (submitted). You do not have to become self-employed to feel engaged – Comparing self-determination, meaningful work, and work engagement in self-employed and employed workers with a task and person level approach.

Background and aim

Studies have found that self-employed workers enjoy in general higher levels of wellbeing than organisationally-employed workers (Binder & Blankenberg, 2020). One part of eudaimonic wellbeing lies in work engagement, which may stem from satisfying the need for self-determination and experiencing work as meaningful. Higher levels of satisfaction regarding the need for self-determination may occur in two ways: first, on a person level, self-employment is a more self-determined choice as it is not the standard form of work (Stephan, Tavares, et al., 2020), and second, on a task level, the freedom that self-employment often provides may make work tasks better fulfil the need for self-determination (Stephan, 2018). Self-employed workers may experience work as more meaningful than organisationally-employed workers as they have chosen their work, and what they do, themselves (Allan, Autin, & Duffy, 2016; Cardon, Wincent, Singh, & Drnovsek, 2009). Again, this may occur both on a personal level, as one's work may be experienced as meaningful, and at task level, as the self-employed may clearly see how tasks contribute to their overall work. In this study, we evaluated work engagement, meaningful work, and self-determination in organisationally and self-employed workers to disentangle the effects of type of work and tasks

performed during a workday. We aimed to ascertain whether the higher levels of wellbeing of self-employed workers found in previous studies is due to their vocation, or the tasks they perform.

Method

The data from high-skilled self-employed workers study included a balanced gender distribution, but the self-employed workers (M=44.08, SD=10.68) were slightly older than the organisationally-employed workers (M=40.54, SD=9.17; t=2.63, p=0.01). After collecting validity evidence of structural relationships between items within scales with CFA, and that the groups could be compared with MI, we analysed the data using Bayesian MLM.

Results

On the person level, workers experiencing more fulfilment of the need for self-determination experienced more work engagement, and those who reported a stronger sense of meaningful work also exhibited higher levels of work engagement. On the person level, self-employed workers experienced slightly more engagement than employed workers. On a task level, tasks that were perceived as providing greater satisfaction of the need for self-determination were also associated with higher levels of work engagement, but we found no relationship between meaningful tasks and engagement. With regard to cross-level interactions, there were no statistically significant relationship between self-determination and engagement, or between meaningful work and engagement.

Conclusions

Our results contribute an explanation to the differences found in wellbeing and work engagement among self-employed and employed workers. The differences are related to both person-level and task-level sources in terms of fulfilment of the need for self-determination and meaningful work. Notably, the influence of self-determination on work engagement was evident across both person and task levels. Interestingly, employment type had minimal influence on work engagement, indicating that form of work is not important to people's experiences of work engagement. This might inspire organisations to modify tasks of employed workers to mimic the self-determined nature of self-employed tasks, possibly leading to higher levels of engagement.

General discussion

The general aim of this thesis was to study the overall health of self-employed workers from new perspectives to disentangle previous contradictory results, by taking time, heterogeneity, the definition of health, and assessment properties into consideration to provide knowledge and understanding of the health of self-employed workers. The four general research questions were:

1. *What differences in health can be found among self-employed workers when their heterogeneity is considered?*
2. *What insights can be gained about the health of self-employed workers when different aspects of health are taken into account?*
3. *How does the health of self-employed workers develop when both long-term and short-term perspectives are considered over time?*
4. *What are the assessment properties of the assessment tools used when studying health in self-employed workers?*

Heterogeneity of health in self-employed workers

The heterogeneity of health in self-employed workers was addressed partly in Study I, in that combinators were separated from self-employed and organisationally-employed workers, and mainly in Study II, where the heterogeneity was the main focus through the person-centred approach. The findings of Study I indicate that on an aggregated level, combinators differ from both self-employed workers and organisationally-employed workers when it comes to health, as they experience less mental illbeing than organisationally-employed workers, but more than self-employed workers. However, the differences between groups were small, and there might be no practical differences in mental illbeing in terms of depressive symptoms, emotional exhaustion, and sleep disturbances experienced by the different types workers.

The small differences found in Study I might, at least in part, be explained by the results of Study II, which showed that health varies substantially between different self-employed workers. Here, four distinct profiles of health of workers engaging in self-employment were found, three of which could be considered healthy, and one unhealthy. Thus, differences within the groups of

workers (self-employed workers, combinators, and organisationally-employed workers) may cancel out most differences between these groups, rendering aggregated assessments of mental illbeing on group level based on type of work, and comparison between them, blunt and difficult to interpret.

While Study II did not separate combinators, these findings might still provide a clue to the inconclusive findings of Study I, as well as earlier studies (Ardianti et al., 2022; Bouwhuis et al., 2017; Stephan et al., 2023), since combinators, just as fully self-employed workers, are most likely also a heterogenous group, making comparisons on an aggregated level difficult to conduct and interpret. Further, to the best of my knowledge, with regard to combinators, Study I was the first to take mental illbeing of these workers into consideration, and while we found that this group experiences worse illbeing than fully self-employed workers, the effect was small and perhaps practically insignificant, which would be in line with Bouwhuis et al.'s (2017) findings indicating no differences in long-term sickness.

The findings of this thesis, in combination with previous research, illustrate the importance of taking heterogeneity of self-employed workers into account. Concerning studies of predefined groups of self-employed workers (see, for example, Koch et al., 2021; Larsson & Thulin, 2019; Litsardopoulos et al., 2021) differentiating combinators from self-employed workers helped to understand that health differences perhaps are small on an aggregated level. However, the use of person-oriented methods might be particularly fruitful when studying health of combinators. Concerning such person-centred approaches to study health differences in the self-employed (see, for example, Bernhard-Oettel et al., 2024; Bujacz et al., 2019; Gish et al., 2022), this thesis adds an important perspective by focusing on workers who use self-employment but may not necessarily remain self-employed forever. This highlights that the study of heterogeneity in self-employment that need more attention.

Concerning the theoretical assumptions, previous research has utilised JDC/JD-R to explain why self-employed workers have both better wellbeing and more illbeing than organisationally-employed workers, arguing that it is because they have more demands but also more control or recourses. However, in Study I, we found that self-employed workers experienced slightly less illbeing than organisationally-employed workers, and this is not in line with this interpretation. While the incongruence of the results regarding illbeing may perhaps again illustrate the consequences of not taking heterogeneity of self-employed workers into account, the they may also illuminate the shortcomings of utilising the JDC/JD-R theory when studying self-employed workers. The theories are developed for organisationally-employed workers who have a clear boundary between demands/resources, which is determined by an employer and worker's reactions to the work environment. However, an employer is not present for the self-employed worker and the self-employed organise their own work environment. Thus,

theories taking intrinsic factors into account may therefore be important to include when studying self-employed work.

In Study II, using ERI (Siegrist, 1996; Siegrist et al., 1986; Siegrist et al., 2004) to understand and explain differences of health in different profiles, profiles covaried as expected with both external factors in terms of effort and reward, and with the intrinsic factor of overcommitment. The healthier profiles had more reward, and the unhealthier had more overcommitment. To the best of my knowledge this is the first study to use ERI when studying heterogeneity of health among self-employed workers, providing new insights of the covariance of external and intrinsic factors with health of self-employed workers.

In sum, this thesis contributes to narrowing the research gap with important evidence on the heterogeneity of health of self-employed workers. It reveals what this heterogeneity looks like when different aspects of health are considered, and how heterogeneity of health in self-employed workers covaries with work and personal characteristics in terms of effort, reward, and overcommitment. These findings inform future research by emphasising that studies on the health of self-employed workers need to take this heterogeneity into account. This could be done by, for example, person-centred methods (as in Study II), matching individuals, or, by studying a specific group of workers to eliminate portions of heterogeneity when comparing different employment groups (as in Study III).

Aspects of health in self-employed workers

Studies II and III addressed the complexity of aspects of health in self-employed workers. In Study II, we focused on the breadth of health, and included variables from all three aspects of health as defined in this thesis; wellbeing, illbeing, and self-rated health. In Study III, we instead focused on depth, by researching the mechanisms behind different wellbeing variables.

In Study II we found that different aspects and variables of health can occur in different patterns. Workers engaging in self-employed work sorted into four different combinations of wellbeing (work satisfaction), illbeing (stress, emotional exhaustion, depressive symptoms, and sleep disturbances), and self-rated health. This illustrate that health of self-employed workers goes beyond just good or bad, and that these aspects of health may occur in different, complex patterns, bringing understanding to the complexity of the relationships found between different aspects of health in self-employed workers in previous studies (Berrill et al., 2021; Brieger et al., 2021; Schmitt & Prasastyoga, 2024).

Studies of health in self-employed workers have mostly utilised JDC/JD-R to study their work characteristics (Stephan, 2018). Beside its shortcomings in studying health of self-employed workers mentioned in previous section, the theory solely focuses on the balance of work environment factors. While ERI

can also be classified as a balance theory, it adds the intrinsic aspect of overcommitment. In Study II, we found that workers within each health profile generally experienced quite equal levels of effort and reward, which might seem counterintuitive at first, but high efforts may lead to high rewards, thus "matching" the effort put in with rewards. In turn, overcommitment did not vary with these aspects, and were higher in workers experiencing high exhaustion. This is in line with previous studies showing that some self-employed workers work excessively (Balducci et al., 2020), experience difficulties in detaching from work (Taris et al., 2008), or have an 'obsessive passion' towards work (Stroe et al., 2018), showing the downside of overconmitment. In conclusion, utilising ERI with its combination of work characteristics and intrinsic factors has been fruitful in our study of self-employed workers. However, when delving solely into wellbeing, theories developed with stress in mind, such as ERI, might do a poor job in explaining the relationship between self-employed work and health. Instead SDT, a theory of optimal functioning, may work better.

In Study III we found that differences in wellbeing in terms of work engagement between self-employed and organisationally-employed workers are related to fulfilment of the need for self-determination and the experience of work as meaningful on a person level, and fulfilment of the need for self-determination on a task level. Employment type had only a small effect, indicating that this is less important than experiences of self-determination and meaning, providing understanding of the mechanisms behind wellbeing in self-employed workers. This goes partly against the idea that the higher levels of wellbeing found amongst self-employed workers stems from their work being a self-motivated choice (Stephan, Tavares, et al., 2020), and indicates that the design of work itself is more significant, at least when it comes to engagement. With regard to SDT, this might indicate that, when it comes to engagement, tasks that fulfil the need for self-determination is more important than the idea of one's work as self-chosen. Thus, in Study III, SDT helps to explain why self-employed workers experience more engagement than organisationally-employed workers: their work tasks fulfil the need for self-determination to a greater degree.

As has been pointed out, health is a complex concept. This thesis illustrates the importance of being thorough when describing what aspects of health one is studying, making it possible to study the complexity of health. When synthesising previous research and the studies of this thesis, results are not as contradictory as one may first think. Often, different aspects of health are under study. For example, Stephan, Tavares, et al. (2020) found that higher levels of wellbeing in self-employed workers in comparison to organisationally-employed workers are explained by the higher levels of meaning of work that self-employed workers experience, in contrast to Study III of this thesis. However, they studied subjective vitality, while we studied engagement. Thus, two different wellbeing variables were assessed. As

mentioned, a recent debate concerning replication and credibility of psychological research raised the importance of describing what is studied, as scales with the same label may assess different constructs (Elson et al., 2023; Iliescu et al., 2024). If we had not described this thoroughly in the two studies in the example, this important distinction would not have been understood, and the results interpreted as contradictory.

In sum, the studies of this thesis illustrate the importance of focusing on both breadth and depth when studying health in self-employed workers to provide understanding and explanation both of the relationship between different aspects of health, as well as the mechanisms behind them. Further, they show the importance of defining health (and other constructs of a study) carefully. The thesis contributes to narrowing the research gap regarding complexity of health of self-employed workers by showing that their health occurs in practically significantly different patterns, covaries with ERI, and is partially explained by entrance into and exit out of self-employment. Further, it contributes by showing the in-depth mechanisms of the relationship between self-employed work and wellbeing in terms of engagement, providing practical indications of how to shape work for maximised engagement.

Temporal patterns of health of self-employed workers

Studies II and III included temporal patterns of health in self-employed workers. Study II focused on longitudinal temporal patterns, with assessments of work and health with three assessment points every other year. In this study, we illustrated fluctuations over longer periods of time in health and work. In general, the health of these workers was stable as they tended to stay in the same health profile over time, and those who changed tended to change to similar profiles. Also, between assessment points, about one-tenth entered and one-tenth exited self-employment at each timepoint. Entrance and exit were related to changes in health, in that those who entered were likely to change to the relaxed and satisfied profile, and those that left self-employment tended to change to any health profile other than the Moderate one. These results are in line with previous research indicating that entering self-employment is related to improvements in health (Georgellis & Yusuf, 2016; Nikolova, 2019; Stephan, Li, et al., 2020), and that exiting self-employment may also lead to improvements in health (Nikolova et al., 2021) as well as deterioration. Study II brings insights to longitudinal fluctuations in self-employed work, health, and their relationships.

In Study III, focus was instead on short-term temporal patterns over just a day, when workers switch between tasks. This study demonstrates that wellbeing in terms of work engagement for both self-employed and organisationally-employed workers fluctuates during a day, which is in line with previous research (Bujacz et al., 2017; Sonnentag, 2017). These fluctuations are dependent on the experiences of fulfilment of the need for

self-determination and experiences of work as meaningful (another wellbeing variable). The results from this study bring evidence that health in terms of wellbeing indeed varies over short-term time periods and show the mechanisms behind it, indicating that differences in wellbeing in self-employed and organisationally-employed workers is not primarily due to employment type.

The studies of this thesis provide evidence that temporal patterns are imperative aspects of health in self-employed workers. Just as generalisations about individuals in the group of self-employed workers is a limitation in research, so are generalisations ignoring time. For example, our results strengthen previous evidence that the better health of self-employed workers in comparison to organisationally-employed workers might be restricted to the newly self-employed (Georgellis & Yusuf, 2016). Further, they indicate that some aspects of wellbeing, in this case engagement, fluctuate substantially over a day, making generalisations over time difficult, and in some cases, perhaps even impossible for certain wellbeing aspects. This underlines the crucial importance of considering such temporal patterns, even when they cover short time periods.

As the theories of work and health in this thesis are not developed with a temporal aspect in mind, it is difficult to make any interpretations of these fluctuations through the lens of these theories. While it is intuitive that demands and recourses, effort and reward, and fulfilment of self-determination should fluctuate over time, none of the theories provide any explanation of the mechanisms of this, or how long time it may take for health and wellbeing consequences to develop. This thesis illustrates the need for development of theories taking time into account, so that changes over time may be better explained and understood.

In sum, this thesis sheds light on the importance of taking time into account, and provides both long-term and short-term evidence of fluctuations in the health of self-employed workers. This thesis contributes to narrowing the research gap regarding the aspect of time by showing that health in terms of work satisfaction, illbeing, and SRH, of self-employed workers are fairly stable over longer time periods, but still fluctuate, covary with work characteristics, and are affected by change of work. Further, it contributes by showing that wellbeing in terms of engagement fluctuate highly over a day, depending of which tasks the worker is conducting. These findings have practical consequences, as time is an important aspect of real life.

Properties of assessment tools of self-employed workers' health

The properties of assessment tools of the health of self-employed workers were addressed in all three studies, but foremost in Study I, which had a specific focus on assessment. We used different statistical methods to scrutinize scales assessing health in terms of illbeing variables. These were

deemed adequate for comparing illbeing in self-employed workers, organisationally-employed workers, and combinators. While we found statistically significant differences, these had small effect sizes, illustrating that when assessment tools are deemed fit for comparison, differences between groups of workers might not be of practical significance. In Studies II and III, we employed similar methods of scrutiny to ensure that assessment tools were up to par, and that results were a consequence of actual effects and differences, not artifacts of assessment.

Other aspects related to assessment in this thesis are parametric methods, Likert-scales, and latent variables. These rely on representationalism, which recognises that psychological assessments capture meaningful aspects of constructs, despite being mediated by factors like the instruments used, question framing, and data interpretation (Markus & Borsboom, 2013). While not perfect, these assessments provide valuable insights that would otherwise be inaccessible. Thus, it is crucial to acknowledge both their limitations and their role in advancing understanding of psychological phenomena.

Another consideration is the critique of using parametric methods to analyse ordinal Likert-scale data, which hinges on whether such data should be treated as continuous. Critics warn this may lead to biased estimates, especially with few response categories. However, extensive research has demonstrated the robustness of parametric methods for Likert-scales with five or more categories, often outperforming non-parametric approaches (Rhemtulla, Brosseau-Liard, & Savalei, 2012). Additionally, parametric methods remain reliable even when statistical assumptions are violated, particularly when analysing latent variables (Carifio & Perla, 2008; Norman, 2010). Hence, while acknowledging the shortcomings of these methods, they are important ways of collecting and analysing data.

As mentioned, there is an ongoing debate of the importance of adequate assessment tools in psychology. This discussion is centred around to what degree psychological assessments should be more standardised (Elson et al., 2023), or if psychology benefits from proliferation (Iliescu et al., 2024). Both sides have recommendations that conform with the approach I have taken in this thesis. I have used standardised tools when possible, and carefully described and motivated when I have changed these to work for self-employed workers, in line with the recommendations of Elson et al. (2023). However, Iliescu et al. (2024) also point out the importance of proliferation of assessment, as psychological phenomena are complex, and no single assessment scales can claim to cover every aspect.

To sum, this thesis contributes knowledge of the properties of the assessment tools used when assessing health and work in self-employed workers. It illuminates the importance of scrutinising assessment tools used, and of being thorough when describing this process and contributes to replication and credibility in psychological research.

Strengths and limitations

The major strengths of this thesis lie in taking heterogeneity, the complexity of health, time, and assessment, into account. These points have been discussed previously, and as such, will only be discussed in relationship to other important strengths and limitations here. In the following section, I discuss the strengths and limitations of theories utilised in this thesis, questionnaires, definition and operationalisation of self-employment, analysis and generalisability of the results.

Theories

One of the strengths in this thesis lies in that I have utilised three different theories, JDC/JD-R, ERI, and SDT. We used JDC/JD-R in Study I for a theoretical explanation of the relationship between type of work and differences in illbeing of external characteristics of work, as this is the most prevalent theory when studying health both in organisationally-employed and self-employed workers. Since JDC/JD-R solely focused on external factors in terms of work characteristics, we used ERI in Study II to provide a perspective of both external and intrinsic factors affecting work and health. Lastly, in Study III, we used SDT to focus on intrinsic factors and experiences of work when studying wellbeing. Thus, together the theories have provided deeper, more multifaceted understanding of the relationship between self-employment and health than the use of one single theory could have done alone.

However, these theories provide no explanation of how work characteristics and health fluctuate over time, nor how these vary on different levels, for example, as in Study III, during a task and on personal level. While this thesis found that work circumstances and health fluctuate over time and level, these theories do not fully provide explanation of when and why. In future, theories taking both self-employment and the aspect of time would be of use.

Questionnaires

One of the strengths of using questionnaires as a data collection tool for the studies in this thesis is that they provide access to many respondents in a representative manner. Further, questionnaires can provide both broad and deep insights into the experiences of the responder.

Critics argue that self-reports may lack validity due to factors like socially desirable responses, misinterpretations, or limited self-awareness, as well as come with reliability concerns, such as response bias and inconsistencies from ambiguous wording or question order. To address these issues, I utilised established assessment tools where available, and took steps to collect validity

evidence for new assessment tools and when the purpose and group of the assessment tool was changed. Thus, while no assessment method is without flaws, I carefully evaluated the validity evidence and limitations of the methods used and held these in consideration when drawing conclusions from the results. It could still be argued that there are better data collection methods than questionnaires, for example, experiments. However, given the aim and research questions of this thesis, this was not considered a viable option. Further, questionnaires provide generalisability, and what is usually called ecological validity. As the respondents were answering questions about real life situations in their natural environment, this provides a closer assessment of their experiences, behaviour, and health in life, than experiments often do.

Also, critics of questionnaires frequently mention Common Method Variance (CMV; also called mono-method bias) as an argument against questionnaires. CMV refers to the variation in observations caused by a common measurement method rather than the construct being studied, and that this inflates relationships between variables (Campbell & Fiske, 1959). While CMV regards all methods and not only questionnaires, it is a common way of disregarding the validity of data collected with questionnaires.

Addressing this, Spector, Rosen, Richardson, Williams, and Johnson (2019) argue that method variance represents unintended systematic influences on an assessed variable, rather than a flaw inherent to the method of questionnaires. They argue that CMV should be taken seriously by checking for its presence in all types of studies, since failure to consider sources of method variance may lead to misspecification and incorrect estimates. Thus, while not disregarding questionnaires because of CMV, it is also important to acknowledge their (and all types of assessments and measures') shortcomings and handle them accordingly.

Asparouhov et al. (2015) suggested a way of handling CMV that I have used in this thesis. They maintain that, in practice, no psychological indicators are perfectly pure construct indicators, and emphasise that common variance in practice is always present (not just in questionnaires). Psychological indicators, such as items and scales in a questionnaire, always include both construct-relevant and random noise. Thus, CMV can be acknowledged and treated. They also turn the perspective, and point out the advantages of using mono-methods, explaining that using a consistent method across variables can enhance reliability and comparability, potentially benefiting validity. Thus, there are advantages to using one common method.

Lastly, I would like to point out that there are studies indicating that the threat of CMV inflating relationships may be overstated, as method variance can both inflate and deflate relationships or even cancel them out (Moorman & Podsakoff, 1992; Ones, Viswesvaran, & Reiss, 1996; Spector, 2006). Thus, inflated scores are not a guarantee; they might even be deflated, which is important to acknowledge.

Overall, while CMV may be a threat to questionnaires, it is not a problem that renders them useless, but rather a problem that can be addressed, which I have endeavoured to do in this thesis.

Definition and operationalisation of self-employment

When operationalising self-employment, one can either ask the respondent if they are self-employed, if they have a registered company, or if available, use registers. I opted for the first option as I deemed that what the worker identified as would provide the truest answer. In Studies I and II, I could have used register data to obtain an objective measurement of self-employment; however, not all registered companies are active, and registers sometimes lag behind in their information, which may carry the risk of misclassification and this is why I did not use this method.

Today, forms of work other than self-employment and organisational employment have quickly taken form and become more common. Here, in particularly freelancing without a registered company, and gig work more generally, are worth mentioning. This work is characterised by project-based compensation, temporariness, and flexibility regarding when and where work is performed (Watson, Kistler, Graham, & Sinclair, 2021). Some workers use the service of an umbrella company that takes on the administrative tasks of invoicing clients and tax deduction, and in order to find clients and assignments, gig workers and freelancers may use online platforms (Watson et al., 2021). Even if the employment form differs from the self-employed who have their own registered company, the way of working (having to find one's own assignments and clients) may not differ so much, and some may identify their work as something that is like self-employment. This renders a small risk that some of these types of workers identified as self-employed in the questionnaires used for this thesis.

Analysis

In this thesis I chose to focus on parameter estimation rather than pure hypothesis testing, which allowed me not only to test differences between groups over time, but also to evaluate the magnitude and importance of these differences. This has contributed insights to the studies of this thesis. For example, in Study I, I found statistically significant differences in illbeing in self-employed workers, organisationally-employed workers, and combinators. However, the differences were small, and focusing on magnitude and effect sizes allowed a nuanced discussion, which is often omitted in research.

With regard to the different analytical approaches of the three studies, they all contributed knowledge in different ways. In Study I, the approach was to take a step back and compare illbeing in different groups of workers, as many

studies have done before, but with thorough investigation of whether the groups are comparable at all. This enabled us to understand if any differences found were likely to appear because of the groups' different interpretation of the items, or because of true differences in illbeing between groups. In extrapolation, and since this study examined assessments that have been used in many earlier studies, the results may also hint at the trustworthiness of earlier, similar comparative studies.

In Study II, the person-centred approached let us study the health of self-employed workers from a different, person-centred instead of a variable-centred, perspective, which offers insights on differences in health within the group of self-employed workers in a way that had seldom been done before.

Lastly, in Study III, I used MLM to disentangle difference levels of wellbeing of self-employed and organisationally-employed workers. Previous research has discussed whether the higher levels of wellbeing found in self-employed workers compared to organisationally-employed workers has to do with their employment form or the work tasks they perform during a work day. MLM helped separate this.

Generalisability

This thesis has strengths when it comes to the generalisability of results in that heterogeneity, complexity of health, and assessment are all taken into account. However, there are also some shortcomings to the generalisability.

While Studies I and II have approximately nationally representative data, self-employed workers of different nations are bound by different laws regulating their businesses. The work situation for self-employed workers in our studies are most like that of other Nordic countries, followed by those included in the European Union − which are, to some degree, bound by the same rules − followed by the rest of the western world, which shares many parts of working culture. Thus, results are highly relevant in Sweden and the Nordics, followed by EU, and, to some degree the rest of the western world.

Study III was not focused on collecting nationally representative data, but instead to access groups of self-employed that might be difficult to reach, and to study a very specific group – the highly-skilled – which eliminates some of the variation due to other work aspects when comparing the role of employment form. However, one should be very careful in generalising the results from this study to other groups of self-employed workers. Instead, while these self-employed workers were also employed in Sweden, the high-skilled may work in more similar ways across the Nordic, European or Western world, and thus, these workers might have more in common with their international counterparts than with low-skilled Swedish self-employed workers. In conclusion, the different studies cover different populations of self-employed workers, and while this allows for specific insights, it does not come without restrictions concerning generalisability.

Study II has strengths in studying several aspects of health, but there are shortcomings too. It is impossible to cover all aspects of health in one thesis, and I have chosen to focus on aspects that provide breath, but it is important to acknowledge that these are not all inclusive. Wellbeing is studied in terms of work satisfaction, engagement, and experiences of work as meaningful, and thus, results from this thesis are generalisable to these aspects of wellbeing. The same goes for illbeing, where this thesis covers stress, depressive symptoms, emotional exhaustion, and sleep disturbances. In general, through the epidemiological nature of the SLOSH-data which has a focus on illbeing, this thesis empathises this over wellbeing. Another limitation associated with comprehensive health regards physical health. As this is a thesis in psychology, I have largely excluded physical aspects of health, focusing instead on mental aspects.

While this thesis has a clear strength when it comes to temporal aspects, a shortcoming lies in that it is difficult to know the best intervals of time between assessments. Studies I and II are based on SLOSH data, which were gathered every second year. While this may be an adequate time frame, for example for emotional exhaustion to develop, it is difficult to know if this is the best period of time for all constructs included. Conversely, while Study III included tasks conducted over a day, these data were collected at the end of the day and not at each time point. This reduces the effort put in by respondents, but opens up for potential recall bias.

Future directions

Lastly, I would like to provide some directions for future studies of the health of self-employed workers.

Research self-employed workers as a non-homogenous group. In this thesis, I have shown that self-employed workers are a group that is at least as heterogenous as organisationally-employed workers. This thesis highlights the question of what actually differentiates workers, and to what extent this is about type of employment or, instead, work characteristics and other aspects in combination with this. Providing this understanding will open for research that uses, for example, predictive models with many different features/variables to determine who needs support, who is at risk, who is likely to quit etc. Thus, researchers should contemplate carefully which groups of self-employed they want to study, and what research design should be applied if they want to study the whole population of self-employed workers without treating them as one.

Research breadth and depth of health in self-employed workers. Previous studies of the health of self-employed workers have mainly focused on one aspect of health at a time, or have not studied the mechanisms behind work and health. This body of research has gathered cumulative evidence that in future can be triangulated to better differentiate between noise and actual health in self-employed workers. Based on this research and triangulation, there is solid ground on which to add breadth and depth to the understanding of the health of self-employed workers. Further, when we have gathered more knowledge of the complexity of self-employed workers' health, and it is important to learn how to use that knowledge to develop better interventions, and provide better and more timely support for these workers.

Research health development of self-employed workers over time. This thesis has only scratched the surface with regard to health development in self-employed workers over time. The aspect of time is an umbrella for several different research questions, and in general most theories do not consider the time aspect in any detail. We need to know when things happen, how they are experienced in the short and long term, and when changes are expected to occur so as to gather knowledge that may be used to support self-employed workers. Thus, more research of both short-term and long-term health in self-employed workers is warranted. Theories of work and health taking the aspect of time in to consideration should be developed.

Chose study designs and analysis methods carefully. In this thesis, I have indicated the importance of carefully choosing a study design and analysis method. I hope to inspire future research to make use of the advancements and new developments concerning research design and statistical analysis. Some older methods of collecting validity evidence and analysing data were developed based on the computer power available at that time. Their restrictions can be overcome as technology has advanced at a fast pace, where more exact and accurate methods exist and should be used.

Concluding remarks

The work presented in this thesis is a step towards learning more about the health of self-employed workers in comparison to organisationally-employed workers, but also on their own, and regarding complex health developments over time. Focus have been on practical significance, both when it comes to methods and analysis, and providing practically useful results, anchored in reality by taking heterogeneity of self-employed workers, complexity of health, and temporal patterns into account. The findings may guide and inspire future research, and may help governments and policy directors to better

understand the interrelations of work and health in the self-employed. This might better support the development of guidelines and supportive measures surrounding self-employed work to optimise decent work and business conditions.

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