FACULTY OF MEDICINE AND HEALTH SCIENCES

Work-Life Balance and work-related stress among academic staff:

Relation between overall and day-to-day experience of Work-Life Balance and adherence to an Ecological Momentary Assessment (EMA) protocol - based on the pilot study of the STRess At Work (STRAW) Project

Word count: 9548

Rani Peeters
Student number: 01704098

Supervisor: Prof. dr. Els Clays
Cosupervisor: Larissa Bolliger (PhD student)

A dissertation submitted to Ghent University in partial fulfilment of the requirements for the degree of Master of Science in Health Promotion

Academic year: 2019-2020

GHENT UNIVERSITY

FACULTY OF MEDICINE AND HEALTH SCIENCES

Work-Life Balance and work-related stress among academic staff:

Relation between overall and day-to-day experience of Work-Life Balance and adherence to an Ecological Momentary Assessment (EMA) protocol - based on the pilot study of the STRess At Work (STRAW) Project

Word count: 9548

Rani Peeters
Student number: 01704098

Supervisor: Prof. dr. Els Clays
Cosupervisor: Larissa Bolliger (PhD student)

A dissertation submitted to Ghent University in partial fulfilment of the requirements for the degree of Master of Science in Health Promotion

Academic year: 2019-2020

GHENT UNIVERSITY

Table of content

Acknowledgments

First and foremost, I want to thank my thesis partner Amber. Although this was not a duo thesis, we worked very closely together since we both have a thesis that is part of the STRAW-Project. She was a superb teammate and became a close friend during this whole course. Thank you Amber, for being my motivator in times it got difficult and, for picking me up when I was feeling down. Thank you for the intense months we spend working together, and thank you for being the best thesis buddy I could have wished for. I wish you a prosperous career in whatever direction you decide to go!

Secondly, I want to thank PhD student and, co-promotor of this thesis, Larissa Bolliger. From the beginning, she was very involved in our theses. She kept a close eye on the things we did, though letting us figure out things by ourselves before lending us a hand. This was a good method to make this paper our own! Other than that, she always had our best interests at heart, and was very much concerned with our mental state during the quarantine time in which we had to write our thesis. To Larissa, thank you for everything you have taught us and for your support in this project. It was a pleasure to work with you.

In addition, I would like to thank our promotor Prof. Dr. Els Clays. Due to the circumstances, we were forced to divert from our original take on the thesis. This led to a statistical analysis of our results; none of us were familiar with. Thanks to the advice we got, we were able to make the necessary analyses and get the needed results. Also, thank you Prof. Dr. Els Clays, for letting us be part of your STRAW-Project and teaching us so much about occupational stress. I think that in the future I will look back on the things I came to know around this topic, and thank you for this opportunity.

To conclude I want to thank my family, friends and boyfriend. They have been a great support during this whole process. I could rely on them for both emotional and structural support. I especially want to thank my boyfriend for helping with coding issues for the baseline survey and technical support in other areas I was not familiar with. Lastly I want to thank my brother and boyfriend for rereading my thesis and giving me the uncensored feedback on my writing to make it as good as I could get it.

List of abbreviations

TERM	ABBREVIATION
Ecological Momentary Assessment	EMA
STRess At Work	STRAW
Work-Life Balance	WLB
Cardiovascular disease	CVD
Effort Reward Imbalance	ERI
Effort Reward Imbalance Questionnaire	ERIQ
Work-Family Conflict	WFC
Job Content Questionnaire	JCQ
Family-Work Conflict	FWC
Work Interference with Personal Life	WIPL
Personal Life Interference with Work	PLIW
Work/Personal Life Enhancement	WPLE
Interquartile Range	IQR
25% Quartile	Q1
75% Quartile	Q3

1. Introduction

1. Title

Work-life balance and work-related stress among academic staff: relation between overall and day-to-day experience of work-life balance and adherence to an Ecological Momentary Assessment (EMA) protocol - based on the pilot study of the STRess At Work (STRAW) Project.

This title was chosen in relation to the STRAW-Project. It covers all the main concepts that are of importance for both the thesis as part of the STRAW-Project. This thesis was conducted based on the pilot study of the STRAW-Project. Due to the COVID-19 outbreak in March 2020, we were forced to include fewer participants than expected. Therefore, focus shifted and this became a thesis that evaluates the adherence to the study protocol. As McIntyre et al. (2016) mentioned, there have not been many feasibility studies on the use of an EMA within an academic population. With the paper at hand, the goal is to fill this gap in science.
The main topic of the STRAW-Project is stress, measured in day-to-day situations at work. The literature shows that stress and work-life balance (WLB) are very much interconnected. How this correlation is directed and what influence day-to-day events at work have on this balance has, to our knowledge, not been researched. That is why this thesis will focus on this part, in addition to the feasibility analyses of the study protocol.

2. Situating the problem

Studies about stress and its relation to work-family balance or WLB have gained more attention over the last few years. The effects of stress and an imbalance in work and family life on both, physical and mental wellbeing are not to be taken lightly. Changes in the workplace (e.g. telecommuting, taking work home) have led to a blurring of the boundaries between workplace and family life (Hayman, 2005).
Most studies on WLB focus on healthcare professionals such as nurses and medical doctors or blue-collar workers. A group of professionals that has recently gained more attention in this field of research is academic personnel. Universities underwent a shift in the last decade to a more managerial and autocratic decision-making environment. This resulted in control being taken away from academics, which meant an increase in demand and pressure (Winefield et al., 2003). It raised the question of how well academic personnel deals with stress coming from this situation and what the impact of their WLB is on these stressful situations and vice versa. In other studies with higher educated working populations, the negative effects of (chronic) occupational stress and poor WLB have been established. For example, more risk for depression, burnout or cardiovascular problems (Baum, 1990; Brotman et al., 2007; Kornitzer

et al., 2006; American Psychological Association, 2019). Current research lacks in analysations of real-time stress and its consequences on different aspects of life, e.g. mental and physical health or social wellbeing.

Importance of the research

With this thesis, the focus mostly lies on overall perceived, underlying WLB and day-to-day WLB due to day-to-day stress situations at work. In the fast-evolving society of today, more research on triggers of day-to-day stress in the work environment and factors, influencing WLB, must be explored further to create a sustainable work environment.

3. STRAW-Project

This thesis is part of the STRess At Work-Project (STRAW-Project). It started in 2018 and is led by Prof. dr. Els Clays at Ghent University in collaboration with The Department of Intelligent Systems at the Jožef Stefan Institute in Ljubljana, Slovenia. The overall project' aim is to research: *"How relationships between 1) work environment risk factors (i.e. stressors), 2) self-perceived stress outcomes (i.e. consequences of stress) experienced in occupational settings, 3) physiological stress parameters, and 4) context as inferred from smartphone sensor data in office-based workers employed in academic settings - are best modelled?"* (based on the STRAW-Project protocol paper, in progress).

Up until now, the majority of studies published on occupational stress focused on nurses and blue-collar workers. With the STRAW-Project, the interest lies with staff working in an academic setting. The participants also include PhD students and postdoctoral students since recent studies showed they are two times more likely to suffer from mental health issues due to stress at work and work-family interference, compared to other higher educated employees, students, and highly educated people in the general public (Smith and Brooks, 2014; Levecque et al., 2017).

The STRAW-Project uses an innovative way to measure day-to-day stress, i.e. EMA. This type of assessment measures behavioural and cognitive processes in a natural, real-time environment. (Stone & Schiffman, 1994; Farquharson et al., 2013). A smartphone application will be used by participants. This app will collect the real-time data on repeated work experiences, mental states, behaviours and activities. Additionally, the Empatica® wristband, a non-intrusive wearable device, will monitor different physiological responses. A more detailed explanation can be found in the methods below.

1. What does this study add

The contribution of this thesis to the overall STRAW-Project, and science in general, is that it will provide an insight on how WLB is perceived in general (baseline) and what effect the fluctuations in day-to-day hassles have on WLB each day. Since this study is performed in a real-life setting and not a lab environment, it will give a more realistic view of stress at work and WLB. It also diverts from the mainstream research, which most often focusses on chronic stress, by assessing day-to-day variations in WLB. A more detailed description of data collection and types of measurements can be found in the methodology below.

This thesis, which is based on the pilot study of the STRAW-Project, will focus on one major concept, i.e. WLB. Furthermore, the study here will perform a feasibility study by assessing the adherence to the EMA protocol. Only a limited amount of studies have researched this and found that the implementation of an EMA protocol is feasible for middle school teachers (Carson et al., 2010; McIntyre et al., 2016). This study will try to analyse if this is the case for staff working in an academic setting as well.

2. Research questions

As mentioned above, this research is based on the pilot study within the STRAW–Project. Two concepts will be researched concerning WLB. The first is the correlation between WLB, measured at baseline and during data collection via EMA. The second concept of interest is adherence to the day-to-day EMA protocol in relation to underlying experience of WLB. A good pilot study includes a feasibility study. That is why adherence of participants to the day-to-day EMA protocol has been included as a point of interest for this thesis.

From these decisions the following research questions were formulated:

1. Is there a correlation between underlying experience of work-life balance among personnel employed in an academic sector and the experience of day-to-day work-life balance?
2. Is participants' adherence towards the day-to-day EMA protocol influenced by underlying experience of work-life balance?

4. Existing knowledge – occupational stress and work-life balance

Up until this point, the larger portion of research about stress in the work environment focusses on chronic stress. Looking at this research, several models have been developed to create a better understanding of the stressors and strains that appear in this environment and their effects on job satisfaction, job control, WLB, etc.

1. Important models

One of these models is the Job Demand Control Model developed by Karasek et al. (1981). Every profession can be placed in this model based on job demands and decision latitude. Work that is associated with high demands (e.g. time-critical and intense tasks) and low decision latitude because of low control over decision authority, skill utilisation and building, results in higher job strain and work stress. Jobs that are situated on the 'activity' diagonal (Figure 1) increase learning and the development of new behaviour patterns, due to an equivalence between job demands and decision latitude, leading to less job strain, less work stress, and less risk for cardiovascular diseases (CVD) for active jobs (Karasek et al., 1981; Baker, 1985). In contrast, jobs, where demands and decision latitude are adversely matched (strain diagonal), are correlated with more work stress and carry greater risk for CVD.

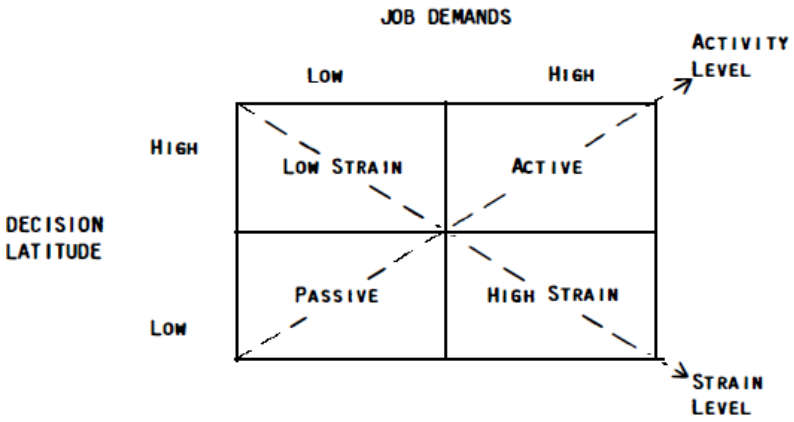

Figure 1: Job Strain Model (Baker, 1985)

A second model is the Effort Reward Imbalance (ERI) model. In 1996, Siegrist developed this model to study the associations between work and health. He concluded that there was a need for a model that integrated the knowledge of different disciplines that dealt with this issue. Therefore, his model links sociological, psychological, and biological information to the workplace, a person characteristics, and short or long-term health consequences. The model used here (Appendix 3) is an adaption of the model from 1996 (van Vegchel et al., 2005). This model, and the one above, are based on similar stressors that are interrelated and could result in an imbalance between work and family life. These models are of importance to the STRAW-Project since one part of it will focus on job demands, job controls and ERI. However, this exceeds the scope of the thesis at hand, which will focus on WLB only.

The model of Karasek et al. (1981) was constructed based on different workplace stressors. Most commonly found in literature workplace stressors are time-sensitive stressors (e.g. Greenhaus & Beutell, 1985; Kinman & Jones, 2008; Allen et al., 2019), job inflexibility, and lack of support from superiors (e.g. Thomas & Ganster, 1995; Anderson et al., 2002; Bell et al., 2012). Other stressors commonly reported to have an influence on stress at work are workload and financial strain (e.g. Geurts et al.,2005; Fontaine et al., 2019).

Greenhaus and Beutell (1985) used these stressors as well, to build their model on work-family conflict (WFC). A more detailed explanation of this model can be found in the literature study. Although the concept of WFC exceeds the scope of this thesis, it is important to mention this concept because of its relation to WLB. This is because WLB and WFC can be placed on the same continuum (Figure 2). Having low WFC/high WLB on one end of this spectrum, and the opposites on the other (Higgins et al., 2004).

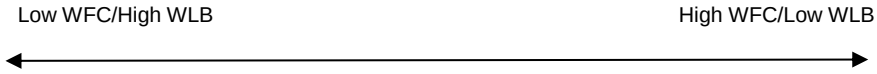

Figure 2: Work-Life balance - Work-family conflict continuum (based on Higgins et al., 2004)

2. Important questionnaires

Next to these models, questionnaires have been developed to assess the different aspects of these models. The Job Content Questionnaire (JCQ) and the Effort Reward Imbalance Questionnaire (ERIQ) are widely known and have been validated. This is also true for Netemeyer et al. (1996) questionnaire for work-family conflict, which was based on the model of Greenhaus and Beutell (1985), amongst others. Netemeyers (1996) questionnaire, however, is less applicable nowadays since it was developed with a more traditional family pattern in mind. Hayman (2005) therefore developed the WLB questionnaire, which is more relevant in this day and age. Therefore, the thesis will make use of this questionnaire instead. The reason for including these models and questionnaires is that they all contribute to the understanding of stress at work, which is the core subject of the overall STRAW-Project.

3. An introduction to stress

Since the focus of the STRAW-Project lies with day-to-day stress situations, it is important to acknowledge the difference between chronic stress and acute stress. Stress occurs when the strain on the body exceeds its capacity (Le Fevre et al., 2003).

Acute stress occurs when there is a factor of unpredictability which cannot be controlled. This can be a novel situation that one has not had to deal with before or a threat to one's ego. Contrary to chronic stress, acute stress can be a form of eustress; stress that comes from positive challenges or exciting experiences, whereas chronic stress wears on the mind and

body, resulting in dysfunction of bodily systems (CESH / CSHS, n.d.). Defining acute stress as eustress should on the other hand not be used frequently since it gives the idea that acute stress is most often good, which it is not (Le Fever et al.,2003).

Day-to-day stress is different from the two types above because of its fluctuating nature. On some days one situation could emerge and produce stress, whereas the same situation on another day won't cause the same level of stress (Lazarus, 2006).

5. Chosen angle and methodology

1. Methodology thesis

The methodology of this thesis follows the study protocol of the STRAW-Project. Five participants were included in this pilot study. After filling in a baseline questionnaire, of which the questionnaires can be found in Appendix 5, which assessed different constructs related to stress, a three-week data-collection process using the developed smartphone application and Empatica® wristband followed. A debriefing session at the end of those three weeks concluded the data collection.

Using IBM SPSS 26 statistics, data was transferred into the desired long-format for correlation analyses. A wide-format was used for baseline and adherence analyses. Correlation between perceived work-life balance at baseline and day-to-day work-life balance was measured using linear mixed model analysis.

To our knowledge, conducting a lengthy EMA like this has not been done for office-based workers employed in an academic setting. Therefore, adherence is part of the feasibility analysis that was carried out. Adherence was analysed using various descriptive data on the total number of completed EMA sessions, completion time, etc. Furthermore, a Spearman correlation analysis was carried out between baseline WLB and the mean of completed EMA session per day, per participant.

6. Construction of the thesis

In the introduction above you have been able to read the broader context of this thesis. The existing knowledge gives an insight into the basics of stress research and the important models that are related to this. In the upcoming sections, the literature study will focus more in-depth on the core definitions of the different forms of stress, as well as the definition of WLB. The main antecedents and consequences of imbalance in the work-life area will be listed. Subsequently, the results of the thesis study will be shown. These include correlations between baseline dimensions of WLB (WIPL and PLIW) and day-to-day experienced WLB, dependent and independent of time. Also, adherence to the study protocol is visualised and described, as well as a correlation analysis between mean EMA sessions per participant and baseline. These

results are then discussed and followed by the main conclusions and limitations of the study, and recommendations for future research.

In the context of the overall STRAW-Project, the fieldwork for this thesis consisted of making the online baseline screening with the selected questionnaires that were given (Appendix 5). Finding English and Dutch versions of these questionnaires were also part of this process. This was a lengthy process. Additionally, the translation of scripts for the smartphone application was done as well as the testing of the app for one week. Other fieldwork included flyer distribution on the different campuses of Ghent University, to recruit participants. After data collection, data cleaning needed to be done. Finally, coding books of the data were made. This way, current and future researchers on the STRAW-Project will have a manual to better understand all the data.

2. Abstract

1. English

Background: Work-life balance (WLB) is gaining popularity both in science and in daily life. For personnel in academia the shift to a more autocratic decision-making environment has led to more job stress, burnout, and depression. The thesis, as part of the STRAW-Project, is interested in the correlation between day-to-day experienced WLB, measured with Ecological Momentary Assessment (EMA), and the underlying WLB academic personnel experiences. Additionally, the adherence to the EMA protocol was analysed.

Methods: Academic personnel of Ghent University (N=5), with at least 80% employment were recruited. A baseline survey measured underlying WLB and job stress, among others. The EMA survey was administered every 90 minutes during three consecutive working weeks, using a smartphone application. Data was analysed using descriptive measures, Spearman correlation, and mixed-model (MM) analyses in IBM SPSS 26.

Results: Crude MM analyses showed significant main effects of baseline 'Work Interference with Personal Life' (WIPL) on day-to-day WIPL, independent from time (p=0,004) but not vice versa. For 'Personal Life Interference with Work' (PLIW) this relation was only borderline significant (p=0,08). There were no significant interaction effects. Some descriptive measures for adherence show non-significant trends. However, no firm conclusions can be made.

Conclusion: Due to small sample size, all result in the study must be analysed carefully. It can only be presumed there might be a correlation between underlying and day-to-day experienced WLB. With this sample, higher WLB did not correlate with higher number of EMAs, although a trend for better adherence could be possible in lager samples.

"Word count article: 9548 (excluding acknowledgements, table of content, introduction, abstract, appendix, tables and reference list)"
"Word count literature study and research questions: 3129"

2. Dutch

Probleem: Werk-levensbalans (WLB) wint aan populariteit, zowel in onderzoek als het dagelijks leven. Voor academisch personeel heeft de verschuiving naar een meer autocratische beslissingscultuur gezorgd voor meer werkstress, burn-out en depressies. Deze thesis, als onderdeel van het STRAW-Project, analyseert de correlatie tussen de dagelijks ervaren WLB, gemeten via Ecological Momentary Assessment (EMA) en de onderliggende, baseline WLB bij academici. Daarenboven werd de haalbaarheid van het EMA protocol geanalyseerd

Methoden: Enkel personeel van Universiteit Gent (N=5), met minstens 80% tewerkstelling werden geïncludeerd. De baseline survey mat onder meer de onderliggende WLB en werkstress. De EMA survey werd elke 90 minuten afgenomen gedurende 3 opeenvolgende werkweken, via een smartphone applicatie. Data werd geanalyseerd o.b.v. descriptieve data, Spearman Correlatie en mixed-model (MM) analyse in IBM SPSS 26.

Resultaten: De ruwe MM analyse resulteerde in een significant hoofdeffect van baseline 'Work Interference with Personal Life' (WIPL) op dag-tot-dag WIPL, onafhankelijk van tijd (p=0,004) maar niet visa versa. Voor 'Personal Life Interference with Work' (PLIW) was dit effect randsignificant (p=0,08). Er waren geen significante interactie effecten. Sommige descriptieve data voor de naleving van het protocol duidden op niet-significante trends. Er kunnen echter geen sterke conclusies worden gevormd.

Conclusie: Vanwege de kleine sample moeten de resultaten met voorzichtigheid geïnterpreteerd worden. Er kan enkel verondersteld worden dat er een mogelijke correlatie is tussen onderliggende en de dagelijkse ervaren WLB. Binnen dit sample wees een hogere WLB niet op een significant hoger aantal EMA sessies, alhoewel er een trend tot betere naleving zou kunnen zijn bij een groter sample.

"Aantal woorden artikel: 9548 (exclusief woord vooraf, inhoudstafel, inleiding, abstract, bijlagen, tabellen en referentielijst)"

"Aantal woorden literatuurstudie en onderzoeksvragen: 3129"

3. Literature study

1. Stress situations at work as part of day-to-day stress

1. Day-to-day stress

The thesis at hand is different from other present-day studies since it focusses on day-to-day stress, and not chronic stress. To make sure there is no confusion in terminology, a few definitions of different types of stress are given.

Definitions for the different concepts within stress research are not set in stone. The literature about this is very broad, but there is a lack of consistency. So, although a clear definition of chronic stress is not decided upon in the literature, it is a type of stress that is constant and occurs over a longer period. It puts a strain on people's psychological and physical wellbeing and may also influence the performance on day-to-day activities. An example of chronic stress in the context of this study is overall job stress. This can be considered a form of chronic stress, because the strain and conflict it produces are ongoing, even when not at work. (Baum, 1990) Over time, chronic stress has been associated with a multitude of health-related and social problems such as cancer, CVD, musculoskeletal discomfort, absenteeism, and burnout (Baum, 1990; Brotman et al., 2007; Salvagioni et al., 2017; American Psychological Association, 2019).

Besides chronic stress, there is also acute stress. The difference with acute stress is that it has an unpredictable factor that cannot be controlled. Those unpredictable factors can be, for example, novel situations or threats to one's ego (CESH/CSHS, n.d.).

Every-day stress or day-to-day stress is the concept of stress on which this thesis will focus. When forming a definition of what day-to-day stress is, Lazarus' (2006) explanation is one of the most comprehendible. In summary, it comes to say that day-to-day stress refers to daily annoyances in life that seem minor but could potentially result in more overall stress and harm people's physical and mental health. Day-to-day stress, also referred to as fluctuating stress, has shown to be a factor in the perceived control over daily task and the emergence of depression (Gooding et al., 2018).

2. Effects of chronic stress at work on health

As mentioned before, chronic stress at work has many adverse effects on both physical and mental health. Many studies have been conducted around this topic and found a relationship between chronic stress and CVD (e.g. Brotman et al., 2007; Kivimäki & Kawachi, 2015; Backé et al., 2012). Bringing this in relation to the Job Demand Control Model, the epidemiological, prospective, multicenter, European study of Kornitzer et al. (2006) found that people on high

strain, high demand jobs are in greater risk for an acute coronary event than people in the low demand, high control category.
The reason why chronic stress is related to more CVD is that it accelerates the atherosclerotic process, i.e. the clogging of arteries caused by the build-up of plaque (fatty deposits) (Brotman et al., 2007). This can be caused by a variety of things among which, insulin resistance.
Basu et al. (2016) found in their systematic review that chronic stress can not only result in CVD or burnout but also carries a higher risk for the development of insulin resistance. This is due to the derailment of the hormone system and extreme activation of the sympathetic nervous system caused by chronic exposure to stress (Innes et al., 2007). With this information and with the information about CVD, both are inevitably connected to each other and to chronic stress.

Not only are there physiological risks associated with chronic stress. Also, mental illnesses can be a result of chronic stress. In literature, these are often classified under work-outcomes. In the work environment, burnout is one of them (McManus et al., 2002; Salvagioni et al., 2017). In lecturers, the amount of occupational stress independently predicts the dimension of burnout. These dimensions are emotional exhaustion, depersonalization, and personal accomplishment (Salami, 2011).
The consequences of burnout are thus far outstretching. Alongside causing other depressive feelings and insomnia, it also has effects on the development of headaches and muscular discomfort, CDV and type 2 diabetes, which were also independently seen as an effect of chronic stress (Salvagioni et al., 2017).

Lastly, one of the greater concepts linked to chronic stress (at work) is absenteeism. Manning and Osland (1989) found that previous absenteeism was related to both work and non-work factors, but stress itself did not have direct relations with absenteeism. Later articles did find a more distinct relationship between stress and absenteeism (Godin & Kittel, 2004; Darr & Johns, 2008). Leontaridi and Ward-Warmedinger (2002) even found that people in OECD-countries (Organisation for Economic Co-operation and Development countries) who experienced stress at work had 10-14% more chance to be absent from work or leave the organisation entirely. Absenteeism is often brought in relation to a loss in productivity. In 2019 a Swiss study estimated that the loss of productivity due to absenteeism caused by stress at work was around € 185 per person per month (Brunner et al., 2019).

3. *Sources of fluctuating and chronic stress and the relation to work-life balance*

Bellavia and Frone (2005) reported in their research that WFC, which can originate from stress at work, results in reduced involvement at home (e.g. more family-related absenteeism), which comprises the WLB.

Additionally, data from the 2002 Canadian Community Health Survey: Mental Health and Well-being (Shields, 2006), showed that the working population in Canada who reported to have day-to-day stress had higher chances of developing depression. This shows that day-to-day stress and stress situations need to be closely monitored in the workplace, to ensure the wellbeing of employees. Stress in day-to-day activities is almost inevitable. Hence the need for studying the effects of occupational stress. Especially in populations or profession groups that are automatically more exposed to stress, because of the nature of their work.

When extrapolating this information to the populations of interest, being staff working in an academic setting, different studies have reported effects of day-to-day stress on WFC and health status. For example, day-to-day stress situation in academics, i.e. professional medical writers, were researched by Makhija et al. (2016). The results stand from a cohort of 47 participants. They indicated that unclear requirements/frequent changes in the scope of the work, ad hoc timelines and tight deadlines during congress submission were the biggest day-to-day challenges. To ensure a healthy WLB spending time with friends and family was listed as the preferred activity.

Damaske et al. (2015) found in their EMA study that people with high socioeconomic status jobs, under which academic staff can be placed, experience higher job demands and job stress during their working day. The study did not research which types of work initiated these demands or stress. A study of Aalim and Ambily (2019) found that time management is one of the factors initiating stress and putting pressure on work-family balance in PhD students.

Also, the frequency of checking e-mails can be a source of day-to-day stress (Kushlev & Dunn, 2015). They found in their experimental study that teachers who limited the times they check their e-mail during the day, to a maximum of three times a day, felt less day-to-day stress and were less tense compared to the control group who were not asked to limit their e-mail checking frequency. Frequently checking e-mails or more than necessary could be seen as an aspect of poor time management, which then seems to confirm the findings of Aalim and Ambily (2019) that this, in turn, harming one's WLB.

Further research evidence in this area is scarce. Other articles about day-to-day stress were not in coherence with our demographic and/or did not report a relation with any form of WLB.

This confirms that there is a gap in the current knowledge of day-to-day stress and stress situations. The paper at hand will try to assess the fluctuations in day-to-day stress situations, using EMA, and how they affect the WLB of staff working in an academic setting.

2. Work-Family Conflict vs. Work-Life Balance

1. Work-family conflict (WFC)

Concerning chronic stress at work, WFC can have a big impact. The concept of WFC has been known since the late '80s. Greenhaus and Beutell (1985) developed a model that illustrated the different relations between time, strain, and behaviour in the work and family domain and how they influence each other due to role conflicts. The latter exceeds the scope of this thesis. Work-family conflict occurs when the demands of one's work life are not compatible with those of family life. Vice versa, family work-conflict (FWC) appears when family demands interfere with demands at work. Greenhaus and Beutell (1985) defined three forms of conflict based on time, strain, and behaviour. Figure 3 illustrates some sources of work-family conflict and how they can produce conflicts between roles. The model uses two different domains i.e. work and family, both consisting of time, strain, and behaviour related factors. Conflict arises when time devoted, strain produced or behaviour required in one domain makes it difficult to fulfil requirements in the other domain.

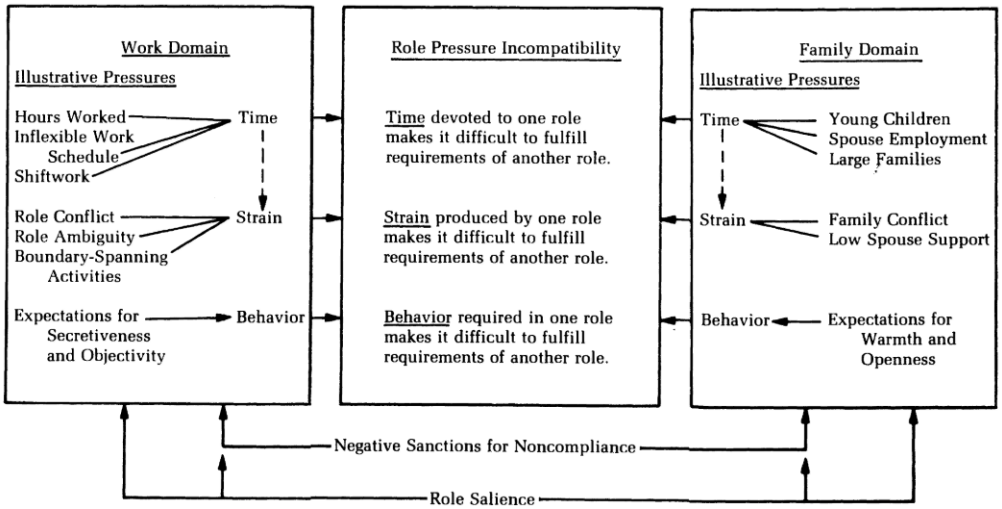

Figure 3: Work-Family Role Pressure Incompatibility (Greenhaus & Beutell, 1985)

In the literature, there is not always a clear distinction between the two directions, i.e. WFC and FWC, although Netemeyer et al. (1996) developed the WFC-questionnaire by which these two types can be assessed separately. Unfortunately, this questionnaire is based on more traditional family life (i.e. men work outside of the home, women are housewives). Therefore it is less applicable to the current workplace situations and employee demographics.

To conclude, the whole concept of WFC is being revised over the last few years. With this, the emergence of a broader concept, work-life balance (WLB), has gained more attention.

Work-life balance (WLB)

As stated in the introduction, Higgins et al. (2004) framed it, that WFC and WLB can be put on the same continuum, with low WFC and high WLB on one side and the opposites on the other side of the spectrum. However, WLB is different from WFC because it includes both work/personal life interference and work/personal life enhancement. Using the term life balance instead of family makes that the questionnaire can be used without any specific marital or family status in mind. This makes it more appealing to a broader employee demographics. Besides, WLB covers a broader work and non-work domain than WFC (Fisher-McAuley et al., 2003). However, the longitudinal evaluation of Brough et al. (2014) explains that not one definition is solid when it comes to WLB. The most comprehendible definition is given in Yusuf's (2018) comparative study; it being: *"Work-life balance consist of two words that is work which is related to ambition, career and life is related to family, health, pleasure though broader, terms are "lifestyle calm balance" and "lifestyle choices".* If we extend this definition by adding (1) the key antecedents of work-life balance; being work and family demands and responsibilities for others, (2) the key moderating constructs: gender and social support, and (3) the most common consequences of WLB: satisfaction, and levels of mental and physical health, it gives a wholesome view of the concept WLB (Brough et al., 2014).

The concept is still interconnected with WFC if the definition of Frone (2003) is taken into account; where balance is created by the interaction of WFC (negative pathway) and work-family facilitation (positive pathway). This is plausible but it has never been explicitly tested. This lies outside the scope of this thesis.

Measuring WLB in this thesis was done with the adapted 15-item questionnaire of Hayman (2005) which was based on Fisher's original questionnaire (2001). This measure has three dimensions of work-life balance; work interference with personal life (WIPL), personal life interference with work (PLIW), and work/personal life enhancement (WPLE). With the interference dimension, the questionnaire assesses the degree of conflict someone could experience between their personal and work-life. This way there is thus a close relation to the WFC and FWC concepts of Netemeyer et al. (1996).

The other concept in WLB is enhancement. This refers more to a positive relation between personal and work life. It is in the literature also named as positive spill over. This means that positive events in one domain (work or non-work) have a positive effect on the other domain (Hayman, 2015). A meta-analysis study (McNall et al., 2010), even went as far as dividing enhancement into two categories; work-family enrichment and family-work enrichment. The former had a greater correlation with work-related variables, whereas the latter had more affinity with non-work-related variables. This thesis, however, does not go as far in as analysing WPLE.

2. Workplace stressors

Going more in detail about workplace stressors, many causes have been researched in the past. These were mostly researched in relation to chronic stress, of which job stress is an example. Baker (1985) was one of the first to categorize different workplace stressors. Among them physical work environment stressors, job content stressors, organizational stressors, and work role stressors. A more modern approach for classifying are the job-quality indices and indicators formulated in the sixth European Working Conditions Survey (Eurofound, 2017). These include, but are not limited to, the categories of Baker (1985). There are seven categories; physical environment, work intensity, working time quality, social environment, skill and discretion, prospects, and earnings (Appendix 4).

Depending on the research, stressors are more elaborately described or placed under antecedents of consequences of either WFC or WLB. The objective of the study is to determine the effect of day-to-day stress on WLB. Therefore hereafter some antecedents and consequences of WLB are discussed.

3. Stressors and consequences of work-life balance (WLB)

Negative stressors and subsequent consequences

Stressors or antecedents negatively influencing WLB are work and family demands. Especially the amount of demand and the acute situation of these demands result in an imbalance (Brough et al., 2014). In the academic setting, a list of main stressors relating to WLB consists of a heavy workload, time and resource constraints, long working hours, poor pay, poor communication, role ambiguity and overload, lack of recognition, striving for publication, providing support for students, and keeping up with technological advances (Kinman, 2001; Kinman & Jones, 2008; Winefield et al., 2003).

Already in the late ‘80s, Bedeian (1988) found that job stress resulted in lower levels of job satisfaction. This, in turn, lowers life satisfaction which is categorised as a factor predicting WLB. However, he studied job stress in relation to WFC. More recently Bell et al. (2012) found that there are negative effects of job stress on WLB. In their research, threat-type stress e.g. feelings of being overwhelmed or nerve-wracked, was a more significant predictor than pressure-type stress. Furthermore, threat-types of stress resulted in poorer well-being, though this effect was not found for pressure-type stress. Other researchers came to the same results that high levels of occupational stress negatively influences the WLB (Gillespie et al., 2001; Zaheer et al., 2016) or that lower job stress in faculty members resulted in higher levels of WLB (Lindfelt et al., 2018).

Tytherleigh et al. (2005) found that academic and research staff, more than other faculty members, reported the highest levels of stress. This due to poor WLB, which was a result of low job control, poor resources, communication, and work relationships. Interestingly, even striving for WLB can be a stressor on itself (Martinez et al., 2013). In addition to this, Singh et al. (2020) concluded in their systematic review that occupational stress and burnout are an unmistakable factor in work life of academics. Furthermore, this study found a link between having higher levels of job stress and the relation with WLB.

Additionally, a high strain/long hour job type, defined by Fan et al. (2018) as a job with a high level of demand and job control, under which jobs in academia can be placed, results in more emotional exhaustion and psychological stress. Working in this environment puts a strain on psychological and overall well-being. Emotional exhaustion, psychological stress, and burnout are commonly found in faculty members as a result of poor WLB and work overload (Barkhuizen and Rothmann, 2008, Porter et al.,2018). According to Catano et al. (2010), WLB strongly predicts stress in the academic setting. Additionally, a poor balance between work and personal life also results in lower physical health and more health problems in general (Barkhuizen and Rothmann, 2008; Lunau et al., 2014).
It is important to note that Kinman and Wray (2015) conducted a longitudinal research evaluating the WLB, amongst other factors, in more than 6000 employees in higher education organisations in the United Kingdom. Their study showed that in two years, the overall WLB of respondents had significantly worsened due to the different stressors that are already listed above.

Positive stressors and subsequent consequences

Besides stressors negatively influencing WLB, some stressors have a positive effect on WLB. Having a more flexible work schedule, or an informal workplace, creating a sense of autonomy, could lead to a better balance in work and personal life. However informal practices are less important if the work schedule is flexible (Anderson et al. 2002). The meta-analysis of French et al. (2018) showed that having a good social support system can help create a more balanced work-life environment. Also, having high resilience capabilities, reported by faculty directors, can result in a healthier balance between personal life and work (Porter et al. 2018, Karasek et al., 1981, Brough et al., 2014). It is uncertain if having tenure or higher rank creates better WLB (Smeltzer et al., 2015; Padilla & Thompson, 2016)

These positive and negative stressors are a sign that keeping an eye on the WLB of staff working in an academic setting is necessary. Especially because a WLB that is not optimal could lead to a higher perception of job stress, higher psychological strain, higher turnover

intentions, absenteeism, stress, and burnout (Allen et al., 2000; Peeters et al., Schaufeli, 2005; Bell et al., 2012; Brough et al., 2014).

3. Research questions

As mentioned in the explanation of the title, this research is based on the pilot study within the STRAW–Project. Two concepts will be researched concerning WLB. The first is the correlation between WLB, measured at baseline and during data collection via EMA. The second concept of interest is adherence to the day-to-day EMA protocol in relation to underlying experience of WLB. A good pilot study includes a feasibility study. That is why adherence of participants to the day-to-day EMA protocol has been included as a point of interest for this thesis.

From these decisions the following research questions were formulated:

1. Is there a correlation between underlying experience of work-life balance among personnel employed in an academic sector and the experience of day-to-day work-life balance?
2. Is participants' adherence towards the day-to-day EMA protocol influenced by the underlying experience of work-life balance?

4. Methodology

1. Study design and sample

This thesis, as part of the STRAW-Project, is an observational study on office-based employees of Ghent University, to measure day-to-day WLB and adherence towards the day-to-day EMA. Therefore, university employees were recruited using flyers on all campuses of Ghent University. E-mails were sent out too by the PhD student working on the STRAW-Project to colleagues at the university. In this thesis only employees of Ghent University were included. However, employees from Odisee University College were added as a second recruitment site for the overall STRAW-Project.

Eligibility criteria were; personnel at Ghent University (and later Odisee University College), Dutch-speaking, being an Android phone user and having permission from the superior to take part in data collection during office hours. Lastly, participants needed to have a working contract of 80-100%. The goal of the overall STRAW-Project is to include 100 participants in total, of which 50 will be from Belgium, and 50 from Slovenia. The necessary ethics committees approved the study. For this study, five participants were included. They all met the inclusion criteria and signed an informed consent in duplicate.

2. Data collection

Figure 4 shows the timeline of the data collection procedure of the whole STRAW-Project. Data from the wristband and smartphone sensor data is not part of this thesis.

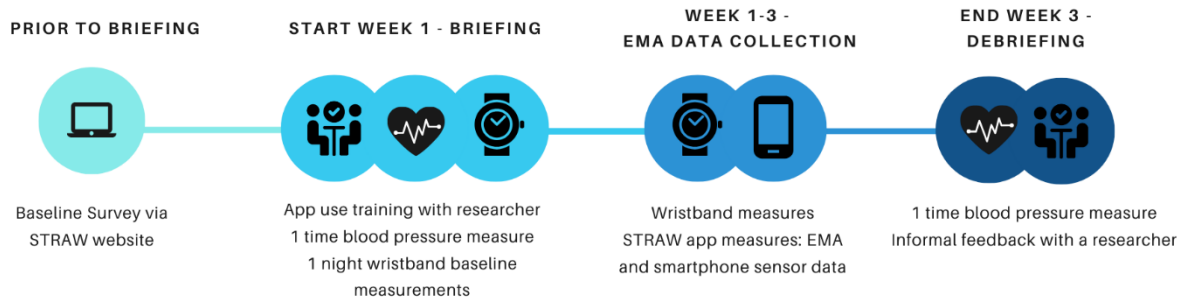

Figure 4: Timeline Data Collection

Baseline questionnaire

Participants who were interested in the study were sent a link, which was later incorporated into the STRAW-website, to the baseline screening, build in LimeSurvey. Besides this link, the information letter was included in this email.

Data collection happened in three stages. Participants who liked to participate were asked to complete the baseline screening before meeting one of the researchers to get information about the app and Empatica® E4 wristband and to sign an informed consent on paper. Their blood pressure was also taken during the first meeting.

The baseline screening consisted of a self-administered questionnaire that asked about 1) general demographic information, work- and health-related information and 2) different aspects related to stress at work such as, work environment, sleep, coping strategies, work-life balance, etc. This last section of the baseline screening was composed with existing, and validated questionnaires (Appendix 5).

EMA data collection using a newly developed smartphone application

The working of the app goes as follows; when installing the app with one of the researchers, participants indicated when their usual working day starts. Based on this information, the app asked questions roughly every 90 minutes, starting at the hour the participant indicated during the setup. These questions included work environment risk factors, self-perceived (stress) outcomes, and activities like; current task, coffee consumption, smoking, and breaks. Questionnaires used for this data can be found in Appendix 5. When indicating their working day was completed, questions about their overall day experience were asked later in the evening. The app did not ask any questions during the weekend.

Smartphone senor data

Meanwhile, that same app also detected acceleration, applications/notifications, barometer, battery life, Bluetooth usage, communication, gyroscope, light, location, network data, processor activity, rotation, screen activation, temperature, time zone, voice detection, and Wi-Fi of the smartphone. This data, however, lies outside the scope of this thesis.

Physiological data from Empatica ® wearable

Simultaneously, the Empatica® E4 wristband measured acceleration, heart rate, blood volume pulse, electrodermal activity and skin temperature during all waking hours of weekdays.
App and Empatica® E4 wristband measures were taken over a period of three weeks (15 working days). For calibrating the wristband, data from the first night was used.
After three weeks, the participants had a debriefing session with a researcher and blood pressure was measured once again.

3. Study variables and materials

The materials used in this study consist of a wide range of different questionnaires (Appendix 5). These questionnaires were used in the baseline screening of this thesis. Some of them were also used in the app that was developed, to conduct the EMA. All of these questionnaires have a long-lasting reputation and have been shown to have good reliability and validity to measure the constructs they envision. The two questionnaires below are described more in detail since they will be used to measure adherence to the evening time EMA.

The WLB questionnaire (Hayman, 2005) was used to assess the WLB of participants, both in the baseline survey as in the EMA evening sessions. The questionnaire consists of 15 questions with a 5-point Likert scale answer option (1 – Strongly disagree, 2 - Disagree, 3 – Neither agree nor disagree, 4 – Agree, 5 – Strongly agree). Questions one through seven measured WIPL and were, all but question seven, reversed scored. Questions eight till 11 measured PLIW and were also reversed scored. A higher score on these dimensions meant a lower interference between work and personal life, resulting in a better WLB. The last four questions measured WPLE and were scored regularly. A higher total score on enhancement equals higher work/personal life enhancement and is to be interpreted as better WLB. The EMA sessions included only the questions of the WIPL and PLIW dimensions.

An analysis on adherence to day-to-day evening questionnaires was performed. Therefore, both the interference concepts of the WLB and the section ‘social support’ from the JCQ will be used. This part of the JCQ is scored using a 4-point Likert scale (1 – Strongly disagree, 2 - Disagree, 3 – Agree, 4 – Strongly agree). There was a fifth option ‘I don’t have a supervisor/or

colleagues', which was scored as 8 (missing). The higher the total score of this section, the better the perceived social support.

Another tool was used in the study; a wearable to measure physiological stress response. The type used here was the Empatica® E4 wristband. McCarthy et al. (2016) conducted a study to assess the validity of the Empatica® E4 wristband against a standard clinical device General Electric's SEER Light Extend Recorder holter portable electrocardiogram. Data showed a similarity of 85% of data quality between the two devices for measuring arterial fibrillation. Empatica did conduct comparative research for their devices. They concluded that there was a good correlation between the data measured by their devices and standard clinical systems, within experimental settings (Empatica, 2014).

For the app, developed within the STRAW-Project, reliability and validity has not been tested yet. This is where this dissertation, will try to shed a small light on. Although only two questionnaires will be used in this study, the goal is still to analyse the feasibility of this app for participants.

4. Statistical analyses

The statistical analyses described here should be seen a feasibility assessment of the outline of the analytical protocol for the STRAW-Project. The approach for the correlation analyses will be used in the overall STRAW-Project as well. The approach for adherence is used to assess feasibility to the EMA protocol, which is a part of this thesis. This will not be the main focus of the overall STRAW-Project. In general, because of the small sample, no firm conclusions can be drawn from the analyses in this thesis.

Descriptive analysis was used for baseline demographic variables. Since most data is skewed and there is only a small sample size, median and 25^{th} (Q1) and 75^{th} (Q3) quartile values are reported. For all statistical analyses, data are classified as significant at the p=0,05 level or borderline significant at the p=0,10 level. Data from the Empatica® wristband and the smartphone sensors are not part of the analyses of this thesis.

Correlation analysis was done on a wide-format data file. For adherence analysis, the data file was a combination of long- and wide-format. Since the study has an observational design, the time variable, included in the correlation analyses, is not expected to affect outcome measures. However, it will still be examined in the mixed-model analyses.

For the correlation data, a selection of the total data was made to analyse. Only relevant variables for this thesis were kept in the data file (baseline and EMA WLB indicator data, i.e. WIPL and PLIW, and time variables). For the WLB dimensions, enhancement (third dimension of WLB) was not included in the EMA session. This would have made the sessions too lengthy. This can be justified since WIPL and PLIW are proven to be good indicators of WLB (Fisher-McAuley et al., 2003)

The analysis of the first research question, assessing the correlation between baseline and day-to-day WLB, is done by using a linear mixed-effect model: random intercept model. This model is used since the repeated data within persons are not independent. It has a random intercept since it is presumed that each participant will have a different intercept. The baseline values of WIPL and PLIW are subject-specific and will persist across all the subjects' repeated (EMA) measures. Using this random effect will induce (limited) covariance among the repeated measures.

First, a spaghetti plot was plotted to visualise the flow of EMA data per participant over the 15 days of data collection. Other than this, there were no further analytic tests since, based on these regression lines, there is no significant effect of this time-variable, and the sample was too small. Subsequently, three random intercept models were executed. EMA data is always the dependant variable. The first model assessed the correlation between overall EMA data and time-variable 'Time_Calendar_Week', hereafter called 'week' (week indicates the first, second or third week of participation). The time variable was listed as a continuous covariate. This model is accompanied by a boxplot. The second model analysed the correlation between baseline WIPL or PLIW and day-to-day WIPL or PLIW. Baseline WIPL or PLIW was listed as a covariate. A scatterplot is added to visualize the baseline and EMA data per participant for both WIPL and PLIW. These plots were then combined to have a clear overview. The scale on the x-axis is not accurate. It is made so all participants can be viewed side by side. The third model was a full factorial interaction model, which analysed the correlation between baseline, EMA, and the time variable 'week'. Lastly, the main effect of baseline and time were tested separately in a crude model.

The conceptual model of the research question on correlations is shown here.

Figure 5: Conceptual model for correlation

For adherence, analyses were done on the whole data file, with a focus on the evening questionnaires of the EMA data, which included WLB questions and social support (JCQ).

For research question 2, adherence to the study protocol, data is analysed using descriptive analysis. Also, a non-parametric Spearman correlation analysis for baseline WLB in relation to the mean number of completed EMA session per day, per participant is carried out. Since the goal is to associate baseline WLB with the total number of EMA session, the choice was made to use the total WLB score, with the inclusion of the enhancement dimension. This was left out of the mixed-model correlation analysis of reasons explained above.

Furthermore, there is particular interest in the exact number of days subjects participated, the number of completed EMA's during those days, the number of completed EMA's per participant per day, and the number of days off. In addition, the median time it took, and corresponding interquartile range (IQR), to complete the evening sessions are analysed, as well as the delay in response to start an EMA session. To visualise these outcomes bar charts and boxplots are shown.

The conceptual model for the research question on adherence is displayed hereafter.

Figure 6: Conceptual model for adherence

The whole data set was first analysed in Excel and colour-coded by session condition i.e. morning session or daytime session with the subdivisions 'with' or 'without' stressful events and evening session with the subdivisions 'with' or 'without' physical symptoms. Each session consisted of the same number of questions, with an exception for physical symptoms. Depending on the number of symptoms indicated, the question length differed by one or two items.

Besides this colour-coding, there was also a colour-coding for sessions that were incomplete due to technical errors, the session being skipped or postponed. These were all left out of the analyses since the data was incomplete.

5. Results and analyses

1. Baseline data

Demographics

The study consisted of five, all female, participants. The median (Q1; Q3) age was 28,66 years (26,43; 34,04). Four out of five participants had a master's degree. One participant had a PhD degree. Other educational attainments options were a bachelor's degree, high school, or other. None of the latter applied to the participants. Three out of five participants had full-time employment as PhD-student, one participant had an 80% employment as a PhD-student and 20% as a pedagogical employee, and one other participant had a full-time employment as a

post-doctoral researcher. All of the participants were married or cohabitated without children. Four participants reported Belgium as their country of birth, one indicated 'other' (Appendix 6). The number of working hours listed on the employment contracts was 38 hours for all participants. However, two participants indicated their actual working hours exceeded this, ranging from 48 to 55 actual working hours. The median time participant worked for the university was 40 months, which equals three years and four months. (Appendix 6)
Due to the limited amount of participants, these demographic factors are left out of the analyses and are only used as descriptive results here for the study sample.

Baseline work-life balance

Median (Q1; Q3) baseline work interference with personal life (WIPL) was 24,00 (21,00; 28,50). Median (Q1; Q3) personal life interference with work (PLIW) was 16,00 (11,50; 19,00). A higher score meaning a lower interference resulting in better WLB. The median (Q1; Q3) work personal life enhancement (WPLE) was 13,00 (11,00; 15,50) for which a higher score meant greater enhancement, resulting in better WLB. Total median (Q1; Q3) WLB was 54,0 (48,00; 58,00) with a minimum of 44 and a maximum of 61 (Appendix 7).

2. EMA data – Correlation

For analyses, day-to-day (EMA) WIPL and PLIW were analysed as outcome (dependent) variables (y-axis). Time_Calendar_Week, Time_Calendar_Day (number of the day) and baseline WIPL and PLIW were seen as the covariates (exposure measures; x-axis) of EMA data. Note that all data reported here should be looked at with caution since the small number of participants causes low statistical power. In addition, no between-participant analyses were done. Further details on variable names can be found in the coding book (Appendix 8).

First, a spaghetti plot was used to visualise the fluctuation of WIPL and PLIW over the 15 days of data collection (number of the day; x-axis). Each participant is shown separately with a different coloured line. For one participant there were 16 days due to administrative arrangements. The lines are interrupted when no data for that day was reported or technical difficulties or errors occurred. Participant 1 and 3 had only one data point for WIPL (Figure 7). Therefore, it does not show on the plot. This occurred again with participant 3 for PLIW (Figure 8). Because of the lack of a clear pattern from this data, the choice was made not to analyse this further in the mixed models.

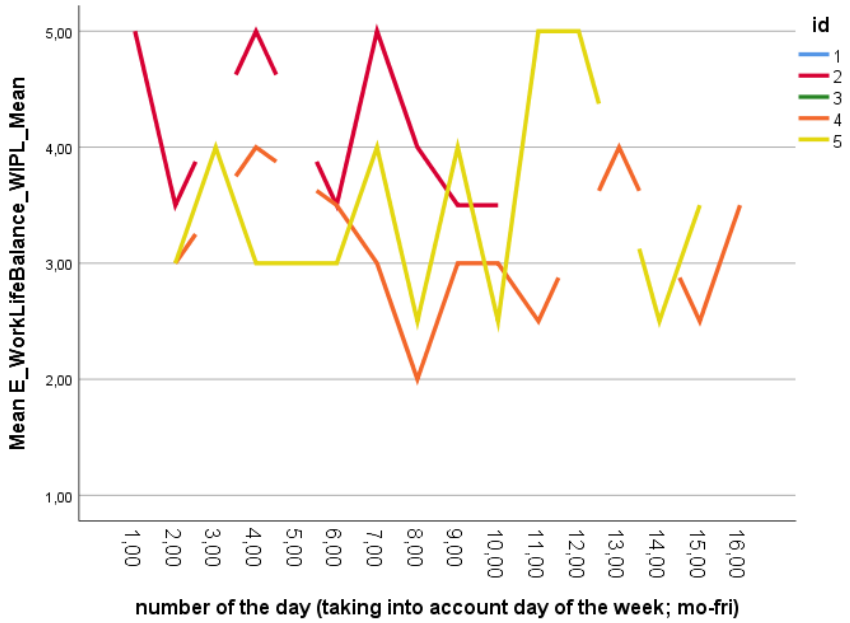

Figure 7: Spaghetti Plot WIPLxDay

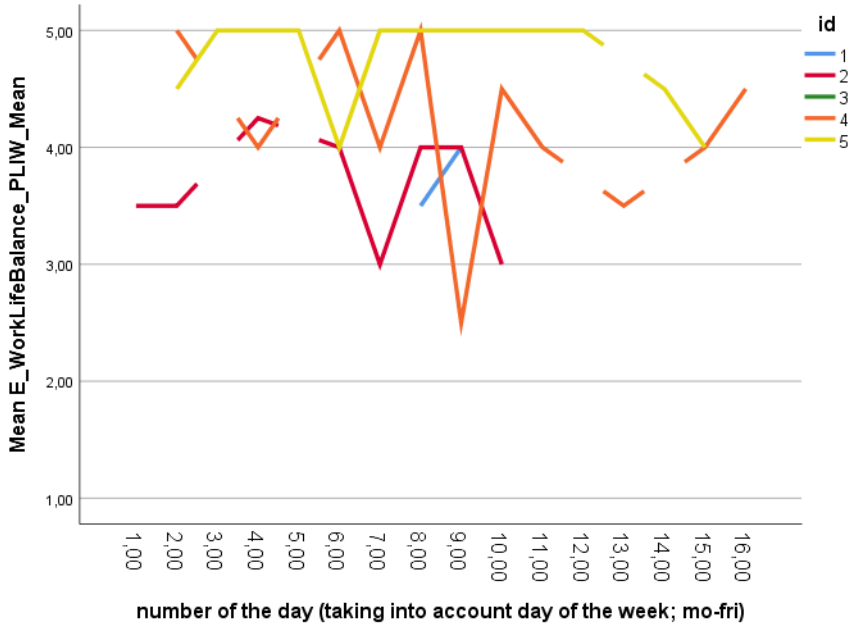

Figure 8: Spaghetti Plot PLIWxDay

After this, the first random intercept model analysis was carried out for the correlation between day-to-day EMA WIPL and PLIW and the time-variable week. Median(Q1; Q3) WIPL values for week 1 to week 3 were respectively 3,25 (3,00; 4,25), 3, 50 (3,00; 3,88), and 3,50 (2,50; 5,00). Median (Q1; Q3) PLIW values for week 1 to week 3 were respectively 4,50 (3,50; 5,00), 4,00 (3,75; 5,00), and 4,00 (4,00; 5,00) (Table 1). Minima and maxima of WIPL and PLIW are displayed in the table below. The boxplots show there was only one outlier (5,00) for WIPL in week 2 (Figure 9, Figure 10).

Table 1: Descriptives day-to-day WIPL/PLIW

Outcome variable	Time week	Median	Quartiles (Q1; Q3)	Minimum	Maximum
Work Interference with Personal Life	1	3,25	(3,00; 4,25)	3,00	5,00
	2	3,50	(3,00; 3,88)	2,50	5,00
	3	3,50	(2,50; 5,00)	3,50	5,00
Personal Life Interference with Work	1	4,50	(3,50; 5,00)	2,00	5,00
	2	4,00	(3,75; 5,00)	2,00	5,00
	3	4,00	(4,00; 5,00)	2,50	5,00

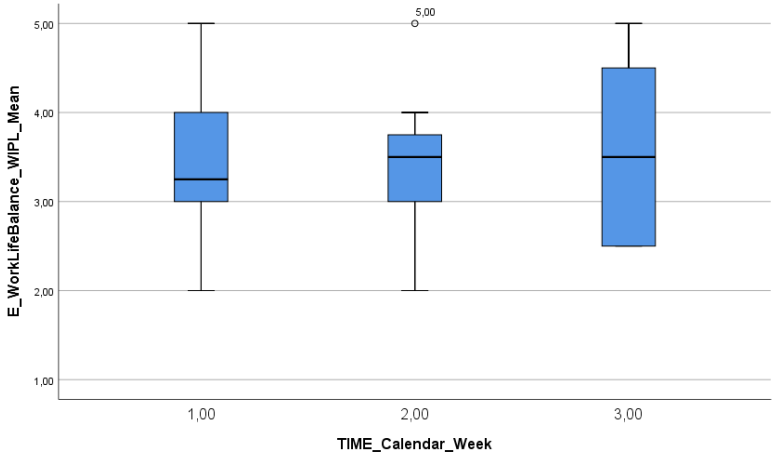

Figure 9: Boxplot EMAxWeek (WIPL)

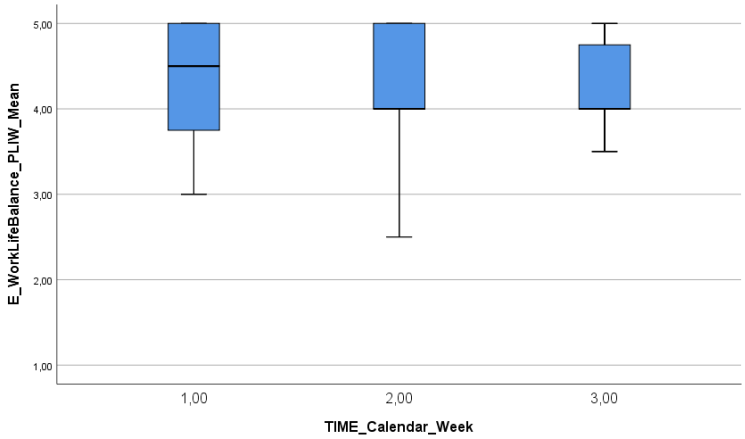

Figure 10: Boxplot EMAxWeek (PLIW)

Table 2: Random Intercept Model - EMAxWeek

Outcome Variable	Regression coefficient	95% CI	P-value
Work Interference with Personal Life	0,07	[-0,33 - 0,49]	0,70
Personal Life Interference with Work	-0,17	[-0,46 - 0,11]	0,23

Table 2 shows there was no statistically significant effect of time-variable week on WIPL (β = 0,08, 95% CI = -0,33 - 0,49, p = 0,70). The time-variable week is not statistically significant associated with change in WIPL. There also was no statistically significant relation for time-variable week on PLIW (β = -0,17, 95% CI = -0,46 - 0,11, p = 0,23). The time-variable week is not statistically significant associated with change in PLIW.

The second random intercept model analysis was done for the correlation between baseline values for WLB indicators (WIPL and PLIW) and EMA values for these dimensions. First, several scatterplots were made and later combined for WIPL (Figure 11) and PLIW (Figure 12). These plots show the range of day-to-day WIPL and PLIW per participants. It shows participant 1 and 3 had only one data entry for WIPL, respectively two and one for PLIW.

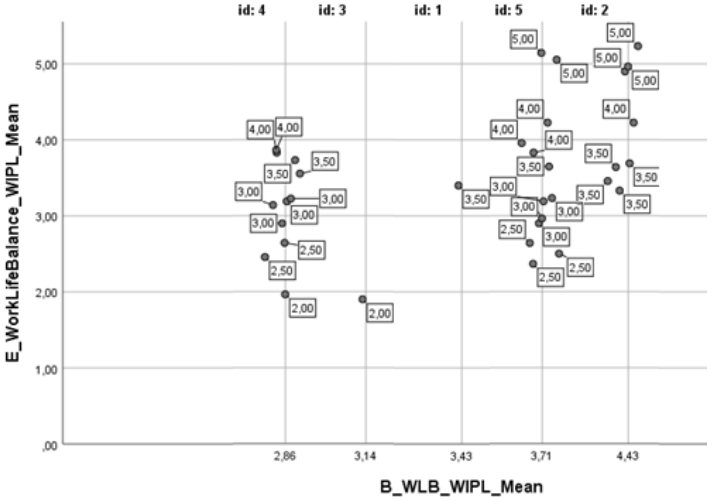

Figure 11: Scatterplot EMAxBaseline (WIPL)

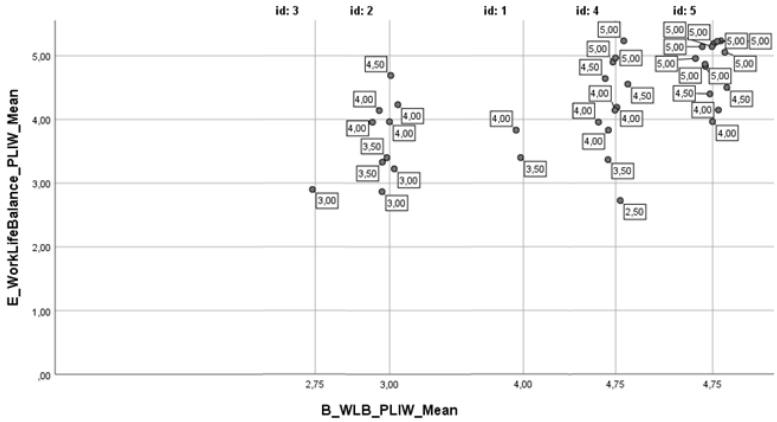

Figure 12: Scatterplot EMAxBaseline (PLIW)

The results in Table 3 hint to a statistically significant positive effect for baseline WIPL on day-to-day WIPL (β = 0,68, 95% CI = 0,23 - 1,13, p = 0,004). Baseline WIPL could therefore be statistically significant associated with day-to-day WIPL. There also seems to be a borderline significant positive result for baseline PLIW on day-to-day PLIW (β = -0,53, 95% CI = -0,18 - 1,25, p = 0,096). There might be a statistically borderline significant association between baseline PLIW and day-to-day PLIW.

Table 3: Random Intercept Model: EMAxBaseline

Outcome Variable	Regression coefficient	95% CI	P-value
Work Interference with Personal Life[a]	0,68	[0,23 - 1,13]	0,004
Personal Life Interference with Work	0,53	[-0,18 - 1,25]	0,096*

a. The final Hessian matrix is not positive definite although all convergence criteria are satisfied. The MIXED procedure continues despite this warning. Validity of subsequent results cannot be ascertained.
**p <0,10*

The third model analyses the interaction between EMA and baseline dimensions of WLB and time-variable week. Results are displayed in Table 4 below.
The analysis show that, for this sample, there is no statistically significant interaction effect of baseline WIPL and time-variable week on day-to-day (EMA) WIPL (β = -0,10, 95% CI = -0,86 - 0,66, p = 0,79). The combination of baseline WIPL and time-variable week does not seem to be statistically significant associated with day-to-day WIPL.
There do not appear to be any significant main effects of baseline WIPL on day-to-day WIPL (β = 0,92, 95% CI= -0,55 - 2,40, p = 0,21) or of time-variable week on day-to-day WIPL (β = 0,47, 95% CI= -2,23 - 3,18, p = 0,72). Baseline WIPL is might not be statistically significant associated with day-to-day WIPL, depending on time-variable week, and vice versa.

The results do not seem to show a significant interaction effect of baseline PLIW and time-variable week on day-to-day (EMA) PLIW (β = -0,005, 95% CI = -0,45 - 0,44, p = 0,98). The combination of baseline PLIW and time-variable week does not appear to be statistically significant when combining with day-to-day PLIW.
There do not appear to be any significant main effects of baseline PLIW on day-to-day PLIW (β = 0,61, 95% CI= -0,22 - 1,44, p= 0,14) or of time-variable week on day-to-day PLIW (β = -0,19, 95% CI = -2,20 - 1,83 p= 0,85). Baseline PLIW does not seem to be significantly associated with day-to-day PLIW, depending on time-variable week, and vice versa.

Table 4: Random Intercept Model - EMAxBaselinexTimeWeek (Full Factorial Model)

Outcome Variable	Baseline			Week			Interaction		
	Regression coefficient	95% CI	P-value	Regression coefficient	95% CI	P-value	Regression coefficient	95% CI	P-value
Work Interference with Personal Life[a]	0,92	[-0,55 - 2,40]	0,21	0,47	[-2,23 - 3,18]	0,72	-0,101782	[-0,86 - 0,66]	0,79
Personal Life Interference with Work	0,61	[-0,22 - 1,44]	0,14	-0,19	[-2,20 - 1,83]	0,85	-0,005767	[-0,45 - 0,44]	0,98

a. The final Hessian matrix is not positive definite although all convergence criteria are satisfied. The MIXED procedure continues despite this warning. Validity of subsequent results cannot be ascertained.

The last model analyses the main effects of baseline WLB dimensions and time-variable week one EMA WLB dimensions separately from each other.

Table 5: Random Intercept Model - EMAxTimeWeek / EMAxBaseline (Crude Model)

Outcome Variable	Baseline			Week		
	Regression coefficient	95% CI	P-value	Regression coefficient	95% CI	P-value
Work Interference with Personal Life[a]	0,74	[0,26 - 1,22]	0,004	0,11	[-0,28 - 0,51]	0,56
Personal Life Interference with Work	0,60	[-0,12 - 1,33]	0,077	-0,21	[-0,50 - 0,07]	0,14

a. The final Hessian matrix is not positive definite although all convergence criteria are satisfied. The MIXED procedure continues despite this warning. Validity of subsequent results cannot be ascertained.

In Table 5 results hint to a significant main effect of baseline WIPL on day-to-day WIPL, independent of time-variable week (β = 0,74, 95% CI = 0,26 - 1,22, p = 0,004). Baseline WIPL appeared to be statistically significant associated with day-to-day WIPL, independent of time-variable week.
There seems to be no significant main effect of time-variable week on day-to-day WIPL, independent of baseline WIPL (β = 0,11, 95% CI = -0,28 - 0,51, p =0,56). Time-variable week might not be statistically significant associated with day-to-day WIPL, independent of baseline WIPL.

Data appeared borderline significant for the main effect of baseline PLIW on day-to-day PLIW, independent of time-variable week (β = 0,60, 95% CI = -0,12 - 1,33, p = 0,08). Baseline PLIW might be statistically significant associated with day-to-day PLIW, independent of the time-variable week.
There is no indication of a significant main effect of time-variable week on day-to-day PLIW, independent of baseline PLIW (β = -0,21, 95% CI = -0,50 - 0,07, p =0,14). Time-variable week does not seem to be statistically significant associated with day-to-day PLIW, independent of baseline PLIW.

3. EMA data – Adherence

Four bar charts with descriptive measures were analysed to assess the overall adherence to the study protocol across the five participants. In addition, three more analytic approaches focus specifically on the evening questionnaires.

The first histogram (Figure 13) shows the total number of days (y-axis) each participant (x-axis) adhered fully to the study protocol; excluding days for which data collection was incomplete or technical difficulties emerged. The x-axis label is named ‘participant_ID2’ due to different formats that were used in the data set. This is the name for the wide-format participant ID.
Median (Q1; Q3) total days of participation was nine days (3,5; 13,00) with a minimum of two days and a maximum of 13 days. Participant 3 had the lowest total days since the app caused unwanted mobile data usage, which resulted in the participant completing only two valid days (Table 6).

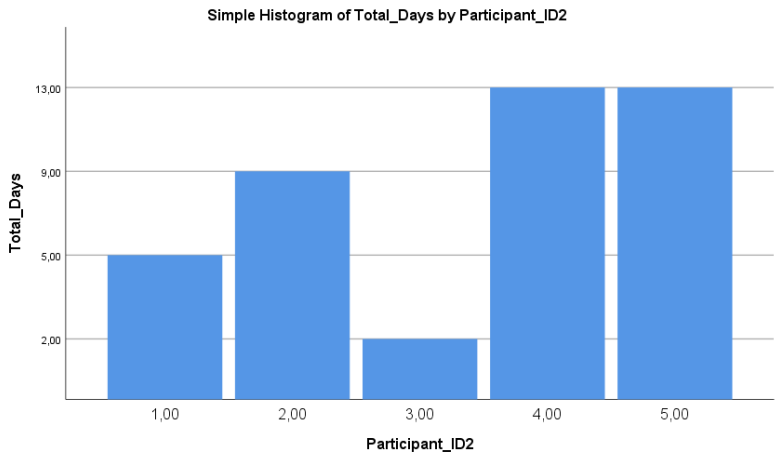

Figure 13: Barchart - Total valid days per participant

Table 6: Descriptives Adherence

Variable	Median	Percentile 25 (Q1)	Percentile 75 (Q3)	Minimum	Maximum
Total Days	9,00	3,50	13,00	2,00	13,00
Total EMA's	34,00	8,00	58,50	3,00	63,00
Day Off	1,00	0,50	4,50	0,00	6,00

The second histogram (Figure 14) shows the total number of completed EMA sessions (y-axis) across participants (x-axis). Median (Q1; Q3) total of completed EMA sessions was 34 (8,00; 58,50) with a minimum of three and a maximum of 63 sessions. Participant 1 and 3 had the most technical issues with the app, resulting in the lowest number of completed EMA sessions.

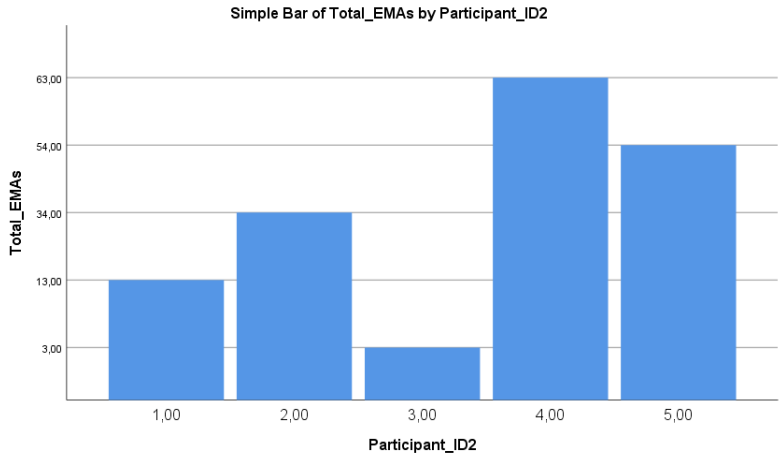

Figure 14: Barchart - Total EMA sessions per participant

The following graph (Figure 15) shows the number of session per day (y-axis) per participant in a clustered bar chart. To acquire this graph, variables on the x- and y-axis are long-format data from the adherence data file, which includes both long- and wide-format date. 'Participant_ID' is the long-format version of participant ID. On the x-axis, the numbers one to

15 indicate the day of data collection (Monday – Friday, repeated three times). The first day for each participant was day one of the data collection. Sessions per day indicate only the valid sessions, thus excluding session with technical errors or sessions that were incomplete. This leads to no bar charts on some days for some participants.

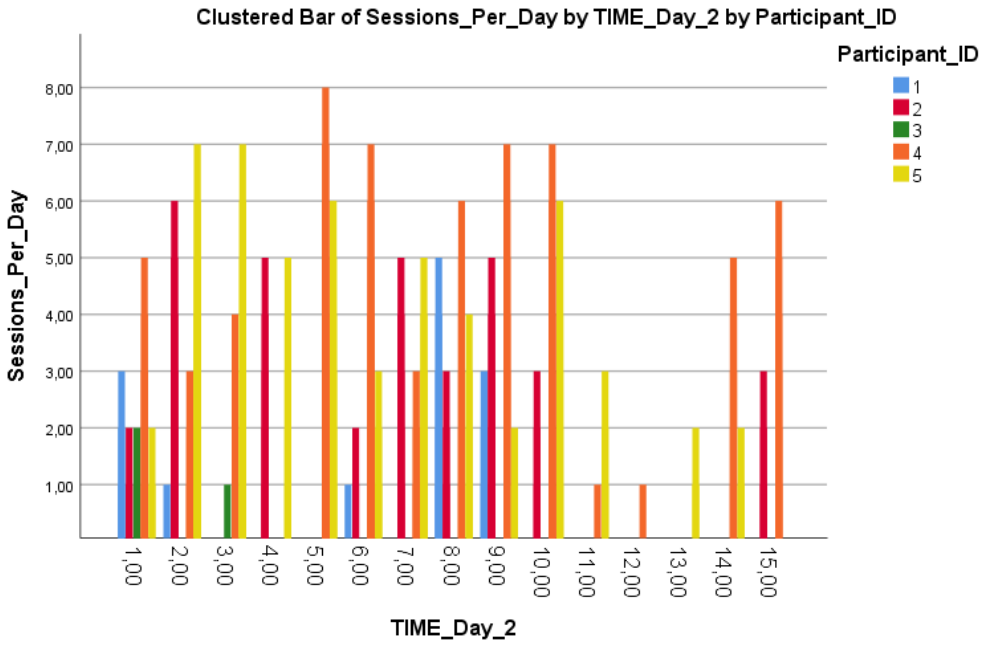

Figure 15: Clustered Barchart - number of EMA session per day per participant

The last histogram (Figure 16) shows (wide-format data) the number of days off (y-axis) per participant, with an indication of the total number of days with valid EMA sessions (x-axis). Value labels were added to give a better view of how many days off there were in comparison to the number of valid participated days. This means for example that participant 2 had nine days of completed EMA sessions and six days off, coming to a total of 15 days. Median (Q1; Q3) number of days off was one (0,50; 4,50) with a minimum of zero days of and a maximum of six days.

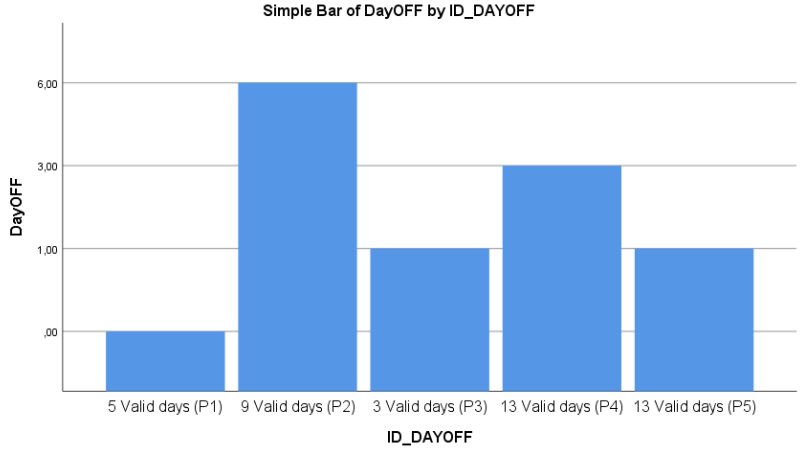

Figure 16: Barchart - Days off per participant with indication of the number of valid days

The focus with adherence for the thesis lies with the evening session. This is where questions about perceived WLB, defined by WIPL and PLIW, were asked. Also, social support is asked as well during these evening sessions. Table 7 show the total frequencies of valid EMA sessions per condition. The ones of interest are the bottom two lines.

Table 7: Frequency of EMA sessions per condition

	Frequency	Valid percentage
Morning, without stressful event	17	10,2
Morning, WITH stressful event	9	5,4
Daytime, without stressful event	80	47,9
Daytime, WITH stressful event	27	16,2
Evening, without physical symptoms	23	13,8
Evening, WITH physical symptoms	11	6,6
Total	*167*	*100,0*

Further adherence analysis was done by analysing the time it took to complete one full EMA evening session (hours:minutes:seconds,milliseconds). There are two types of evening sessions. When the questions of the physical symptoms checklist were answered with ‘no’, there were no follow-up questions. This condition is called ‘evening, without physical symptoms’ (Table 7) and occurred 23 times across participants. When answered with ‘yes’ (either one or two symptoms), follow-up questions were asked. This condition is called ‘evening, with physical symptoms’ (Table 7), and occurred 11 times across participants. The boxplots show the participant ID (long-format) on the x-axis and total completion time on the y-axis (long-format variable).

Figure 17 (evening, without physical symptoms) shows for participant 1 and 3 that there was no data available. Either this was because of technical issues, incomplete data or there were no evening sessions asked.

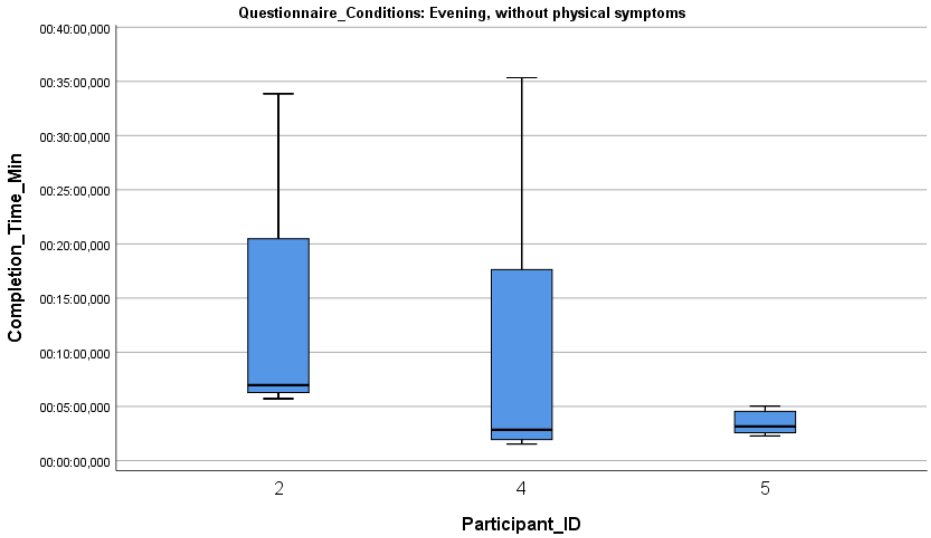

Figure 17: Boxplot - Completion time (hh:mm:sec,millisec) evening, without physical symptoms per participant

Figure 18 (evening, with physical symptoms) shows only a large boxplot, with long whiskers and singular lines. However, the whisker of participants 4 extends to a maximum completion time during one of the sessions of 13 hours, 18 minutes, 50 seconds and 96 milliseconds. This happened because the last question of the evening session was ignored until the morning of the next day. This makes the session itself complete, but with extended completion time. Since this case was extreme, a second boxplot was made reporting the value above as missing. This results in Figure 19.

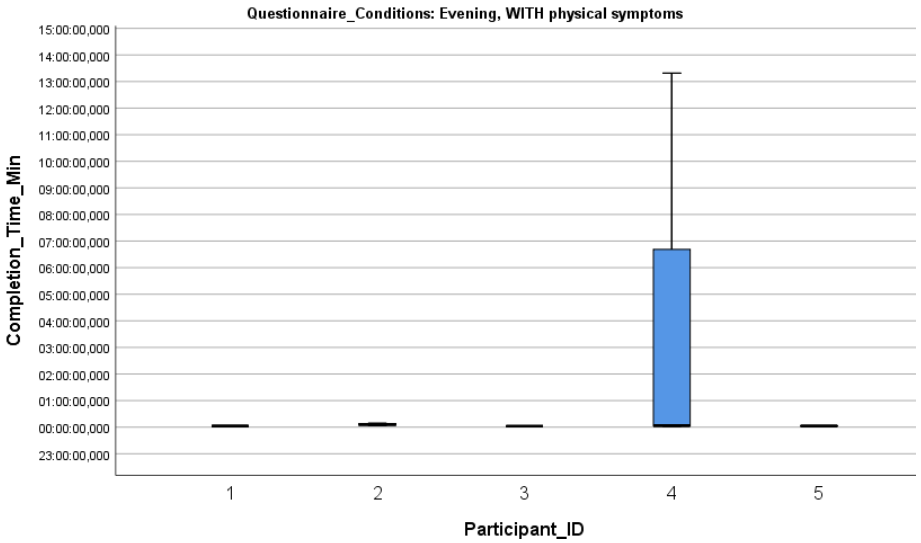

Figure 18: Boxplot - Completion time (hh:mm:sec,millisec) evening, with physical symptoms per participant

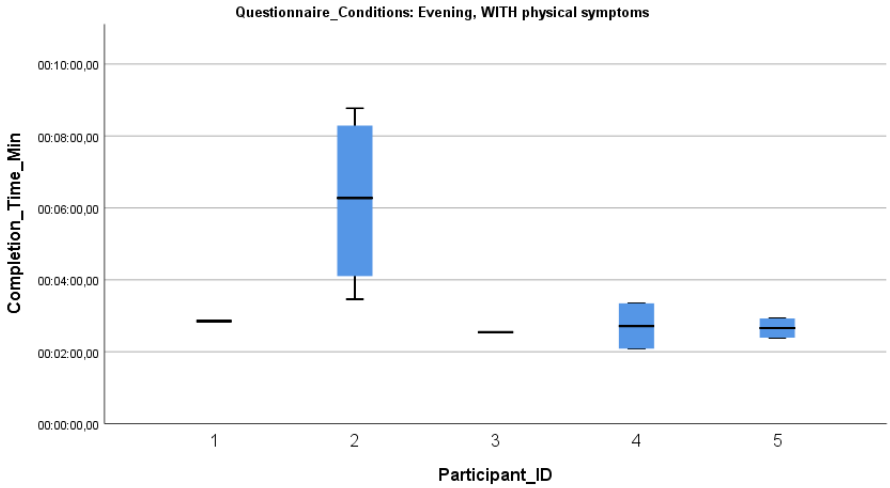

Figure 19: Boxplot - Completion time (hh:mm:sec,millisec) evening, with physical symptoms per participant (ADAPTED)

Table 8: Descriptives Total Completion Time

Condition			Participants				
		Characteristics of distribution	1	2	3	4	5
Total completion Time	Evening Q, without symptoms	Median (IQR)	-	0:06:58,23 (0:21:10,29)	-	0:02:50,86 (0:22:52,30)	0:03:09,15 (0:02:00,85)
		Min	-	0:05:42,57	-	0:01:32,08	0:02:16,27
		Max	-	0:33:51,37	-	0:35:20,46	0:05:02,27
	Evening Q, WITH symptoms	Median (IQR)	-	0:06:16,61 (0:04:44,87)	-	0:03:20,64 (-)	0:02:39,55 (-)
		Min	0:02:51,02	0:03:27,65	0:02:32,57	0:02:05,21	0:02:23,44
		Max	0:02:51,02	0:08:46,24	0:02:32,57	13:18:50,96	0:02:23,44
	Evening Q WITH symptoms ADAPTED	Median (IQR)				0:02:42,92 (-)	
		Min				0:02:05,21	
		Max				0:03:20,64	

Table 8 shows that the median completion time for evening, without physical symptoms for participant 1 and 3 could not be calculated since there were no data points. Median (IQR) completion time for participant 2 was 0:06:58,23 (0:21:10,29), for participant 4 it was 0:02:50,86 (0:22:52,30), and for participant 5 it was 0:03:09,15 (0:02:00,85).

Median completion time for evening, with physical symptoms for participant 1 and 3 could not be calculated since there was only one data point for each participant. For participant 1 total completion time (based on one session) was 0:02:51,02. For participant 3 this was 0:02:32,57. Median (IQR) completion time for participant 2 was 0:06:16,61 (0:04:44,87), for. participant 4 it was 0:03:20,64 (IQR= undefinable), and for participant 5 it was 0:02:39,55 (IQR= undefinable). With the adaptation, listing the high completion time as missing, median completion time for participant 4 was 0:02:42,92 (IQR= undefinable).

Hereafter, the variable delay in response is analysed. This is the time it took for participants to start answering the questions of a session after its pop-up on the app (hours:minutes:seconds,milliseconds). Since that goal here is to see the median delay in response (y-axis, long format) per participant (x-axis, long-format), there is no need to categorise this by questionnaire conditions (evening with or without physical symptoms). The boxplot (Figure 20) shows that for participant 3 there is insufficient data (one data point) to create a boxplot. Furthermore, there are several outliers for all the other participants.

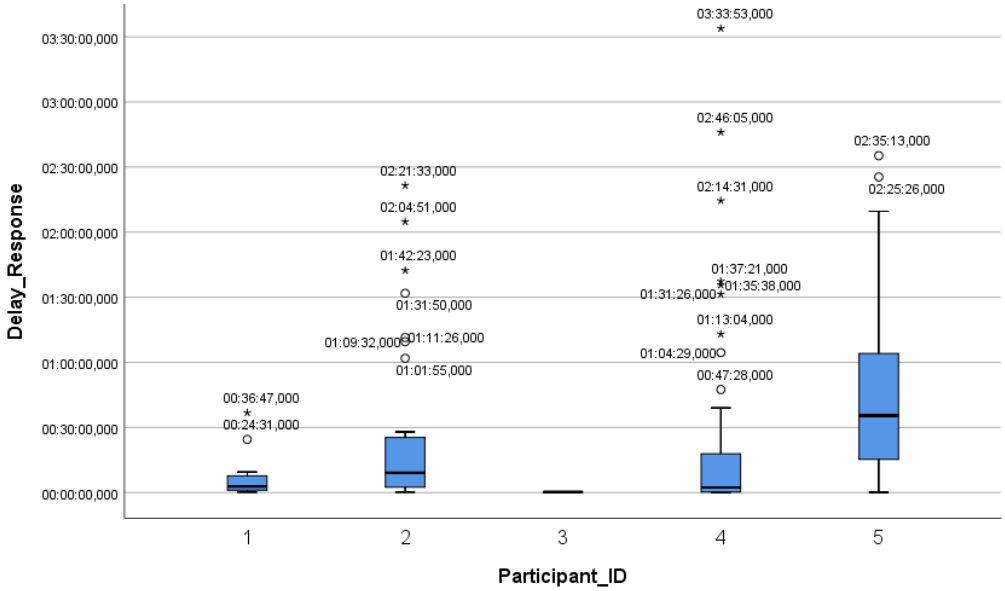

Figure 20: Boxplot - Delay in Response

Table 9: Descriptives Delay in Response

	Participants				
	1	2	3	4	5
Median (IQR)	0:02:51,00 (0:07:52,00)	0:09:06,50 (0:23:43,25)	0:00:16,00 (-)	0:02:20,00 (0:17:46,00)	0:35:29,00 (0:51:42,25)

Table 9 shows the median (IQR) delay in response for participant 1 was 0:02:51,00 (0:07:52,00). For participant 2 it was 0:09:06,50 (0:23:43,25). For participant 3 it was 0:00:16,00 (IQR= unidentifiable). For participant 4 it was 0:02:20,00 (0:17:46,00). Lastly, for participant 5 it was 0:35:29,00 (0:51:42,25).

The last adherence analysis was a correlation analysis between the mean number of completed EMA session per day, per participant and total baseline WLB. Baseline WLB was calculated summing up the total scores of baseline WIPL, PLIW and WPLE (Yusuf, 2018). The absolute minimum score that can be obtained with the WLB questionnaire is 15, the absolute highest is 75. However, this is different from the actual lowest and highest perceived WLB

possible. Since reversed scoring is used in several questions the lowest perceived WLB possible is 19, the highest perceived WLB possible is 71. The former represents the possible range of the x-axis (Figure 21). The calculations for these ranges are done by looking at the formulation of the questions and the possible responses, keeping reversed scoring in mind. The y-axis total EMA sessions is here defined with value labels, indicating the participants with their corresponding mean number of EMA sessions per day.

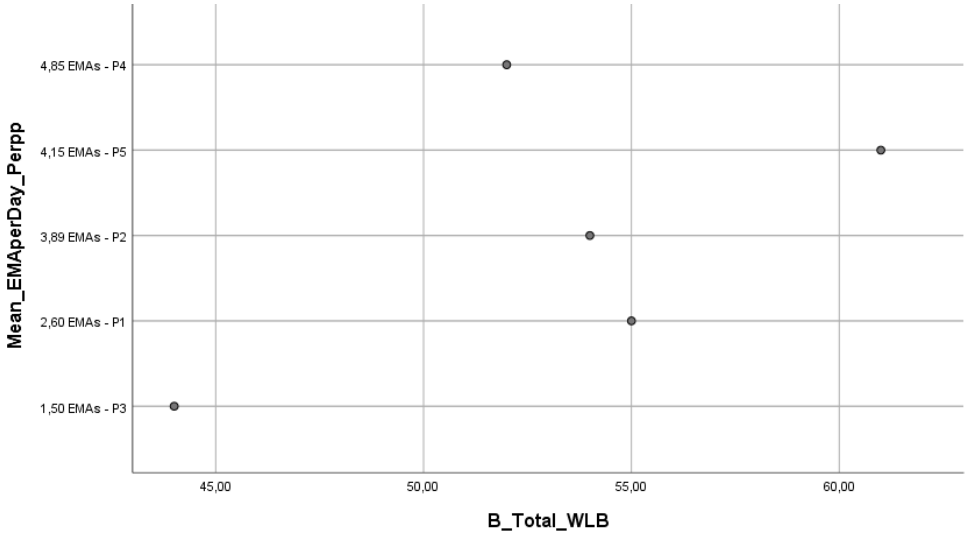

Figure 21: Scatterplot Mean EMA per day per participant in relation to total baseline WLB

Table 10: Correlation - Baseline WLBxMean EMA per day per participant

			B_Total_WLB	Mean_EMAperDay_Perpp
Spearman's rho	*B_Total_WLB*	Correlation Coefficient	1,000	0,300
		Sig. (2-tailed)	.	0,624
		N	5	5
	Mean_EMAperDay_Perpp	Correlation Coefficient	0,300	1,000
		Sig. (2-tailed)	0,624	.
		N	5	5

Data from Spearman correlation analysis (Table 10) show no statistically significant correlation between total WLB mean number of completed EMA session per day, per participant ($r = 0,30$, $p = 0,62$).

6. Discussion and limitations

This thesis was based on the pilot study protocol of the STRAW-Project. Data was gathered from the first cohort of five participants. The paper at hand sought anwers to the following research questions *(1) Is there a correlation between underlying experience of work-life balance among personnel employed in an academic sector and the experience of day-to-day work-life balance? And (2) Is participants' adherence towards the day-to-day EMA protocol influenced by the underlying experience of work-life balance?* Due to the small sample size the findings are of low statistical power and should be interpreted with caution. They are rather tentative.

Demographic results

The demographic results immediately show one of the limitations of the thesis as part of the pilot study of the STRAW-Project. Technical delays of the app development and the Covid-19 emergence resulted in only five, all female, participants instead of the presumed 15. However, the baseline data gathered of these participants was complete due to a meticulous survey design, which did not allow participants to skip questions.

Data showed none of the participants had children and median age was relatively young (28,66). The data set was too small to test differences between age groups or marital status and there is too little variety in categories for this as well. This could be a point of interest in the later stages of the study.

Although all participants had a working contract of 38 hours per week, two participants worked 20% (or more) longer than this. However, due to limited data, no significant differences can be analysed. This could be interesting to analyse in the further stages of the STRAW-Project. Even researching a correlation between these extended working hours and perceived WLB, either at baseline or day-to-day could be an opportunity (Fontinha et al., 2019).

Considering baseline WLB, a higher score means a higher perceived balance between work and personal life. Literature does not report any cut off values of what is considered good or poor WLB (Fisher-McAuley et al., 2003; Yusuf, 2018). The highest positive score of WLB can be obtained by counting the largest number for positive items and the lowest for negative items and vice versa for the lowest negative score. This comes to 71 as the highest positive WLB score and 19 as the lowest negative WLB score. The closer to 71 the better the perceived WLB. Median value between 19 and 71 is 45.

Correlation

Data from the evening sessions were limited. Because these type of questions were only asked once at the end of each day. In an ideal situation, this would have produced 15 data points for each participant, with a total of 75 data points. One of the limitations of this thesis is that there were still technical issues that had to be dealt with in the course of this first cohort of participants. Leading to more incomplete data and errors. This resulted in only 44 valid data points for the evening questionnaire.

With the correlation analysis, there were only four significant associations. The first two between day-to-day and baseline WIPL and PLIW; where a higher baseline value resulted in a higher day-to-day value for these dimensions of WLB. The second two occurred with the crude model analysis of day-to-day and baseline WIPL and PLIW independent of time-variable week.

However, even though these results are significant, no conclusion must be drawn from this. Firstly, because of reasons of limited data, explained above. Secondly, in the case of WIPL, there were always problems with convergence. This means there was not enough data to run this test. However, the test was still carried out, but output has questionable validity. Therefore, the significant data is not to be interpreted as such. No definite conclusions can be drawn from these analyses. They are however an indication of how data could be analysed in a later phase of the STRAW-Project.

Adherence

Since data analysis for adherence was more descriptive, there are no statistical conclusion that can be drawn from the first part. Going more in-depth on the days off registered; It is interesting to see that participant 2 who had valid data for 9 days reported to have a day off on six occasions. So, 40% of the participated days were days off. The reason for this is unknown. Possibly this had something to do with the app, causing a decrease in willingness to adhere to the app. However, these are speculations. Although this was not possible to analyse in the thesis, absenteeism because of stress (Leonardi et al., 2002; Godin & Kittel, 2004) could be an explanation for these results. Analysing the amount of stress, WLB, and the days off could be of interest for the overall STRAW-Project.

Completion time analysis shows that most EMA evening sessions had a median completion time of around three minutes. The one session that took over 13 hours to complete is special in that case that it might show some poorer adherence to the protocol. The last question was not answered until the next morning. It stands out that participant 2 had a higher median time to complete the questionnaires. Also for delay in response, this participant had the highest median delay in response time. What this means, and if there is a relation between those two

variables or if another factor like work-life balance influences this is unsure. Due to the small dataset, this was not relevant to analyse further at this point.

Concerning the scatterplot of correlation, for these participants, it shows that the person with the highest baseline WLB had amongst the highest mean EMA sessions per day. The one with the lowest baseline WLB also had the lowest mean EMA sessions per day. However, no conclusion on this can be made since correlation analysis was not significant for these variables.

Although there were difficulties with the app which made it difficult for some participants to adhere fully to the protocol, this study approach is still valuable. Even though there are missings, the app still measured experiences in the real-time setting which allow for more accurate answers from participants with limited recall bias (Yang et al., 2018).

Other limitations

It has already been mentioned that due to the Covid-19 pandemic this research has not been conducted as previously planned. It has resulted in a small cohort of only five participants since the start of the next cohort was planned after the lockdown was issued. Therefore, the conclusions and significant results are of low power. They should be treated as a possible indication of what might be seen in a later phase of the study.

There are other limitations to this study. For the WLB questionnaire, there is no official Dutch version that has been validated. The first 11 questions were translated by Honingh (2015) as part of a master' thesis. Due to back-translation from English to Dutch, there is a possibility that this might lead to a decrease in internal validity. This also applies for the remaining four questions that were translated as a part of the thesis.

Participants that completed this study were recruited by the leading researchers via email. These people are part of the close network of the main researchers of the STRAW-Project. So, there is a form of selection bias. However, these participants were able to give valuable feedback on different aspects of the overall STRAW-Project. This made it possible to change minor difficulties in data collection. This will probably result in better adherence and completion of both, baseline and EMA questionnaires, and hopefully result in a more reliable outcome of the STRAW-Project.

Concerning EMA sessions, only valid sessions are included. So, if at any time technical issues occurred or participants swiped away during sessions for a repeated number of times, the

session was considered invalid. The amount of valid sessions was 167 across participants. However, our original files showed over 500 sessions across participants. So technical errors and incomplete session are factors that could be linked to poor adherence (e.g. questionnaires being swiped away). Unfortunately, it was not possible at this time to differentiate between technical issues, swiping away, or not answering at all. This is something that the overall STRAW-Project might consider to focus on.

7. Conclusions

This thesis tried to find a correlation between overall (baseline) experience of WLB, among personnel employed in an academic sector, and the experienced day-to-day WLB. Results of this, albeit small, cohort show a possible significant positive effect of baselines' WLB dimension WIPL on day-to-day experienced WIPL (β = 0,74, 95% CI= 0,26 - 1,22, p= 0,004). A higher baseline WIPL is associated here with higher day-to-day WIPL. The crude model also shows this possible significant association as independent from the week variable. Which was expected due to the observational nature of the study. For PLIW these associations were not as significant.

Concerning adherence to the protocol, no significant correlation between overall (baseline) WLB and the mean number of EMA sessions per day, per participant was found. However, the scatterplot associated with this might show a positive linear correlation; the higher the baseline WLB, the higher the number of mean total EMA sessions. Other than that, higher completion times and delays in response could be indicators of poorer adherence.

It should be noted that all these formulated conclusions are based on a small sample. Due to this, the reader should be very critical when reading and interpreting these results. The small sample size and consequences of this for the validity of all results is a problem that the researchers were aware of upon writing this thesis.
However, the thesis at hand gives an overview of the analyses that are of interest to the overall STRAW-Project and how these can be interpreted.

In general, the study contributes to science with a methodologic pathway of analysing adherence to a high-frequency EMA protocol. The EMA method used was specifically designed for the overall STRAW-Project. By focussing on one questionnaire, there was the opportunity to have a more in-depth analysis approach, which can be used to analyse all other questionnaires within the STRAW-Project. Besides this, the thesis sheds a light on the possible correlation of underlying WLB and day-to-day perceived WLB.

1. Recommendations

Concerning the available literature, it might be advisable for researches to come to a better conceptualisation of WLB and WFC and their relation. Inconsistencies in the literature make it difficult to interpret results from studies and extrapolate these findings to other settings. Other than that, a more uniform use of measurement tools for these concepts is advisable. The rise of interest in concepts related to work and stress would possibly benefit from this.

With the Covid-19 pandemic and the rise in people teleworking, it could be a point of interest in later research to find out more about the relation between teleworking and WLB (Hill et al.,1998).

Moving forward, the STRAW-Project might consider using different demographic variables as covariates when analysing day-to-day WLB in correlation to other concepts like job control, sleep, contract working hours vs. actual working hours, etc. Analysing the relations between WLB, job stress, and number of days off might give an idea of absenteeism, due to either job stress, poor WLB, or other variables.
With more data available for the overall STRAW-Project, within-person analyses might be of interest as well. With the academic population, it is advised to look into tenure and higher ranks and the relation to WLB, since literature is inconsistent.
Furthermore, it is recommended to look into ways of analysing the technical issues on a higher level. This way a clearer analysis of the feasibility of the EMA protocol will be possible.
If future research within the STRAW-project keeps these limitations above and listed recommendations in mind, it will contribute valuable results to the research areas of WLB and EMA studies.

8. Reference list

Aalim, P. N., & Ambily, R. (2019). A Descriptive Study on Mental Stress, Time-Management & Worklife-balance among Ph. D. Scholars. *Indian Journal of Public Health Research & Development,* 10(7), 1308-1312. https://doi.org/10.1155/2019/5046934

Acute vs. chronic stress – CESH / CSHS. (n.d.). Retrieved December 1, 2019, from https://humanstress.ca/stress/understand-your-stress/acute-vs-chronic-stress/

Allen, T. D., French, K. A., Dumani, S., & Shockley, K. M. (2019). A cross-national meta-analytic examination of predictors and outcomes associated with work-family conflict. *The Journal of applied psychology*. https://doi.org/10.1037/apl0000442

Allen, T.D., Herst, D.E.L., Bruck, C.S., and Sutton, M. (2000). Consequences Associated With Work-to-Family Conflict: A Review and Agenda for Future Research. *Journal of Occupational Health Psychology*, 5, 278–308. https://doi.org/10.1037//1076-8998.5.2.278

American Psychological Association. (2019). Stress effects on the body. Retrieved November 23, 2019, from http://www.apa.org/helpcenter/stress-body

Anderson, S. E., Coffey, B. S., & Byerly, R. T. (2002). Formal Organizational Initiatives and Informal Workplace Practices: Links to Work-Family Conflict and Job-Related Outcomes. *Journal of Management*, 28(6), 787-810. https://doi.org/10.1177/014920630202800605

Backé, E. M., Seidler, A., Latza, U., Rossnagel, K., & Schumann, B. (2012). The role of psychosocial stress at work for the development of cardiovascular diseases: a systematic review. *International archives of occupational and environmental health*, *85*(1), 67-79. https://doi.org/10.1007/s00420-011-0643-6

Baker, D. B. (1985). The study of stress at work. *Annual review of public health*, *6*(1), 367-381. https://doi.org/10.1146/annurev.pu.06.050185.002055

Barkhuizen, N., & Rothmann, S. (2008). Occupational Stress of Academic Staff in South African Higher Education Institutions. *South African Journal of Psychology*, 38(2), 321-336. https://doi.org/10.1177/008124630803800205

Basu, S., Qayyum, H., & Mason, S. (2017). Occupational stress in the ED: a systematic literature review. *Emergency Medicine Journal*, 34(7), 441-447. https://doi.org/10.1136/emermed-2016-205827

Baum, A. (1990). Stress, intrusive imagery, and chronic distress. *Health psychology : official journal of the Division of Health Psychology, American Psychological Association*, 9(6), 653-675. https://doi.org/10.1037//0278-6133.9.6.653

Bedeian, A. G., Burke, B. G., & Moffett, R. G. (1988). Outcomes of Work-Family Conflict Among Married Male and Female *Professionals. Journal of Management*, 14(3), 475-491. https://doi.org/10.1177/014920638801400310

Bell, A. S., Rajendran, D., & Theiler, S. (2012). Job stress, wellbeing, work-life balance and work-life conflict among Australian academics*. E-Journal of Applied Psychology*, 8(1), 25-37. https://doi.org/10.7790/ejap.v8i1.320

Bellavia, G., & Frone, M. (2005). Work-family conflict. In J. Barling, E. K. Kelloway, & M. Frone (Eds.), *Handbook of work stress* (pp. 185-221). Sage Publications.

Brotman, D. J., Golden, S. H., & Wittstein, I. S. (2007). The cardiovascular toll of stress*. Lancet (London, England)*, 370(9592), 1089-1100. https://doi.org/10.1016/s0140-6736(07)61305-1

Brough, P., Timms, C., O'Driscoll, M., Kalliath, T., Siu, O., Sit, C., & Lo, D. (2014). Work-life balance: A longitudinal evaluation of a new measure across Australia and New Zealand workers. *The International Journal of Human Resource Management*, 25, 2724-2744. https://doi.org/10.1080/09585192.2014.899262

Brunner, B., Igic, I., Keller, A. C., & Wieser, S. (2019). Who gains the most from improving working conditions? Health-related absenteeism and presenteeism due to stress at work. *The European Journal of Health Economics*, 20(8), 1165-1180. https://doi.org/10.1007/s10198-019-01084-9

Carson, R. L., Weiss, H. M., & Templin, T. J. (2010). Ecological momentary assessment: A research method for studying the daily lives of teachers. *International Journal of Research & Method in Education,* 33(2), 165-182. https://doi.org/10.1080/1743727X.2010.484548

Catano, V., Francis, L., Haines, T., Kirpalani, H., Shannon, H., Stringer, B., & Lozanzki, L. (2010). Occupational stress in Canadian universities: A national survey. *International Journal of Stress Management*, 17(3), 232-258. https://doi.org/10.1037/a0018582

Damaske, S., Zawadzki, M. J., & Smyth, J. M. (2016). Stress at work: Differential experiences of high versus low SES workers. *Social science & medicine (1982),* 156, 125-133. https://doi.org/10.1016/j.socscimed.2016.03.010

Darr, W., & Johns, G. (2008). Work strain, health, and absenteeism: a meta-analysis. *Journal of occupational health psychology*, 13(4), 293-318. https://doi.org/10.1037/a0012639

Empatica. (2014). *Comparison of Biopac ECG100C and Empatica E3.* Retrieved February 14, 2020 from https://empatica.app.box.com/s/yia9ircm3h9sbe5nwqe5k6guhqamlzl0

Eurofound (2017), *Sixth European Working Conditions Survey – Overview report (2017 update)*, Publications Office of the European Union, Luxembourg.

Fan, W., Moen, P., Kelly, E. L., Hammer, L. B., & Berkman, L. F. (2019). Job strain, time strain, and well-being: A longitudinal, person-centered approach in two industries. *Journal of Vocational Behavior*, 110, 102-116. https://doi.org/10.1016/j.jvb.2018.10.017

Farquharson, B., Bell, C., Johnston, D., Jones, M., Schofield, P., Allan, J., Ricketts, I., Morrisson, K., Johnston, M. (2013). Nursing stress and patient care: real-time investigation of the effect of nursing tasks and demands on psychological stress, physiological stress, and job performance: study protocol. *Journal of advanced nursing*, *69*(10), 2327-2335. https://doi.org/10.1111/jan.12090

Fisher, G. G. (2001). *Work/personal life balance: A construct development study*. Unpublished doctoral dissertation, Bowling Green State University, Bowling Green.

Fisher-McAulley, G., Stanton, J., Jolton, J., & Gavin, J. (2003, April 12). *Modelling the relationship between work life balance and organisational outcomes*. Paper presented at the Annual Conference of the Society for Industrial Organisational Psychology. Orlando.

Fontaine, J., Mascagni, T., Mangelschots, S., Kittel, F., & Godin, I. (2019). *De impact van organisationele veranderingen en resulterende jobstress op somatisatie, biologie en absenteïsme*. Tech. Rep. No. PS/15. Brussel, Politique Scientifique Fédérale – Federaal Wetenschapsbeleid.

Fontinha, R., Easton, S. and Van Laar, D. (2019) Overtime and quality of working life in academics and non-academics: the role of perceived work-life balance. *International Journal of Stress Management*, 26 (2); 173-183. https://doi.org/10.1037/str0000067

French, K. A., Dumani, S., Allen, T. D., & Shockley, K. M. (2018). A meta-analysis of work-family conflict and social support. *Psychological bulletin*, 144(3), 284-314. https://doi.org/10.1037/bul0000120

Frone, M. (2003). Work-Family Balance. In J.C. Quick and L.E. Tetrick (Eds.), *In Handbook of Occupational Health Psychology* (pp. 143-162). Washington, DC: American Psychological Association. https://doi.org/10.1037/10474-007

Geurts, S. A. E., Taris, T. W., Kompier, M. A. J., Dikkers, J. S. E., Van Hooff, M. L. M., & Kinnunen, U. M. (2005). Work-home interaction from a work psychological perspective: Development and validation of a new questionnaire, the SWING. *Work & Stress*, 19(4), 319-339. https://doi.org/10.1080/02678370500410208

Gillespie, N. A., Walsh, M., Winefield, A. H., Dua, J., & Stough, C. (2001). Occupational stress in universities: Staff perceptions of the causes, consequences and moderators of stress. *Work & Stress, 15*(1), 53-72. https://doi.org/.1080/02678370117944

Godin, I., & Kittel, F. (2004*).* Differential economic stability and psychosocial stress at work: associations with psychosomatic complaints and absenteeism. *Social science & medicine*, 58(8), 1543-1553. https://doi.org/10.1016/s0277-9536(03)00345-9

Gooding, P. L. T., Callan, M. J., & Hughes, G. (2018). The association between believing in free will and subjective well-being is confounded by a sense of personal control. *Frontiers in psychology*, 9(623). https://doi.org/10.3389/fpsyg.2018.00623

Greenhaus, J. H., & Beutell, N. J. (1985). Sources of conflict between work and family roles. *The Academy of Management Review*, 10(1), 76-88. https://doi.org/10.2307/258214

Hayman, J. (2005). Psychometric assessment of an instrument designed to measure work life balance. *Research and practice in human resource management*, 13(1), 85-91. https://doi.org/20.500.11937/46385

Higgins, C., Duxbury, L., & Johnson, K.(2004). *Exploring the Link Between Work-Life Conflict and Demands on Canada s Health Care System*. (Rep. No. 3). Ottawa, Health Canada

Hill, e. j., Miller, b. c., Weiner, s. p., & Colihan, j. (1998). Influences of the virtual office on aspects of work and work/life balance. *Personnel Psychology,* 51(3), 667-683. https://doi.org/10.1111/j.1744-6570.1998.tb00256.x

Honingh, M. (2015) *Het Nieuwe Werken en haar schaduwzijden*. Unpublished master's thesis, University of Amsterdam, Amsterdam, The Netherlands

Innes, K. E., Vincent, H. K., & Taylor, A. G. (2007). Chronic stress and insulin resistance-related indices of cardiovascular disease risk, part I: neurophysiological responses and pathological sequelae. *Alternative Therapies in Health & Medicine*, 13(4), 46-52.

Karasek, R., Baker, D., Marxer, F., Ahlbom, A., & Theorell, T. (1981). Job decision latitude, job demands, and cardiovascular disease: a prospective study of Swedish men. *American Journal of Public Health*, 71(7), 694-705. https://doi.org/10.2105/ajph.71.7.694

Kinman, G. (2001). Pressure Points: A review of research on stressors and strains in UK academics. *Educational psychology*, 21(4), 473-492. https://doi.org/10.1080/01443410120090849

Kinman, G., & Jones, F. (2008). A Life Beyond Work? Job Demands, Work-Life Balance, and Wellbeing in UK Academics. *Journal of Human Behavior in the Social Environment*, 17(1-2), 41-60. https://doi.org/10.1080/10911350802165478

Kinman, G., & Wray, S. (2015). *Work-related wellbeing in UK Higher Education-2014. University and College Union*. https://doi.org/10.13140/RG.2.2.24867.76321

Kivimäki, M., & Kawachi, I. (2015). Work Stress as a Risk Factor for Cardiovascular Disease. *Current cardiology reports*, *17*(9), 630. https://doi.org/10.1007/s11886-015-0630-8

Kornitzer, M., deSmet, P., Sans, S., Dramaix, M., Boulenguez, C., DeBacker, G., Ferrario, M., Houtman, I., Isacsson, S. O., Ostergren, P. O., Peres, I., Pelfrene, E., Romon, M., Rosengren, A., Cesana, G., Wilhelmsen, L. (2006). Job stress and major coronary events: results from the Job Stress, Absenteeism and Coronary Heart Disease in Europe study. *European journal of cardiovascular prevention and rehabilitation: official journal of the European Society of Cardiology, Working Groups on Epidemiology & Prevention and Cardiac Rehabilitation and Exercise Physiology*, 13(5), 695-704. https://doi.org/10.1097/01.hjr.0000221865.19415.e9

Kushlev, K., & Dunn, E. W. (2015). Checking email less frequently reduces stress. *Computers in Human Behavior,* 43, 220-228. https://doi.org/10.1016/j.chb.2014.11.005

Lazarus, R. S. (2006). Stress and emotion: A new synthesis. Springer Publishing Company.

Le Fevre, M., Matheny, J., & Kolt, G. S. (2003). Eustress, distress, and interpretation in occupational stress. *Journal of Managerial Psychology*, 18(7/8), 726-744. https://doi.org/10.1108/02683940310502412

Leontaridi, R. M., & Ward-Warmedinger, M. E. (2002). *Work-related stress, quitting intentions and absenteeism* (Discussion paper No. 493). Retrieved from The Institute for the Study of Labor website: http://ftp.iza.org/dp493.pdf

Levecque, K., Anseel, F., De Beuckelaer, A., Van der Heyden, J., & Gisle, L. (2017). Work organization and mental health problems in PhD students. *Research Policy*, 46(4), 868-879. https://doi.org/10.1016/j.respol.2017.02.008

Lindfelt, T., Ip, E. J., Gomez, A., & Barnett, M. J. (2018). The impact of work-life balance on intention to stay in academia: Results from a national survey of pharmacy faculty. *Research in social & administrative pharmacy: RSAP*, 14(4), 387-390. https://doi.org/10.1016/j.sapharm.2017.04.008

Lunau, T., Bambra, C., Eikemo, T. A., van der Wel, K. A., & Dragano, N. (2014). A balancing act? Work–life balance, health and well-being in European welfare states. *European journal of public health*, 24(3), 422-427. https://doi.org/10.1093/eurpub/cku010

Makhija, M., Arvind, S., & Sinha, S. (2016). A day in the life of a professional medical writer: An online survey-based study. *Current Medical Research and Opinion*, 32, S7-S7.

Manning, M. R., & Osland, J. S. (1989). The relationship between absenteeism and stress. *Work & Stress*, 3(3), 223-235. https://doi.org/10.1080/02678378908251558

Martinez, E., Ordu, C., Della Sala, M. R., & McFarlane, A. (2013). Striving to obtain a school-work-life balance: The full-time doctoral student. *International Journal of Doctoral Studies,* 8(39-59). https://doi.org/10.28945/1765

McCarthy, C., Pradhan, N., Redpath, C., & Adler, A. (2016, 29-31 May 2016). *Validation of the Empatica E4 wristband*. Paper presented at the 2016 IEEE EMBS International Student Conference (ISC)

McIntyre, T. M., McIntyre, S. E., Barr, C. D., Woodward, P. S., Francis, D. J., Durand, A.C., Mehta, P., Kamarck, T. W. (2016). Longitudinal study of the feasibility of using ecological momentary assessment to study teacher stress: Objective and self-reported measures. *Journal of Occupational Health Psychology*, 21(4), 403-414. http://dx.doi.org/10.1037/a0039966

McManus, I. C., Winder, B. C., & Gordon, D. (2002). The causal links between stress and burnout in a longitudinal study of UK doctors. *The Lancet*, 359(9323), 2089-2090. https://doi.org/10.1016/s0140-6736(02)08915-8

McNall, L. A., Nicklin, J. M., & Masuda, A. D. (2010). A Meta-Analytic Review of the Consequences Associated with Work–Family Enrichment. *Journal of Business and Psychology,* 25(3), 381-396. https://doi.org/10.1007/s10869-009-9141-1

Netemeyer, R., Boles, J., & McMurrian, R. (1996). *Development and Validation of Work-Family and Family-Work Conflict Scales* (Vol. 81).

Padilla, M. A., & Thompson, J. N. (2016). Burning Out Faculty at Doctoral Research Universities. *Stress and health: journal of the International Society for the Investigation of Stress*, 32(5), 551-558. https://doi.org/10.1002/smi.2661

Peeters, M. C. W., Montgomery, A. J., Bakker, A. B., & Schaufeli, W. B. (2005). Balancing Work and Home: How Job and Home Demands Are Related to Burnout. *International Journal of Stress Management*, 12(1), 43-61. https://doi.org/10.1037/1072-5245.12.1.43

Porter, M., Hagan, H., Klassen, R., Yang, Y., Seehusen, D. A., & Carek, P. J. (2018). Burnout and Resiliency Among Family Medicine Program Directors. *Family medicine*, 50(2), 106-112. https://doi.org/10.22454/FamMed.2018.836595

Salami, S. O. (2011). Job stress and burnout among lecturers: Personality and social support as moderators. *Asian Social Science*, 7(5), 110. https://doi.org/10.5539/ass.v7n5p110

Salvagioni, D. A. J., Melanda, F. N., Mesas, A. E., Gonzalez, A. D., Gabani, F. L., & Andrade, S. M. (2017). Physical, psychological and occupational consequences of job burnout: A systematic review of prospective studies. *PloS one*, 12(10), e0185781. https://doi.org/10.1371/journal.pone.0185781

Shields, M. (2006). Stress and depression in the employed population. *Health reports / Statistics Canada, Canadian Centre for Health Information = Rapports sur la santé / Statistique Canada, Centre canadien d'information sur la santé,* 17, 11-29.

Siegrist, J. (1996). Adverse health effects of high-effort/low-reward conditions. Journal of occupational health psychology, 1(1), 27-41. https://doi.org/10.1037//1076-8998.1.1.27

Singh, C., Cross, W., Munro, I., & Jackson, D. (2020). Occupational stress facing nurse academics-A mixed-methods systematic review. *Journal of clinical nursing*, 29(5-6), 720-735. https://doi.org/10.1111/jocn.15150

Smeltzer, S. C., Sharts-Hopko, N. C., Cantrell, M. A., Heverly, M. A., Jenkinson, A., & Nthenge, S. (2015). Work-life balance of nursing faculty in research- and practice-focused doctoral programs. *Nursing outlook*, 63(6), 621-631. https://doi.org/10.1016/j.outlook.2015.04.008

Smith, E., & Brooks, Z. (2014). *Graduate student mental health 2015*. Retrieved from http://nagps.org/wordpress/wp-content/uploads/2015/06/NAGPS_Institute_mental_health_survey_report_2015.pdf

Stone, A. A., & Shiffman, S. (1994). Ecological Momentary Assessment (Ema) in Behavioral Medicine. *Annals of Behavioral Medicin*e, 16(3), 199-202. https://doi.org/10.1093/abm/16.3.199

Thomas, L., & Ganster, D. (1995). Impact of Family-Supportive Work Variables on Work–Family Conflict and Strain: A Control Perspective. *Journal of Applied Psychology*, 80, 6-15. https://doi.org/10.1037/0021-9010.80.1.6

Tytherleigh, M. Y., Webb, C., Cooper, C. L., & Ricketts, C. (2005). Occupational stress in UK higher education institutions: a comparative study of all staff categories. *Higher Education Research & Development*, 24(1), 41-61. https://doi.org/10.1080/0729436052000318569

van Vegchel, N., de Jonge, J., Bosma, H., & Schaufeli, W. (2005). Reviewing the effort-reward imbalance model: drawing up the balance of 45 empirical studies. *Social science & medicine*, 60(5), 1117-1131. https://doi.org/10.1016/j.socscimed.2004.06.04

Winefield, A., Gillespie, N., Stough, C., Dua, J., Hapuarachchi, J., & Boyd, C. (2003). Occupational Stress in Australian University Staff: Results From a National Survey. *International Journal of Stress Management*, 10. https://doi.org/:10.1037/1072-5245.10.1.51

Yang, Y. S., Ryu, G. W., Han, I., Oh, S., & Choi, M. (2018). Ecological Momentary Assessment Using Smartphone-Based Mobile Application for Affect and Stress Assessment. *Healthc Inform Res*, 24(4), 381-386. https://doi.org/10.4258/hir.2018.24.4.381

Yusuf, S. (2018). A Comparative Study of Work-Life Balance and Job Satisfaction of the Employees Working in Business Process Outsourcing Sector. *IRA-International Journal of Management & Social Sciences* (ISSN 2455-2267), 2, 87-93. https://doi.org/10.21013/jmss.v10.n2.p3

Zaheer, A., Islam, J.U., & Darakhshan, N. (2016). Occupational Stress and Work-Life Balance: A Study of Female Faculties of Central Universities in Delhi, India. https://doi.org/ 10.11648/j.jhrm.20160401.11

9. Appendix

1. Appendix 1: Approval ethics committee

Afz.: Commissie voor Medische Ethiek

Maatschappelijke Gezondheidszorg
Prof. dr. Els CLAYS

Alhier

contact	telefoon	e-mail
Ann Haenebalcke Commissie voor medische Ethiek	+32 (0)9 332 22 66	Ethisch.comite@uzgent.be ann.haenebalcke@uzgent.be

Ons kenmerk	Uw kenmerk	datum	pagina
2019/1093		9-sep-19	1/2

Betreft :

Advies voor monocentrische studie met als titel:
STRAW Project: How does overall psychosocial stress influence day-to-day stress situations at work? - Scriptie: Rani Peeters

Belgisch Registratienummer: B670201940989

* Diverse, (Alle goedgekeurde documenten cfr. Project 2019/1091)
* Begeleidende brief dd. 10/07/2019
* Informatie- en waarschuwingsnota over de verwerking van informatie voor medisch-wetenschappelijk onderzoek dd. 19/07/2019 : Rani Peeters
* Antwoord onderzoekers dd 02/09/2019 op opmerkingen EC dd 14/08/2019
* Adviesaanvraagformulier : (Document E) (Ontvangen dd 29/07/2019) Versie 2

Advies werd gevraagd door:
Prof. dr. E. CLAYS ; Hoofdonderzoeker

BOVENVERMELDE DOCUMENTEN WERDEN DOOR HET ETHISCH COMITÉ BEOORDEELD. ER WERD EEN POSITIEF ADVIES GEGEVEN OVER DIT PROTOCOL OP 06/092019. INDIEN DE STUDIE NIET WORDT OPGESTART VOOR 05/09/2020, VERVALT HET ADVIES EN MOET HET PROJECT TERUG INGEDIEND WORDEN.
Vooraleer het onderzoek te starten dient contact te worden genomen met Bimetra Clinics (09/332 05 00).

THE ABOVE MENTIONED DOCUMENTS HAVE BEEN REVIEWED BY THE ETHICS COMMITTEE.A POSITIVE ADVICE WAS GIVEN FOR THIS PROTOCOL ON 06/09/2019. IN CASE THIS STUDY IS NOT STARTED BY 05/09/2020, THIS ADVICE WILL BE NO LONGER VALID AND THE PROJECT MUST BE RESUBMITTED.
Before initiating the study, please contact Bimetra Clinics (09/332 05 00).

DIT ADVIES WORDT OPGENOMEN IN HET VERSLAG VAN DE VERGADERING VAN HET ETHISCH COMITE VAN 17/09/2019
THIS ADVICE WILL APPEAR IN THE PROCEEDINGS OF THE MEETING OF THE ETHICS COMMITTEE OF 17/09/2019

° *Het Ethisch Comité werkt volgens 'ICH Good Clinical Practice' - regels*
° *Het Ethisch Comité beklemtoont dat een gunstig advies niet betekent dat het Comité de verantwoordelijkheid voor het onderzoek op zich neemt. Bovendien dient U er over te waken dat Uw mening als betrokken onderzoeker wordt weergegeven in publicaties, rapporten voor de overheid enz., die het resultaat zijn van dit onderzoek.*
° *In het kader van 'Good Clinical Practice' moet de mogelijkheid bestaan dat het farmaceutisch bedrijf en de autoriteiten inzage krijgen van de originele data. In dit verband dienen de onderzoekers erover te waken dat dit gebeurt zonder schending van de privacy van de proefpersonen.*
° *Het Ethisch Comité benadrukt dat het de promotor is die garant dient te staan voor de conformiteit van de anderstalige informatie- en toestemmingsformulieren met de nederlandstalige documenten.*
° *Geen enkele onderzoeker betrokken bij deze studie is lid van het Ethisch Comité.*

ALGEMENE DIRECTIE
Commissie voor Medische Ethiek

VOORZITTER:
Prof.dr. D. Matthys

SECRETARIS
Prof.dr. J. Decruyenaere

STAFMEDEWERKER
Muriel Fouquet
T +32(09) 332 33 36
Sara De Smet
T +32(09) 332 68 55
Sabine Van de Moortele
T +32(09) 332 68 54

SECRETARIAAT
Wendy Van de Velde
T +32(09) 332 56 13
Sandra De Paepe
T +32(09) 332 26 88
Ann Haenebalcke
T +32(09) 332 22 66

INGANG 75
ROUTE 7522

UZ GENT
UNIVERSITEIT GENT

Universitair Ziekenhuis Gent
C. Heymanslaan 10 | B 9000 Gent
www.uzgent.be

- *Alle leden van het Ethisch Comité hebben dit project beoordeeld. (De ledenlijst is bijgevoegd)*
- *The Ethics Committee is organized and operates according to the 'ICH Good Clinical Practice' rules.*
- *The Ethics Committee stresses that approval of a study does not mean that the Committee accepts responsibility for it. Moreover, please keep in mind that your opinion as investigator is presented in the publications, reports to the government, etc., that are a result of this research.*
- *In the framework of 'Good Clinical Practice', the pharmaceutical company and the authorities have the right to inspect the original data. The investigators have to assure that the privacy of the subjects is respected.*
- *The Ethics Committee stresses that it is the responsibility of the promotor to guarantee the conformity of the non-dutch informed consent forms with the dutch documents.*
- *None of the investigators involved in this study is a member of the Ethics Committee.*
- *All members of the Ethics Committee have reviewed this project. (The list of the members is enclosed)*

Namens het Ethisch Comité / On behalf of the Ethics Committee

Prof. dr. D. MATTHYS
Voorzitter / Chairman

CC: De heer T. VERSCHOORE - UZ Gent - Bimetra Clinics
FAGG - Research & Development; Victor Hortaplein 40, postbus 40 1060 Brussel

UZ GENT
UNIVERSITEIT GENT
Universitair Ziekenhuis Gent
C. Heymanslaan 10 | B 9000 Gent
www.uzgent.be

2. Appendix 2: Field work

UNIVERSITEIT GENT

FACULTEIT GENEESKUNDE EN GEZONDHEIDSWETENSCHAPPEN

Logboek veldwerk

Beschrijving veldwerk	Plaats (UGent of naam externe locatie)	Duur (X aantal uur of minuten)
Zoeken NL/ENG versies vragenlijsten en schalen	Thuis	3u
Vertalingen vragenlijsten en opstelling baseline screening	Thuis	5 uur 45 min
Aanpassing baseline questionnaire	Thuis	1 uur 30 min
Vertalen EMA, graph, veranderen baseline	Thuis	2u
Vertalen Excel file Questionnaire data	Thuis	2 uur 30 min
Digitaliseren van de baselinescreening via LimeSurvey	Thuis	8u
Testen van de app (gedurende 1 week + feedback) die de participanten zullen gebruiken	Thuis	45 min (voor de hele week + feedback)
Informed consent toevoegen aan baseline screening	Thuis	30 min
Zoeken NL versie WLB inventory	Thuis	3u
Vertalen scripts voor App	Thuis	30 min
Vertalen scripts + aanpassing Limesurvey (Utrecht vragen)	Thuis	30 min
Vertaling recovery experience + opzoeken volledige symptomschecklist + vertalen	Thuis	1u
Aanpassen baseline	Thuis	2u
Laatste hand aan baseline (gespreid over 2 weken)	Thuis	6u
Nalezen stay informed document	Thuis	30 min
Flyers rondbrengen	Campus Sterre	10 min
Flyers rondbrengen	Campus Blandijn en UFO	20 min
Limesurvey testen hoe data er uit komt + handleiding lezen	Thuis	1u
Data cleaning (part 1)	Thuis	2 uur 30 min
Data cleaning (part 2 + 3)	Thuis	9 uur 30 min + 1u
Codingbook samenstellen	Thuis	1u45 (33u45)
Data cleaning EMA (pp1)	Thuis	5 uur 30 min
Data cleaning EMA (pp3+4)	Thuis	10u45 (70u)

Gelieve het logboek veldwerk op te laden in Sparta tegen de deadline voor het indienen van de masterproef.

Approved and signed by co-promotor: Larissa Bolliger (PhD student)

Ghent, 21.05.20

3. Appendix 3: Effort Reward Imbalance Model (Van Vegchel, de Jonge, Bosma, & Schaufeli, 2005)

Appendix 3: ERI model

4. Appendix 4: Overview job quality indices and indicators (Eurofound, 2017)

Appendix 4: JQ indices

5. Appendix 5: List of Used Questionnaires EMA & Baseline

Table 11: List of Used Questionnaires EMA & Baseline

Baseline	EMA	Reference
General information, work-related information, health and well-being		Self-developed
Occupational Sitting and Physical Activity Questionnaire		Chau J, Van der Ploeg H, Dunn S, Kurko J, Bauman A. Validity of the occupational sitting and physical activity questionnaire. *Med Sci Sports Exerc*. 2012;44(1):118–125. https://doi.org/10.1249/MSS.0b013e3182251060.
Pittsburgh Sleep Quality Index	*Pittsburgh Sleep Quality Index*	Buysse, D.J., Reynolds III, C.F., Monk, T.H., Berman, S.R., & Kupfer, D.J. (1989). The Pittsburgh Sleep Quality Index: A new instrument for psychiatric practice and research. *Journal of Psychiatric Research*, 28(2), 193-213. https://doi.org/10.1016/0165-1781(89)90047-4
Job Content Questionnaire	*Job Content Questionnaire*	Karasek, R., Quintal, L. Brisson, C., Kawakami, N., Houtman, I., Bongers, P. & Amick, B. (1998). The Job Content Questionnaire (JCQ): An Instrument for Internationally Comparative Assessments of Psychosocial Job Characteristics. *Journal of Occupational Health Psychology*, Vol. 3, No. 4, 322-355. https://doi.org/10.1037/1076-8998.3.4.322
Effort Reward Imbalance Questionnaire		Siegrist, J., Starke, D., Chandola, T., Godin, I., Marmot, M., Niedhammer, I., & Peter, R. (2004). The measurement of effort–reward imbalance at work: European comparisons. *Social Science & Medicine,* 58(8), 1483-1499. https://doi.org/10.1016/S0277-9536(03)00351-4
Perceived Stress Scale		Cohen, S., Kamarck, T., & Mermelstein, R. (1983). A global measure of perceived stress. *Journal of Health and Social Behavior*, 24, 385-396. https://doi.org/10.2307/2136404
Short Form – 12		Ware, J., Jr., Kosinski, M., & Keller, S. D. (1996). A 12-Item short-form health survey: Construction of scales and preliminary tests of reliability and validity. Medical Care, 34(3), 220–233. https://doi.org/10.2307/3766749
Connor-Davidson Resilience Scale		Connor, K. M., & Davidson, J. R. (2003). Development of a new resilience scale: The Connor-Davidson resilience scale (CD-RISC). *Depression and anxiety*, *18*(2), 76-82. https://doi.org/10.1002/da.10113

COPE Inventory	*COPE Inventory*	Carver, C. S., Scheier, M. F., & Weintraub, J. K. (1989). Assessing coping strategies: a theoretically based approach. *Journal of personality and social psychology*, *56*(2), 267. https://doi.org/10.1037/0022-3514.56.2.267
Recovery Experience Questionnaire	*Recovery Experience Questionnaire*	Sonnentag, S. & Fritz, C. (2007). The Recovery Experience Questionnaire: Development and Validation of a Measure for Assessing Recuperation and Unwinding From Work. *Journal of Occupational Health Psychology,* 12(3):204-21. https://doi.org/10.1037/1076-8998.12.3.204
Utrecht Work Engagement Scale	*Utrecht Work Engagement Scale*	Schaufeli, W. B., Bakker, A. B., & Salanova, M. (2006). The measurement of work engagement with a short questionnaire: A cross-national study. *Educational and psychological measurement*, *66*(4), 701-716. https://doi.org/10.1177/0013164405282471
Perceptions of Fair Interpersonal Treatment Scale	*Perceptions of Fair Interpersonal Treatment Scale*	Donovan, M. A., Drasgow, F. & Munson, L.J. (1998). The Perceptions of Fair Interpersonal Treatment scale: Development and validation of a measure of interpersonal treatment in the workplace. *Journal of Applied Psychology*, Vol. 83, No. 5, 683-692. https://doi.org/10.1037/0021-9010.83.5.683
Work Life Balance Inventory	*Work Life Balance Inventory*	Hayman, J. (2005). Psychometric assessment of an instrument designed to measure work life balance. *Research and practice in human resource management*, *13*(1), 85-91.
	Larsen and Kasimatis' Symptoms Checklist	Larsen, R. J., & Kasimatis, M. (1991). Day-to-day physical symptoms: Individual differences in the occurrence, duration, and emotional concomitants of minor daily illnesses. *Journal of Personality*, 59, 387-423. https://doi.org/10.1111/j.1467-6494.1991.tb00254.x
	Positive and Negative Affect Schedule	Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: the PANAS scales. *Journal of personality and social psychology*, *54*(6), 1063. https://doi.org/10.1037/0022-3514.54.6.1063
	Stress Appraisal Measure	Peacock, E. J., Wong, P. T. P. (1990). The Stress Appraisal Measure (SAM): A Multidimensional Approach to Cognitive Appraisal, Stress Medicine, Volume 6, 227-236. https://doi.org/10.1002/smi.2460060308

Appendix 5: used questionnaires

6. Appendix 6: Demographic variables SPSS

Demographic variables	N or Median (Total N=5)
Sex	
Female	5
Male	0
Age	28,66
Range	[26,43 - 34,04]
Education Level	
High School	0
Bachelor	0
Master	4
Doctorate	5
Other	0
Marital status	
Married or living together with children	0
Married or living together without children	4
In a relationship, not living together with children	0
In a relationship, not living together without children	0
Single with children	0
Single without children	0
Other	1
Working hours contract	
38 hours	5
Actual working hours	
38 hours	3
48 hours	1
55 hours	1
Months at institution	
17	1
33	1
40	1
47	1
125	1

Appendix 6: Demographic variables

7. Appendix 7: Descriptives Baseline WLB

Descriptives: Baseline WLB dimensions and total

	WIPL	PLIW	WPLE	Sum_WLB
Median	24,00	16,00	13,00	54,00
Minimum	20,00	11,00	11,00	44,00
Maximum	31,00	19,00	16,00	61,00
25th percentile (Q1)	21,00	11,50	11,00	48,00
75 percentile (Q3)	28,50	19,00	15,50	58,00

Appendix 7: Descriptives Baseline WLB

8. Appendix 8: Coding book Correlation data

Coding book - Correlation BS and EMA	
General information	
ID	Number given to the participants in the pilot study (Ranging from 1 to 5)
_R	Recoded
_RR:	Double recoded (e.g. reversed scoring)
B_	Baseline variable
E_	EMA variable
Missing values	
99	Items not included in the day/evening questionnaire
999	Items not asked
9999	Items were visible, but not answered
8	'I have not seen my colleagues or supervisor' (Social support subscale - JCQ)
Value labels	
Subscale 'Sociale ondersteuning' → 8 = 'I have not seen my colleagues or supervisor'	8 will be treated as user missing, therefore it is indicated as missing in spss.* *this was scored in EMA as 4 and was then recoded to 8
Time columns	
TIME	Week, day and measuring moment (based on duration of the study) *e.g. When starting at Tuesday → Tuesday is day one of the study.*
TIME_Days	Days (based on duration of the study
TIME_Weeks	Weeks (based on duration of the study)
TIME_EMA	Ascending numbering of the measuring moments.
TIME_Calendar	Week, day and measuring moment (based on calendar dat) *e.g. Monday is always day 1, 6 and 11*
TIME_Calendar_Days	Days (based on calendar date)
TIME_Calendar_Weeks	Weeks (based on calendar date)
Extra information	
Question: 'Was er een bepaalde gebeurtenis	Answer NO: Only three items from the stressfulness scale.

die spanning veroorzaakte?’	Answer YES: Two items from Threat scale and two items from Challenge scale.
Recoding of EMA	EMA questionnaire likert-scale data which was had a set point of 0 instead of 1 (like in baseline questionnaires) war recoded to match baseline coding. *e.g. WLB EMA 0-4 → 1-5* *e.g. JCQ EMA 0-3 → 1-4*

Appendix 8: Coding Book - Correlation Data

10. List of Figures

11. List of Tables