Working from home during a global pandemic



Master thesis

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	psychological employee wellbeing in the context of telework during the				
	COVID-19 pandemic.				
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Preface

In front of you lies the master thesis 'Working from home during a global pandemic'. It has been written to fulfill the Master's program in Business Administration, specialization Marketing at the Radboud University Nijmegen. I would like to take the opportunity to thank especially my supervisor Prof. Dr. J. Bloemer for her guidance and support during my process. I am thankful for all the participants who took time to respond to my survey. Finishing my master thesis would not have been possible without their response. Furthermore I would like to thank my family and friends for their unconditional support and motivation.

Abstract

Psychological employee wellbeing has become an important part of internal marketing as a means of generating value for employees, organizations and society at large. According to the Self-Determination Theory (SDT) have the three psychological needs autonomy, competence and relatedness a positive effect on psychological wellbeing in all contexts. However, this has not been studied before during an unprecedented situation as the COVID-19 pandemic under the target group teleworkers. Psychological employee wellbeing (PWB) is in this research measured by six dimensions, which consist of: environmental mastery, autonomy, purpose in life, personal growth, self-acceptance and positive relations. The purpose of this research is to investigate the relative effect of autonomy, competence and relatedness on each dimension of PWB. In total, 201 respondents completed the survey. The data is analyzed by means of multiple regression analysis. The results show that autonomy and competence have a positive significant effect on the dependent variable environmental mastery, of which competence has the strongest effect. Autonomy and competence are found to have a significant positive effect on the dependent variable autonomy, of which the independent variable autonomy has the strongest effect. Autonomy and relatedness are found to have a positive significant effect on the dimension positive relations of which relatedness shows the strongest effect. Autonomy, competence and relatedness are found to have a positive significant effect on the dimension self-acceptance, of which the effect of competence is the strongest. Only relatedness is found to have a positive significant effect on purpose in life and personal growth. Based on the results, it can be concluded that the three psychological needs (autonomy, competence and relatedness) do not have a significant positive effect on all six dimensions of PWB as was hypothesized beforehand. This research is of theoretical and managerial relevance, since it clearly demonstrates which psychological need has the biggest impact on the dimensions of PWB and is the first to investigate this.

Keywords: autonomy, competence, relatedness, Self-Determination Theory (SDT), wellbeing, psychological employee wellbeing, internal marketing, telework, remote work

Table of content

1. Introduction	7
1.1. Employee wellbeing	7
1.1.1.Psychological employee wellbeing	
1.2. Research problem	9
1.3. Theoretical relevance	10
1.4. Practical relevance	11
1.5. Outline of the thesis	11
2. Theoretical background	12
2.1. Employee wellbeing	12
2.1.1. Psychological employee wellbeing	13
2.2. Psychological needs of Self-Determination theory	14
2.2.1. Autonomy	15
2.2.2. Competence	16
2.2.3. Relatedness	17
2.3. Conceptual model	19
3. Methodology	
3.1. Data collection	
3.2. Sample	
3.3. Measures	21
3.3.1. Construct measurement independent variables	21
3.3.2. Construct measurement dependent variable	
3.4. Pre-test survey	25
3.5. Research ethics	25
3.6. Reliability and validity	
4. Results	
4.1. Sample descriptive	
4.2. Quality of the data	
4.2.1. Discriminant validity	
4.2.2. Convergent validity	
4.2.3. Reliability analysis	
4.3. Assumptions for Multiple regression analysis	
4.3.1. Assumption 1: Linearity of the phenomenon measured	
4.3.2. Assumption 2: Constant variance of the residuals	
4.3.3. Assumption 3: Independence of the residuals	

4.3.4. Assumption 4: Normality of the residuals	
4.4. Hypotheses testing with Multiple Regression	
4.4.1. Testing Hypothesis 1	
4.4.2. Testing Hypothesis 2	
4.4.3. Testing Hypothesis 3	
4.5. Additional analyses with demographic variables	
5. Discussion	
5.1. Conclusion	
5.2. Theoretical implications	
5.3. Managerial implications	
5.4. Limitations and suggestions for future research	
References	
Appendix 1: Demographic variables	
Appendix 2: Overview adjustments survey	
Appendix 3: Survey definitive	
Appendix 4: Sample descriptives	
Appendix 5: Discriminant validity	
5.1. Discriminant validity iteration 1	
5.2. Discriminant validity: Iteration 2	
Appendix 6: Convergent validity	72
6.1. Convergent validity independent variables	72
6.2. Convergent validity dependent variables	75
Appendix 7: Reliability analysis	
7.1. Reliability analysis independent variables	
7.1.1. Reliability analysis Autonomy (AUT)	
7.1.2. Reliability analysis Competence (COM)	
7.1.3. Reliability analysis Relatedness (REL)	
7.2. Reliability analysis dependent variables (6 dimensions PWB)	
7.2.1. Reliability analysis Autonomy (PAUT)	
7.2.2. Reliability analysis Environmental Mastery (EM)	
7.2.3. Reliability analysis Positive Relations (PR)	
7.2.4. Reliability analysis Purpose in Life (PL)	
7.2.5. Reliability analysis Personal Growth (PG)	
7.2.6. Reliability analysis Self-Acceptance (SA)	
Appendix 8: Descriptives table	

Appendix 9: Testing linearity with polynomials	
Appendix 10: Outcomes MRA	89
10.1. Outcomes MRA Environmental mastery (EM)	89
10.2. Outcomes MRA Autonomy (PAUT)	91
10.3. Outcomes MRA Positive Relations (PR)	
10.4. Outcomes MRA Personal Growth (PG)	
10.5. Outcomes MRA Self-Acceptance (SA)	97
10.6. Outcomes MRA Purpose in Life (PL)	
Appendix 11: Correlation matrix	101

1. Introduction

This chapter presents an introduction to this research by providing information about the research area employee wellbeing, describing the research problem and explaining the theoretical- and practical relevance of this research.

1.1. Employee wellbeing

Employee wellbeing is a current issue and the importance is recognized by many companies. In particular, since the COVID-19 pandemic, there is a stronger emphasis on wellbeing and more specifically on employee wellbeing. Many workers across the world have experienced a dramatic and unexpected shift in their location of work. Subsequently, office work was directly replaced by telework (also called: remote working or telecommuting), to prevent the direct contact between workers (Di Martino & Wirth, 1990; Eurofound, 2020). Also in the Netherlands, employees are forced or strongly advised to work from home. In the second quarter of 2020, during the so-called "lock-down" there were 6,5 million employees in the Netherlands who worked from home (Vollebregt, 2020). Hence, this is a significant increase compared to previous years and a further increase is expected. While these measurements may be positive for the prevention of COVID-19, they may take a toll on employee's wellbeing. Working from home does not seem to be a temporary phenomenon. It may become even permanent, when COVID-19 is over (Vollebregt, 2020). As a result, employee wellbeing is affected during the COVID-19 pandemic, especially the mental part of employee wellbeing. For instance, many individuals are feeling isolated and emotionally drained and do not have enough time to get the work done (Eurofound, 2020). Teleworking has blurred the boundary between work and private life (Winkel, 2020) and has increased the hours that employees work overtime (Vollebregt, 2020). There are, in addition many employees with burn-out symptoms, employees who perceive a lack of social contact and who feel less connected with their colleagues (Winkel, 2020).

Multiple studies stress the importance of employee wellbeing and its value on societal, organizational and individual level. The Dutch constitution states that it is the responsibility of the authorities to take care of the wellbeing of the Dutch population, which includes employees. Paying attention to wellbeing benefits society as a whole, since people who experience wellbeing are found more effective, successful and more likely to act in ways that benefit society (Diener, Kesebir & Lucas, 2008). For instance, people have more trust in society and better social relationships, show democratic attitudes and are more likely to invest time in volunteer work (Diener et al., 2008).

On an organizational level, paying attention to employee wellbeing is thus a legal obligation for organizations in the Netherlands. Employee wellbeing is part of internal marketing which cannot be ignored since it is a key factor for maintaining customers, attracting new customers and achieving competitive advantage (Yang, Huang & Wei, 2015). As a result, employee wellbeing can indirectly improve the performance of the organization (Yang et al., 2015). The quality of employee performance can be improved by treating employees as internal customers and the success of a firm depends partly on the satisfaction perceived by employees in their work (Abzari & Ghujali, 2011). Employee wellbeing is considered to have a strong positive effect on the quality of services delivered by the employees to the external customers. This means that the wellbeing of employees is reflected in the contact they have with external customers. As a result, organizations are in a better position to reach external marketing objectives and to deliver good service quality, in particular in service businesses (Yang et al., 2015).

Employee wellbeing also influences organizational wellbeing through increasing employee performance and decreasing employee turnover (Page & Vella-Brodrick, 2009). Wright & Bonett (2007) found strong significant effects of job satisfaction and employee wellbeing on employee turnover. Employees who perceive low levels of wellbeing usually have a higher intention to leave the organization (Page & Vella-Brodrick, 2009). Furthermore, Myer-Briggs (2019) found not only a negative correlation between workplace wellbeing and turnover intention but also with job search and continuance commitment. Employee turnover is associated with high business costs, which are much higher than maintaining an employee. Losing an employee costs organizations at least 1.5 times the employee's annual salary (Cascio's, 2003). This shows the importance for organizations to pay attention to the wellbeing of their employees.

Employee wellbeing is also associated with positive outcomes on an individual level. For instance, employees are more likely to secure a job, receive positive evaluations from their managers and get easier re-employed (Diener, Kesebir & Lucas, 2008).

1.1.1.Psychological employee wellbeing

In academic research, there is no universally agreed-upon definition or conceptualization of employee wellbeing. However, there is a clear overlap in the described factors that determine the concept. Employee wellbeing can be defined as the physical, mental and emotional wellbeing of employees (Cartwright & Cooper, 2009; Currie, 2003). Employee wellbeing consists of three core components, according to Page & Vella-Brodrick (2009), namely: subjective wellbeing, workplace wellbeing and psychological wellbeing. Psychological

wellbeing is part of mental wellbeing, since positive psychological functioning is seen as a key factor for mental wellbeing (Page & Vella-Brodrick, 2009) and can be defined as "perception of engagement with existential challenges of life" (Keyes, Shmotkin, & Ryff, 2002, p.1007). The psychological part of employee wellbeing will be investigated in this research, because according to the Self-Determination Theory (hereafter: SDT), the satisfaction of the three psychological needs lead to psychological employee wellbeing. Psychological employee wellbeing will be investigated in this research based upon the six dimensions of Ryff (1989), which consist of: environmental mastery, autonomy, positive relations, personal growth, purpose in life and self-acceptance.

According to the Self-Determination Theory (Deci & Ryan, 2008) the satisfaction of the three psychological needs, which include autonomy, competence and relatedness, are determinative for experiencing psychological wellbeing. The Self-Determination Theory argues that counteracting one of these three needs causes destructions in wellbeing. The satisfaction of the three psychological needs are found to have a direct influence on psychological wellbeing (Deci & Ryan, 2000). Autonomy at work implies the extent to which employees have influence on their own job tasks (Van Den Broeck, Ferris, Chang & Rosen, 2016). Competence is about the extent to which the competences of employees are recognized and valued in an organization. This implies the feedback that employees receive and the possibilities they have to develop their competences (Van Den Broeck et al., 2016). Relatedness involves the meaningful and supportive relationships that employees have at work with their coworkers or manager. It is about the need to feel connected to others at work and being part of a group (Van Den Broeck et al., 2016).

1.2. Research problem

Paying attention to psychological employee wellbeing, in particular during the COVID-19 pandemic when employees work from home, is of crucial value. The SDT argues that the satisfaction of the three psychological needs: autonomy, competence and relatedness lead to psychological wellbeing. However, it is plausible that the societal measure of teleworking, which is taken to counteract the COVID-19 pandemic, undermines the satisfaction of the three psychological needs and as a result affects the psychological wellbeing of employees (Cacioppo, Hawkley & Thisted, 2010).

Prior studies, such as for example the study of Brunelle & Fortin (2021) have investigated the three psychological needs in a teleworking context. However, this research contributes by conducting the research at a time that employees work from home at an unprecedented large

scale and during the crisis situation of COVID-19. In addition, it is conducted in an unusual situation where teleworking is a mandatory order, instead of a voluntary option (Wang, Liu, Qian & Parker, 2020). These unusual circumstances, may affect how individuals evaluate the three psychological needs and may have consequences for the effects on the six dimensions of psychological employee wellbeing. Therefore, the objective of this study is to investigate the effects of the three psychological needs (autonomy, competence and relatedness) on each dimension of psychological employee wellbeing during the COVID-19 pandemic. Note that this research thus explicitly focusses on the effects during the COVID-19 pandemic and cannot be compared with the effects before the COVID-19 pandemic.

Hence, the following research question is formulated:

What is the effect of autonomy, competence and relatedness on psychological employee wellbeing of Dutch employees who work from home during the COVID-19 pandemic?

1.3. Theoretical relevance

This research is academically relevant, because it adds new knowledge to the field and new context to the existing literature of psychological employee wellbeing. First, this research adds new knowledge to the field by investigating the effect of autonomy, competence and relatedness on the six dimensions of psychological wellbeing. This has not been investigated before.

Second, this research adds new context to the existing literature of psychological employee wellbeing since few researchers emphasize the influence of autonomy, competence and relatedness on psychological employee wellbeing in crisis-situations, such as the COVID-19 pandemic. The working environment of employees has changed dramatically, due to the COVID-19 pandemic. The measurements taken by the government have forced many employees to work from home. Employees who are used to work at the office may face a lot of challenges when working from home, which as a result can affect the employee's psychological wellbeing. Because working from home may not be a temporary phenomenon, it is of great value to investigate the effects of autonomy, competence and relatedness on each dimension of psychological employee wellbeing. Therefore, this study aims to fill the gap in literature by investigating the influence of the three psychological needs on psychological employees who work from home during the COVID-19 pandemic.

1.4. Practical relevance

Besides the theoretical relevance, this research also has practical relevance for marketing managers and employees who work from home since the COVID-19 pandemic. It is important to study the impact of the psychological needs on psychological employee wellbeing during the COVID-19 pandemic, because there are tendencies that working from home may become the standard after the COVID-19 pandemic. However, working from home can only become the new standard when psychological employee wellbeing is kept at the highest level. Therefore, the aim is to provide insights in which dimension of psychological wellbeing is best positively influenced by the three psychological needs (autonomy, competence or relatedness). The results of this study may provide crucial insights in the effect of the three psychological needs on each dimension of psychological employee wellbeing. As a result, managers can take actions to fulfill the psychological needs of their employees in order to improve a specific dimension of psychological employee wellbeing and thus improving psychological wellbeing as a whole and improving organizational outcomes. Paying attention to psychological employee wellbeing is of essential value for organizations and is a crucial part of internal marketing that will help organizations to maintain employees (Page & Vella-Brodrick, 2009; Myer-Briggs, 2019; Yang, Huan & Wei, 2015), increase the quality of the services delivered by employees to external customers, attract new customers and achieve competitive advantage (Yang et al., 2015). Employee wellbeing has not only found to have positive outcomes on organizational level, but also on individual and societal level (Diener, Kesebir & Lucas, 2008).

1.5. Outline of the thesis

This master thesis is divided into several chapters. The second chapter of this research examines psychological employee wellbeing and the three psychological needs from the SDT in more detail. Besides, in chapter two, the conceptual model will be presented with the associated hypotheses. The next chapter, chapter three, describes the methodology of the study, by explaining the data collection, construct measurement, data analysis, research ethics, reliability and validity. The results from the analyses can be found in chapter four. Finally, chapter five provides a conclusion and discussion of the results and explains the implications for theory and practice, the limitations of the study and recommendations for further research.

2. Theoretical background

This chapter provides an extensive theoretical background on the major concepts that are of importance in this research. First, employee wellbeing will be discussed in more detail and second, the SDT will be explained, by paying attention to autonomy, competence and relatedness. Third, the hypotheses are described and the constructs are visualized in a conceptual model.

2.1. Employee wellbeing

It is clear that employee wellbeing has become a critical issue in many organizations. Especially since the COVID-19 pandemic, the importance of this matter is widely acknowledged. In literature, there is consensus that employee wellbeing is a multidimensional concept, but there is no universally agreed-upon definition or conceptualization of the concept. According to Deci & Ryan (2001) wellbeing in general refers to optimal psychological functioning and experience. Employee wellbeing in specific can be defined as the physical, mental and emotional wellbeing of employees (Cartwright & Cooper, 2009; Currie, 2003). Juniper, White & Bellamy (2009) refer to it as work-related wellbeing, which can be seen as an element of an employee's overall wellbeing which is only determined and influenced by work.

Despite the lack of a universally agreed-upon definition, there is an overlap in the described factors or dimensions that determine employee wellbeing. Tuzovic & Kabadayi (2020) distinguish four dimensions of employee wellbeing: physical wellbeing, mental wellbeing, social wellbeing and financial wellbeing. Physical wellbeing is about the vitality and functioning of an individual's body. Mental wellbeing, of which psychological wellbeing is part, means that an employee works in a productive way and is aware of his or her own abilities. The meaning of social wellbeing is that individuals are able to communicate, develop meaningful relationships with others and maintain a supportive network. Financial wellbeing is about an individual's current and future financial state (Tuzovic & Kabadayi, 2020). According to Page & Vella-Brodrick (2009), employee wellbeing consists of three components: subjective wellbeing, workplace wellbeing and psychological wellbeing. Psychological wellbeing is part of mental wellbeing (Page & Vella-Brodrick, 2009). While it is important to be aware of these dimensions and components, this research only focuses on the psychological wellbeing of employees. The reason for this focus is that the satisfaction of autonomy, competence and relatedness are found to have a direct effect on psychological

wellbeing in all contexts (Deci, Ryan, Gagné, Leone, Usunov & Kornazheva, 2001; Deci & Ryan, 2001).

2.1.1. Psychological employee wellbeing

In the SDT research, psychological wellbeing is conceptualized using measures from hedonic and eudaimonic wellbeing perspectives (Ryan & Deci, 2001). The hedonic approach of wellbeing can be defined in terms of pleasure attainment and pain avoidance, whereas the eudaimonic approach defines wellbeing in terms of the degree to which a person is optimally functioning (Ryan & Deci, 2001). The former focuses mainly on happiness whereas the latter views wellbeing as more than only happiness, such as meaning and self-realization (Ryan & Deci, 2001). Therefore, psychological wellbeing falls under the umbrella of eudaimonic wellbeing and can be defined as "perception of engagement with existential challenges of life" (Keyes, Shmotkin, & Ryff, 2002, p.1007).

Psychological wellbeing consists of six dimensions which are a multidimensional approach for the measurement of psychological wellbeing (Ryff, 1989). The six dimensions of Ryff (1989) include: self-acceptance, positive relations with others, autonomy, environmental mastery, purpose in life and personal growth (Ryff, 1989, p.1071). *Self-acceptance* occurs when an individual has self-actualization, optimal functioning and maturity as characteristicsthe individual accepts its current and past life. *Positive relations* with others implies for example interpersonal relationships with people, which are based on trust, mutual identification and intimacy. *Autonomy* implies qualities as self-determination, independence and the internal regulation of behavior. Individuals show autonomous functioning and evaluate themselves without seeking for approval. *Environmental mastery* implies that an individual chooses or creates environments that are appropriate for the individuals' psychic conditions. *Purpose in life* has to do with the meaning, direction and goals in life. *Personal growth* includes the need for self-actualization, realizing one's potential and openness to new experiences (Ryff, 1989, p.1071).

The psychological wellbeing of employees in this research is domain-specific, which refers to the wellbeing in the telework context. Telework can be defined as "a flexible work arrangement whereby people work in locations, remote from their central offices with no personal contact with co-workers, but the ability to communicate with co-workers using ICT" (Di Martino & Wirth, 1990, p. 530).

13

2.2. Psychological needs of Self-Determination theory

The SDT provides insights in conditions that facilitate or undermine wellbeing. The theory argues that the satisfaction of the three psychological needs facilitate psychological wellbeing in several social contexts such as workplaces, schools and friendships across all cultures (Deci, Ryan, Gagné, Leone, Usunov & Kornazheva, 2001; Deci & Ryan, 2001). Thwarting the three basic needs has psychological implications in all social and cultural contexts, even though the needs may not be equally valued in all cultures (Deci & Ryan, 2001). In SDT research, psychological wellbeing is operationalized using measures from hedonic and eudaimonic wellbeing perspectives (Ryan & Deci, 2001). The satisfaction of the three psychological needs, positively influence the eudaimonic wellbeing of individuals and facilitate mental wellbeing and more job commitment (Deci & Ryan, 2001). In addition, the study of Cantarero, Tilburg & Smoktunowicz (2021) shows that a decrease in the satisfaction of the three psychological needs- specifically during the COVID-19 pandemic- has negative consequences for the mental wellbeing of individuals in their daily life. However, this is not studied in a working context.

A model related to the SDT is the Job Demands-Resources model (hereafter: JD-R model), which provides insights in the positive (also called: job resources) and negative (also called: job demands) indicators of employee wellbeing (Bakker & Demerouti, 2007). Job demands include physical, psychological, social, or organizational aspects of the job which require physical and/or psychological effort or skills. Examples of job demands are: high working pressures and/or unpleasant physical working environment. The negative effects of high job demands can be compensated when employees have enough resources (Bakker & Demerouti, 2007). Job resources include physical, psychological, social or organizational aspects of the job that reduce the job demands and are functional in achieving desired outcomes at work. Job resources can be found in the organization at large, social relations, organization of work and within job tasks. Social relations refer to the support from coworkers and supervisor (Bakker & Demerouti, 2007). Organization of work includes job resources such as role clarity and participation in decision making. Autonomy, performance feedback, skill variety and task identity are important job resources within job tasks (Bakker & Demerouti, 2007). Job resources fulfill the three basic psychological needs- autonomy, competence and relatednessin the SDT. The need for autonomy and relatedness will be satisfied with social support from coworkers or supervisors and the need for competence will be satisfied when employees receive proper feedback which fosters learning (Bakker & Demerouti, 2007). According to

the well-known Demand-Control model of Karasek, the combination of having high job demands and high job resources leads to positive outcomes in terms of employee wellbeing (Bakker & Demerouti, 2007).

2.2.1. Autonomy

The first basic psychological need in the SDT is autonomy, which is defined as "the perception of being the origin of one's own behavior and experiencing volition in action" (Ng, Ntoumanis, Thøgersen-Ntoumani, Deci, Ryan, Duda & Williams, 2012, p.327). Autonomy in the SDT entails that employees can self-regulate and self-organize their work (Deci & Ryan, 2000). Employees feel like the initiator of their own actions, in which they have a lot of freedom to determine how and when they conduct their work (Deci et al., 2001). Employees can organize their behavior on the basis of internal controls, instead of external controls of the environment (Deci et al., 2001). This implies that employees can act with choice and volition and at the same time, when doing so, comply with the expectations and wishes of others. A working context that facilitates this is required (Deci & Ryan, 2000). For instance, for employees to experience autonomy, autonomy support from their supervisor is required which means that they offer opportunities for choice and stimulate employees to be the self- initiator of their work (Deci et al., 2001).

According to Breaugh (1985), there are three facets of autonomy that can be differentiated: work method autonomy, work scheduling autonomy and work criteria autonomy. The first facet of autonomy entails the degree of choice employees have over their procedures or methods at work. The second is about the degree that employees feel in control over their schedule, sequence and timing of their activities at work. The third implies the degree of freedom employees have to determine the criteria to evaluate their performance. It is of importance that employees can decide for themselves, how and when they conduct certain tasks, which implies job control and resources (Bakker & Demerouti, 2007). Lack of enough job control or resources can cause several problems for employees such as for example a burn-out (Bakker & Demerouti, 2007). The study established the positive effect of autonomy on employee wellbeing (Wheatley, 2017). Autonomy has benefits for employees, since they feel free to express their opinions towards their colleagues and they feel free to be themselves. In addition, employees make choices that are based on their own preferences, instead of preferences of others (Brunelle & Fortin, 2021). According to Wheatley (2017), autonomy has found to have a positive effect on the positive association with the job, leisure and life satisfaction which in turn has a positive influence on wellbeing.

Autonomy has often been linked with teleworking (Brunelle & Fortin, 2021). Teleworkers have autonomy to organize, plan and execute activities at work, due to the absence of direct supervision (Standen, Daniels & Lamond, 1999). In addition, teleworking allows employees to choose a working method that fits best their personal preferences (Brunelle & Fortin, 2021).

To reiterate, according to the SDT (Deci & Ryan, 2000) and JD-R model (Bakker & Demerouti, 2007) is autonomy an important driver for psychological employee wellbeing. The experienced autonomy has a direct positive effect on psychological employee wellbeing. Several studies demonstrate a positive effect of autonomy on wellbeing. For instance, autonomy is found to be negatively related to burnout and is found to be an important source for employees to buffer against work stress, since it increases the coping strategies of employees (Taris et al.,2002; Gagné & Bhave, 2011). Therefore, it can be hypothesized that autonomy has a positive influence on the six dimensions of psychological wellbeing.

Hence, the following hypothesis is derived:

Hypothesis 1 (H1): Autonomy has a positive influence on the six dimensions of psychological employee wellbeing of Dutch employees who work from home during the COVID-19 pandemic.

2.2.2. Competence

The second basic psychological need in the SDT is competence, which is defined as "the feeling of being effective in producing desired outcomes and exercising one's capacities" (Ng et al., 2012, p.327). Competence is a need to develop new skills and to feel capable of doing the tasks in a certain job (Deci et al., 2001). This implies that an employee does not have any doubts about whether the tasks can be executed successfully. As a result, this may increase employees' confidence, which in turn has a positive effect on their wellbeing. Competence implies that an employee can optimally perform challenging tasks at work and is able to achieve the desired results and outcomes (Deci et al., 2001). It is important that the competences of employees are recognized and appreciated in an organization. This can be done, for instance by getting feedback from the organization and if needed by getting opportunities to develop their competences (Van den Broeck et al., 2016).

Tuzovic & Kabadayi (2020) confirm the importance of competences for employee wellbeing in the context of the COVID-19 pandemic. They studied the impact of social distancing on employee wellbeing and found different factors that determine specific employee wellbeing outcomes, whereof skills. The authors emphasize that the skills factor, which includes having the required competence and experience for specific roles, is needed to achieve good performance. During the COVID-19 pandemic multiple employees could not work at the office and had to work from home. Working from home required additional skills, such as the ability to use multiple online platforms. This can negatively affect the employee's wellbeing, because people can perceive additional stress when they acknowledge the urgency of learning new skills (Tuzovic & Kabadayi, 2020). In contrary, Brunelle & Fortin (2021) indicate that employees' feeling of competence may be satisfied via some aspects of teleworking. Teleworking requires some specific competences and sustained performance which can make employees feel more confident about their capabilities. Furthermore, teleworkers are found to be productive, which means that they can accomplish difficult tasks and can execute work activities properly and within time. As a result, an employee can feel more competent (Brunelle & Fortin, 2021). According to Fotiadis, Abdulrahman & Spyridou (2019), competence provides feelings of self-efficacy and personal mastery and positively contributes to the work-life balance, which in turn positively affect wellbeing. The SDT argues that employees experience psychological wellbeing, when their need for competence is satisfied (Van Den Broeck et al., 2016). Therefore, it can be hypothesized that competence has a positive influence on the six dimensions of psychological wellbeing. Hence, the following hypothesis is derived:

Hypothesis 2 (H2): Competence has a positive influence on the six dimensions of psychological employee wellbeing of Dutch employees who work from home during the COVID-19 pandemic.

2.2.3. Relatedness

The third basic psychological need in the SDT is relatedness, which is defined as "the feeling of being respected, understood and cared for by others" (Ng et al., 2012, p.327). Relatedness implies a working culture with mutual respect, support and dependence of employees (Deci et al., 2001). It also implies the need to feel connected to other people, which can be expressed as being loved or cared for by others (Deci & Ryan, 2000). If people view themselves as a member of a group, develop close relations or experience a sense of community, the need of relatedness will be satisfied (Deci & Ryan, 2000). When this need for relatedness is satisfied, employees will experience meaningful and supportive relationships with their coworkers or manager (Van Den Broeck et al., 2016). It is found that the need for relatedness is in some situations of less importance, compared to the need for autonomy and competence. This is

because for certain activities the need for relatedness may be less applicable, because they need to be executed individually (Van Den Broeck et al., 2016).

Tuzovic & Kabadayi (2020) confirm the importance of relatedness for (mental) employee wellbeing during the COVID-19 pandemic. The authors emphasize the importance of support, which is an important element in the definition of relatedness from the SDT. Support can be seen as social support, which includes support from family, friends and coworkers. Bartsch, Weber, Büttgen & Huber (2021) argue that leaders should combine task-oriented and relation-oriented leadership behaviors, in particular in the virtual work environments during the COVID-19 pandemic. This is of special importance for employees working in service firms, who unexpectedly had to work from home. Task-oriented leadership behaviors is helpful in times of the COVID-19 pandemic because it sets a clear direction for employees, which can be of great value to offer employees more clarity in their tasks to be executed from home (Bartsch et al., 2021). Relation-oriented leadership behaviors are aimed at stimulating a supportive and collaborative remote working environment (Bartsch et al., 2021). This support can be helpful for employees who have additional daily tasks related to child care and need to give education at home, since the high schools are closed in the COVID-19 pandemic (Bartsch et al., 2021).

Teleworkers rely on several electronic communication devices to maintain relationships at work. Contacting others, via internet or by phone during the COVID-19 pandemic satisfies the need for relatedness and is positively related to mental wellbeing (Cantarero, Tilburg & Smoktunowicz, 2021). However, the interactions that employees have via electronic devices, such as email, video-calls and telephone may limit the exchange of information, compared to face-to-face interactions (Brunelle & Fortin, 2021). This remote contact can weaken the interpersonal relationships between colleagues (Golden, 2006). Interactions may be more formal and less spontaneous when they are mediated by electronic communication devices (Brunelle, 2013). Therefore, teleworking can make it harder for employees to have rich conversations with their coworkers (Brunelle & Fortin, 2021).

To reiterate, the SDT argues that employees experience wellbeing, when their need for relatedness is satisfied (Van Den Broeck, et al., 2016). This implies a direct positive influence of relatedness on psychological wellbeing. Therefore, it can be hypothesized that the experience of relatedness has a positive influence on the six dimensions of psychological employee wellbeing.

Thus, the following hypothesis is formulated:

Hypothesis 3 (H3): Relatedness has a positive influence on the six dimensions of psychological employee wellbeing of Dutch employees who work from home during the COVID-19 pandemic.

2.3. Conceptual model

In this paragraph, the conceptual model is depicted, which is a graphical representation of the hypothesized effects that are derived from the theory above.



Figure 1: Conceptual model

3. Methodology

This chapter provides detailed information about the methodology used in this research. The paragraphs are structured as follows: data collection, sample, construct measurement, pre-tests survey, research ethics and validity and reliability.

3.1. Data collection

In order to test the hypotheses, quantitative research was conducted by means of an online survey, since this research is concerned with the impact of the three psychological needs (autonomy, competence and relatedness) and its influence on psychological wellbeing. An online survey is in particular well- suited for this research since questions can be asked to a group of people about the perceived autonomy, competence and relatedness. Moreover, a large and varied population can be examined in a relatively short period of time (Vennix, 2019). In addition, retrieved information by an online survey does not have to be processed manually and the researchers can prevent that respondents accidentally skip a question (Vennix, 2019). Besides, an online survey was the most appropriate method in this unprecedented crisis situation of COVID-19, because no personal contact was needed for participation.

The survey was distributed for five days, within the timeframe of 20 April up and till 25 April 2021.

3.2. Sample

The population of this research consisted of all employees who were strongly advised by the government to work from home in the Netherlands since the COVID-19 pandemic. Since this group was too large to be investigated in this study entirely, the unit of analysis focused on a smaller group. The unit of analysis were employees who worked from home in the Netherlands during the first quarter of 2021, whereas under normal circumstances they used to work at the office and only occasionally at home. In order to be assured that all respondents fall under this target group, selection criteria have been used for participation. The following question was asked to the respondents: "how often did you work from home in the first quarter of 2021?" Respondents who answered this question with 'I did not work from home during this period' were excluded from participation.

This research focused on employees who worked in the tertiary and quaternary sector and had a function aimed at serving internal or external customers. The tertiary sector includes commercial services, for instance: ICT services and financial services, whereas the quaternary sector comprises non-commercial services such as education and healthcare. To be able to describe the sample, the survey included several demographic questions, which can be found in appendix 1.

Two sampling techniques were used to collect the data, namely: voluntary response sampling (Murairwa, 2015) and snowball sampling (De Jong & Van Ommeren, 2002). The survey was posted on LinkedIn to reach a network of people that fell under the target group of this research. LinkedIn was considered as an appropriate platform for spreading the survey, because the audience is business-oriented and a diverse group of workers is active on it. Albeit every person could decide for themselves to participate or not, there may have occurred some bias, because the survey was distributed via the LinkedIn network of the researchers and people without a LinkedIn account were hence excluded from participation. Furthermore, the researchers asked LinkedIn users who have been working from home since the COVID-19 pandemic to repost the researchers' post on their LinkedIn page, with the request to participate in the survey. In addition, the researchers asked them to list others in their organization. These respondents needed to be people who were representative of the target group, which means that they met the criteria of working from home in the first quarter of 2021. By means of the snowball sampling technique, people without a LinkedIn account

were possibly also reached.

3.3. Measures

The measurements of the independent and dependent variables were based on existing literature and existing scales. All items utilized a 7-point Likert scale, ranging from 1 to 7 (strongly agree, agree, more or less agree, undecided, more or less disagree, disagree and strongly disagree).

3.3.1. Construct measurement independent variables

The Work-related Basic Need Satisfaction Scale (Van Den Broeck, Vansteenkiste, De Witte, Soenens & Lens, 2010) was utilized to measure the three psychological needs. The scales of the psychological needs autonomy, competence and relatedness were proved to be reliable with an average alpha score of respectively .81, .85 and .82. The scale consisted of 18 items and was proved to be applicable in all work contexts (Van Den Broeck et al., 2010). The advantage of this scale is that the items of autonomy, competence and relatedness reflect employee's perceptions of the need satisfaction (Van Den Broeck et al., 2010). Since this research is concerned with the evaluation or experience of the psychological needs, this scale was most applicable. Moreover, the items for each need included positive (need satisfaction) and negative (need frustration) items, to overcome acquiescence bias (Van Den Broeck et al.,

2010). Negatively formulated items imply that the respondent must have answered "strongly disagree" in the 7-point Likert scale to indicate a positive evaluation of the psychological need.

To prevent any language problems for the respondents, the Dutch version of the Work-related Basic Need Satisfaction Scale was used, which was also proved to be reliable by van den Broeck, Vansteenkiste, de Witte, Lens & Soenens (2009). The table below (table 1) presents an overview of all the original items that were included in the scale derived from Van Den Broeck et al., (2016).

Concept	Definition	Items
Autonomy	"The perception of	1. I feel like I can be myself at my job
(AUT)	being the origin of	2. At work, I often feel like I have to follow other
	one's own behavior	people's commands
	and experiencing	3. If I could choose, I would do things at work
	volition in action" (Ng	differently
	et al., 2012, p.327)	4. The tasks I have to do at work are in line with
		what I really want to do
		5. I feel free to do my job the way I think it could
		best be done
		6. In my job, I feel forced to do things I do not
		want to do
Competence	"The feeling of being	1.I don't really feel competent in my job \rightarrow item
(COM)	effective in producing	deleted
	desired outcomes and	2. I really master tasks in my job
	exercising one's	3. I feel competent in at my job
	capacities" (Ng et al.,	4. I doubt whether I am able to execute my job
	2012, p.327).	properly
		5. I am good at the things I do in my job
		6. I have the feeling that I can even accomplish
		the most difficult tasks at work
Relatedness	"The feeling of being	1.I don't really feel connected with other people
(REL)	respected, understood	at my job
	and cared for by	2. At work, I feel part of a group
	others" (Ng et al.,	3. I don't really mix with other people at my job
	2012, p.327).	4. At work, I can talk with people about things
		that really matter to me
		5. I often feel alone when I am with my
		colleagues \rightarrow item deleted
		6. Some people I work with are close friends of
		mine

Table 1: Construct summary psychological needs (IV's)

To ensure that all respondents answered the questions from the telework context, every question included the sentence: "when working from home or during telework". In total, two items were deleted from the survey. Item 5 of relatedness was deleted, because the question was found less applicable in the telework context. Item 1 of competence was deleted due to overlap with item 3 of competence. An overview of all the amendments that were made to the items can be found in Appendix 2.

3.3.2. Construct measurement dependent variable

To reiterate, there is no unambiguous definition of psychological wellbeing, but there is consensus in literature that it is a multidimensional concept. Psychological wellbeing was defined as "the perception of engagement with existential challenges of life" and can be seen as an element of eudaimonic wellbeing (Keyes, Shmotkin, & Ryff, 2002, p.1007). Psychological wellbeing was measured on the basis of the 6 dimensions from Ryff (1989), which included: autonomy, environmental mastery, personal growth, positive relations, purpose in life and self-acceptance. Thus, the relative influence of the psychological needs on each dimension of psychological wellbeing was measured.

Ryff's (1989) psychological wellbeing 18-item scale was used, consisting of three items for each of the six dimensions of psychological wellbeing. The 18-item scale was proved to be comparable to the original scale which consisted of 120 items in total and each item was found to correlate only with its own scale and the scale intercorrelations were found to be generally low (Clarke, Marshall, Ryff, & Wheaton, 2001). While the reliability of the large 120-item scale was high, the six dimensions of the 18-item scale had a Cronbach's alpha ranging from 0.33 to 0.56, which was low to modest (Clarke, Marshall, Ryff, & Wheaton, 2001). According to Ryff & Keyes (1995), this was due to the small number of items per scale.

The measurement scales by Ryff (1989) were widely used in academic research (Springer & Hauser, 2006). The 18-item scale focused on daily psychological wellbeing. However, these six dimensions with the associated items could plausibly be filled through work (Page & Vella-Brodrick, 2009). Psychological wellbeing was in this research domain-specific, which means that all questions needed to be answered from the perspective of the telework setting. Therefore, the questions were adjusted by making them more applicable for a telework context. For instance, item 3 of dimension autonomy was "people" replaced by colleagues. In addition, negatively formulated items were positively formulated by the researchers to ensure good reliability. Moreover, six items from the original scale of Ryff (1989) were added to the

18-item scale, to overcome any problems low numbers of items that represent a certain dimension. These six items are selected, based on high item total correlation and are indicated with a * sign, in the table below. A complete overview of these adjustments can be found in Appendix 2. The table below (table 2) presents an overview of all the original items that were included in the scale derived from Ryff (1989).

Concept	Dimension	Items
Psychological	Autonomy	1. I tend to be influenced by people with strong
wellbeing	(PAUT)	opinions
_		2. I have confidence in my own opinions, even if they
		are contrary to the general consensus
		3. I judge myself by what I think is important, not by
		what others think
		4. It is difficult for me to voice my opinions on
		controversial matters*
	Environmental	1. In general, I feel I am in charge of the situation in
	mastery (EM)	which I live
		2. The demands of everyday life often get me down
		3. I am quite good at managing the responsibilities of
		my daily life
		4. I am good at juggling my time so that I can fit
		everything in that needs to get done*
	Personal growth	1. I think it is important to have new experiences that
	(PG)	challenge how you think about yourself and the world
		2. For me, life has been a continuous process of
		learning, changing and growth
		3. I gave up trying to make big improvements or
		changes in my life a long time ago
		4. I have the sense that I have developed a lot as a
		person*
	Positive	1. Maintaining close relationships has been difficult
	relations (PR)	and frustrating for me
		2. People would describe me as a giving person,
		willing to share my time with others
		3. I have not experienced may warm and trusting
		relationships with others
		4. I enjoy personal and mutual conversations with
		others*
	Purpose in life	1. I live life one day at a time and don't really think
	(PL)	about the future
		2. I sometimes feel as if I have done all there is to do
		in life
		3. Some people wander aimlessly through life, but I
		am not one of them
		4. I have a good sense of what it is I am trying to
		accomplish in life*

 Table 2: Construct summary psychological wellbeing (DV)

Se	elf-acceptance	1. In many ways, I feel disappointed about my
(S.	SA)	achievements in life
		2. When I look at the story of my life, I am pleased
		with how things have turned out
		3. I like most aspects of my personality
		4. When I compare myself to others, it makes me feel
		good about who I am*

3.4. Pre-test survey

The English items from the psychological wellbeing scale from Ryff (1989) were translated into Dutch, to overcome any language problems for the respondents. These questions were translated with the help of a native English speaker. The items about the three psychological needs autonomy, competence and relatedness were already formulated in Dutch by Van Den Broeck, Vansteenkiste et al., (2009). To ensure good quality of the survey, the researchers first conducted a pre-test to test whether the survey items contained any mistakes and whether the items were clear for the respondents. According to Hill (1998) must the sample size of a pretest contain between 10 to 30 respondents. Therefore, for this research ten individuals from the target group evaluated the survey. In this pre-test, respondents were asked to read and answer the questions out loud. This gave the researchers insights into how the questions were being interpreted and whether the questions were comprehensible for the respondents. As a result, the pre-test also guaranteed that the questions were correctly translated into Dutch. Making use of individuals from the target group has found to increase the validity of the research (De Jong & Schellens, 2002). Based on the received feedback during the pre-tests, amendments were made to the survey. A complete overview of the amendments and the definitive Dutch version of the survey can be found respectively in Appendix 2 and 3.

3.5. Research ethics

The principles of research ethics that are recommended by the American Psychological Association (2017) were taken into account in this whole research. First of all, participants were informed that they were participating in a research survey from the Radboud University. Second, the researchers strived to do no harm and protect the rights and welfare of those who were involved. For example, by emphasizing that participation in the survey was on a voluntary basis and that the respondents were free to withdraw from the research at any time. Third, the researchers were aware of the fact that this research was being conducted in an unprecedented crisis situation. Therefore, people who encountered severe mental or physical problems related to this crisis situation were not addressed to fill in the survey. The researchers did not want to bother people with severe problems related to the COVID-19 pandemic. Fourth, the professional and scientific responsibilities towards society were taken seriously, by securing the privacy of the respondents. This means that participants remained anonymous and data was handled confidentially. In addition, integrity was kept, by promoting accuracy, honesty and truthfulness in science. Finally, respect for people's rights and dignity was taken into account by respecting their demographics and by treating them in an equal way.

3.6. Reliability and validity

Some actions were taken by the researchers to guarantee the reliability and validity of this research. First, the concepts used in this research were based on existing theory and the constructs were measured using existing scales from prior research which proved to be reliable. Second, the survey was distributed via LinkedIn. However, some bias may occur when the LinkedIn network of the researchers is being used, because respondents may have similarities, such as for example the education level or sector where they work. However, to counteract this bias, the researchers will make sure that a variety of people is being recruited to participate in the survey by keeping updated on the demographics of the respondents. The researchers strived for external validity by achieving a large sample size and diverse group of respondents. Third, the survey was translated into Dutch to overcome any language problems for the respondents. The validity may be affected due to the translation, because some English verbs may be difficult to translate. However, the researchers conducted a pre-test to examine whether the questionnaire is comprehensible for the respondents and an English native speaker checked whether the items were translated properly. In addition, the anonymity of the respondents was kept with as a result that social desirability bias was prevented.

4. Results

This chapter presents the results of this research. Multiple regression will provide insights in the relative contribution of each independent variable on each of the six dimensions of psychological wellbeing. The first paragraph examines the sample descriptive. The second paragraph examines the quality of the data by focusing on the validity and reliability of the constructs in the conceptual model. Thereafter, the assumptions for multiple regression analysis are tested in order to be able to run the analysis and test the hypotheses of this research.

4.1. Sample descriptive

For this research, an amount of 230 respondents has been reached. After removing respondents who did not meet the criteria for participation and removing respondents that answered the survey for less than 50%, a net sample of 201 responses remained. In total, 103 respondents were male, 97 female and 1 person selected the option 'prefer not to say' (Appendix 4, table 1). The average age of the respondents was 43,77, with ages ranging from 22 to 65. In all, 6% were 25 years old or younger, 21% were between ages 26 and 35, 24% were between ages 36 and 45, 31% were between ages 46 and 55 and 18% were aged between 56 and 65 (Appendix 4, table 2). The question about the amount of telework in the first quarter of 2021 was an important criterion for participation in this research, as explained in Section 3.2. In total, 56% of the respondents worked completely from home during the first quarter of 2021, whereas 26% worked 75 percent or more from home, 7% worked at least 50 percent from home and 11% worked less than 50 percent from home (Appendix 4, table 4). In addition, 96% of the respondents were still working from home when they participated in the survey (Appendix 4, table 5). The sectors in which the respondents were working varied (Appendix 4, table 3a). Most of the respondents worked in the ICT sector (33%), Healthcare and welfare sector (18%) and service sector (18%). In addition, 29% of the respondents held a managerial position (Appendix 4, table 6). Most of the respondents, specifically 78% were employed for more than two years in the organization (Appendix 4, table 7).

4.2. Quality of the data

Several analyses were performed as a means to assess the quality of the data. First, factor analyses were conducted to determine the discriminant validity. Second, convergent validity of each construct was determined. Third, reliability analyses were performed to determine the internal consistency of the constructs. The most important output from all these analyses can be found in Appendix 5, 6 and 7.

4.2.1. Discriminant validity

In order to determine discriminant validity, all items of the constructs were put in one factor analysis. Constructs can be seen as statistically different when all construct items only load on one specific factor and not on any other factors. Factor analysis with the extraction method principal axis factor was conducted on the items with oblique rotation in order to be able to discriminate between factors. Oblique rotation is appropriate when at least one correlation exceeds the value of .30 (Hair et al., 2019). This criteria was met, as can be seen in the factor correlation matrix (Appendix 5.1). As a result, oblique rotation was found to be the best rotation method. The Kaiser-Meyer-Olkin (hereafter: KMO) measure was used to verify the sampling adequacy. The general rule is that the KMO must exceed the value of .50 (Hair et al., 2019). This criteria was met, with a KMO of .887, indicating sufficient inter-correlations and establishing that factor analysis was appropriate since it was expected to yield distinct and reliable factors (Field, 2018). The Bartlett's Test of Sphericity was significant, which is an indication that there exist sufficient correlations among the variables (Hair et al., 2019). The communalities after extraction exceeded the threshold of .20. Nine factors were extracted, with eigenvalues of Kaiser's criterion of one and these nine factors combined accounted for 63.248% of variance explained. The fact that nine factors were extracted is appropriate since this research involves nine constructs of which three independent variables and six dependent variables. Almost all items loaded on the factor representing the construct they were supposed to load on. According to Hair et al., (2019) are factor loadings of at least .30 to .40 minimally acceptable. The criterion which is used in this research for a factor loading is .30. However, this criteria is taken more flexible when deleting an item would damage the Cronbach's alpha of the construct. In congruence with Field's (2018) recommendation, factor loadings with values below .3 were suppressed in the iterations. Nonetheless, because some items loaded less than .30 on its own construct, another iteration was needed which suppressed factor loadings with values below .20 (Appendix 5.1 pattern matrix.)

Discriminant validity independent variables

The pattern matrix (Appendix 5.1) revealed that competence (COM) was found to only load high on its own factor. Therefore, no items were deleted from this construct. Furthermore it was noted that all items of autonomy (AUT) loaded >.30 on its own factor, except for item 3 (AUT3R) and item 5 (AUT5). AUT3R loaded on another factor instead of on its own. In addition, AUT5 loaded higher on factor 1 (0.320) than on its own (0.279). Decided was to delete AUT3R since this item only loaded on another factor and deleting this item would increase the Cronbach's alpha (Appendix 5, section 2.1.). Although AUT5 had a higher

loading on another factor than on its own, it was decided to keep this item in the analysis, because deleting this item would negatively influence the reliability of the construct (Appendix 7, section 7.1.1). For this reason, AUT5 was not removed, despite it had a higher loading on another factor, because the loading of AUT5 almost met the criteria of .30 (.279) and the reliability was considered as more important. Furthermore, it was noted that all items of relatedness (REL) correlated high with its own factor, except for item 5 (REL5) which loaded higher on another factor. Therefore, in combination with the reliability analysis which indicated that deleting this item would increase the Cronbach's alpha with >.05 (Field, 2018) the item was excluded from the analyses (Appendix 7.1.3.).

Discriminant validity dependent variables

All items of self-acceptance (SA) and personal Growth (PG) were found to only load high on its own factor (Appendix 5.1 pattern matrix). Therefore, no items were deleted from these constructs. Furthermore, the pattern matrix revealed that item 3 from purpose in life (PL3) and item 4 from purpose in life 4 (PL4) did not load on its own construct. Moreover, the reliability analysis proved that deleting these two items would cause a substantial increase in Cronbach's alpha (Section 4.2.3., table 5). Therefore, it was decided to remove these two items from the analysis. Besides, some items of the construct autonomy (PAUT) loaded higher on another factor (Appendix 5.1. pattern matrix). For instance, item 4 (PAUT4) loaded less than .30 on its own factor and item 2 (PAUT2) was a crossloader. According to Hair et al. (2019) this is a reason to delete a certain item. However, deleting one of these items would have caused problems for the reliability of the construct. Autonomy (PAUT) as a construct did not meet the criteria for reliability (Appendix 7.2.1). The only way to increase the reliability of this construct was deleting item 1 (PAUT1). Although there were two other items that showed higher loadings on other factors, the reliability issues of the construct were deemed more problematic at this point. For this reason, PAUT1 was removed, since this resulted in a substantial increase of Cronbach's alpha. Subsequently, PAUT met the criterion of having an acceptable Cronbach's Alpha (>0.6). Furthermore, the construct positive relations (PR) showed some implications concerning discriminant validity. Item 2 (PR2) and item 3 (PR3) loaded high on its own factor. Item 1 (PR1) and item 4 (PR4) loaded higher on the factor Relatedness. This can be explained on theoretical grounds, since relatedness and positive relations include items about the same subject. The items from these two constructs did not have similarities in items, but were about the same theme. This can also be seen in Chapter 2, were the constructs relatedness and positive relations are defined. Therefore, there

was decided to keep all items of the construct positive relations (PR). Furthermore, the pattern matrix revealed that item 1 from the construct environmental mastery (EM1) loaded higher on two other factors than on its own and showed that EM1 had cross-loading issues, since the difference between the two loadings was less than .20. In addition, the loading of EM1 on its own factor was too low (.112) to be maintained. Since the Cronbach's alpha of this construct was above the acceptable level, there was decided to delete EM1. Although removing this item slightly decreased the Cronbach's alpha, the cross-loading issues were deemed more problematic at this point.

A second iteration of the factor analysis was performed without the four items of the dependent variables: item 1 autonomy (PAUT1), item 3 and 4 of purpose in life (PL3 and PL4), item 1 environmental mastery (EM1) and without the two items of the independent variables item 3 autonomy (AUT3R) and item 5 relatedness (REL5). The outcomes can be found in Appendix 5, section 5.2. Again, the KMO value was satisfactory (0.882) and Bartlett's test was significant (p < 0.001). All items had acceptable levels of communality (> 0.20). As can be seen from the table 'Total variance explained' seven factor were extracted based on eigenvalues >1 instead of nine factors. This difference can be explained since the independent variable autonomy (AUT) has overlap with the dependent variable autonomy (PAUT). In addition, the independent variable relatedness (REL) was found to have overlap with the dependent variable positive relations (PR). These constructs have theoretical overlap, which can be found in the definitions which are given in chapter 2. This is the reason why two factors less are extracted, after deleting the items. Although this being the case, it was decided to continue with the analysis.

4.2.2. Convergent validity

In order to determine convergent validity, factor analyses were performed for each construct with its associated items (Appendix 6). The level of correspondence of the items to the dimensional structure of the construct could be examined since each factor analysis only consisted of the items of the specific construct. Table 3 reveals the eigenvalues and the percentage of explained variance, which give an indication of the one-dimensionality of each construct. According to Hair et al. (2019) is a percentage of explained variance of>50% considered as adequate. Autonomy is the only construct that does not meet the criteria of >50%. However, decided was to continue with the analysis since this percentage nearly meets the criteria. Furthermore the results show satisfactory KMO values (> .50), significant Bartlett's tests, communalities after extraction (>.20) and all constructs load on one factor

each. An overview of the results for each independent variable and each dependent variable can be found respectively in Appendix 6.1 and 6.2.

Independent variables			Dependent variables (PWB)						
	AUT	COM	REL	PAUT	PR	PL	PG	SA	EM
Eigen- values	2.346	3.035	2.483	1.778	2.204	1.667	2.539	2.978	1.941
% of variance explained	47%	61%	62%	59%	55%	83%	63%	74%	65%

Table 3: Eigenvalues and variance explained

4.2.3. Reliability analysis

A reliability analysis was performed for each construct which consisted of at least one item. The internal consistency of each scale was assessed by means of Cronbach's alpha. The value for Cronbach's alpha should be >.70, although Hair et al. (2019) considered constructs with a Cronbach's alpha of >.60 as minimally acceptable. For this research, the researchers strived to achieve Cronbach's alpha values of at least .70 for each construct.

The table depicted below (table 4) shows an overview of the Cronbach's alpha values of the three independent variables before and after deleting some items. Competence (α = .812) demonstrated high internal consistency and no items were deleted from this scale. One item of the construct autonomy was removed, which resulted in a higher Cronbach's alpha (α =.691). The construct almost met the threshold of .70. In addition, one item was removed from the construct relatedness, which resulted in an increase in Cronbach's alpha (α =.794). Thus, the deletion of items for autonomy and relatedness show improvements in reliability.

Construct		Original # Items	Cronbach's Alpha	# of items deleted	Cronbach's alpha
Autonomy	(AUT)	6	.681	1	.691
Competence	(COM)	5	.812	0	.812
Relatedness	(REL)	5	.733	1	.794

Table 4. Internal consistency independent variables

The table depicted below, shows an overview of the Cronbach's alpha values of the six dependent variables before and after removing some items. Overall, there can be concluded that all constructs were internally consistent before deleting any item, except for autonomy (PWB, PAUT) with a Cronbach's alpha of .584. Removing item 1 of autonomy (PWB, PAUT1) has increased the reliability of Cronbach's alpha from .584 to .646. Removing more

items of this construct would not further increase the Cronbach's alpha (Appendix 7, section 7.2.1). Personal growth (α = .807) and self-acceptance (α = .885) demonstrated high internal consistency and no items were deleted from these scales. In addition, table 5 reveals that deleting two items of purpose in life has led to a substantial increase in Cronbach's alpha, from .613 to .800. Although the deletion of one item from the construct environmental mastery caused a slight decrease in alpha (from .758 to .704) it was still deleted since the cross-loading issues and the fact that its loading on its own factor was too low, were deemed more problematic at this point (Appendix 5.1).

Construct		Original # Items	Cronbach's Alpha	# of items deleted	Cronbach's alpha
Environmental	(EM)	4	.758	1	.704
Mastery					
Positive relations	(PR)	4	.723	0	.723
Autonomy	(PAUT)	4	.584	1	.646
Personal growth	(PG)	4	.807	0	.807
Purpose in Life	(PL)	4	.613	2	.800
Self-Acceptance	(SA)	4	.885	0	.885

Table 5. Internal consistency dependent variables

As can be seen from table 4 and 5, all constructs have a Cronbach's alpha of >.70, except for the dependent variable autonomy (PWB, PAUT) and independent variable autonomy. Although these constructs do not exceed the value of .70, the Cronbach's alpha of these constructs is still considered as acceptable (Hair et al., 2019). It can be concluded that the constructs have a good reliability. Moreover, the Cronbach's alpha values of this research were found to be higher than the values in literature.

4.3. Assumptions for Multiple regression analysis

This paragraph will examine the assumptions for multiple regression analysis. According to Hair et al. (2019) four assumptions have to be met, before multiple regression analysis can be performed. The assumptions will be tested for each of the six dimensions of PWB. This means that six multiple regression analyses will be conducted. The assumptions will be examined below.

4.3.1. Assumption 1: Linearity of the phenomenon measured

First of all, the skewness and kurtosis were checked, to examine if the variables are normally distributed (Appendix 8). The data were assumed to be normally distributed when the values for skewness and kurtosis lay within the range of -3 and +3 (Hair et al., 2019). All variables met this criteria. Second, to test the assumption of linearity, a scatterplot based on the ZRESID and ZPRED was developed, which can be found for each dependent variable in appendix 10. Since some scatterplots were showing some sort of pattern, the linearity of the phenomenon's could not be established. For instance, the scatterplots of self-acceptance and environmental mastery (Appendix 10) had some concentrations of the dots in a specific corner. This could be an indication of non-linearity between the independent and dependent variables. Therefore, polynomial terms were included for all six dependent variables to check if there was non-linearity involved. To test if the relations were non-linear, second and third order polynomial terms were included for the three independent variables autonomy, competence and relatedness, because these variables have an interval measurement scale. These outcomes can be found in Appendix 9. After including these polynomial terms, the researchers saw that the second and third order polynomial terms were not significant, except for purpose in life (Appendix 9, table 12). The second order polynomial term for relatedness (namely: RELcentered2) was found to be significant, which indicated non-linearity. Including this second order polynomial term led to an increase in adjusted R-square from .015 to .046, which was an indication that it improved the explanation of the variance of the model. Therefore, RELcentered2 was included as a polynomial in the multiple regression analysis, only for the dependent variable purpose in life.

4.3.2. Assumption 2: Constant variance of the residuals

To test the assumption of constant variance of residuals, scatterplots were checked to determine if there were some patterns visible in the residuals. To check whether the data was homoscedastic, the scatterplots were assessed to determine if there was some pattern visible in the residuals. When a consistent pattern in the variance can be found, it is an indication that the variance is not constant. The scatterplots in appendix 10 showed no clear pattern such as for example a triangle. Based on these scatterplots, constant variance of the residuals was confirmed.

4.3.3. Assumption 3: Independence of the residuals

To test the assumption of independence of the residuals, which means that the predicted value is not related to another prediction (Hair et al., 2019), the standardized predicted value in the 'residuals statistics^a' table (Appendix 10) was checked. The mean must have a value of .000

and the standard deviation a value of 1.000. There can be seen in appendix 10 that all values meet the criteria. This means that the assumption of independence of residuals is met and that the errors do not correlate with independent variables. In addition, independence of residuals was checked by looking at the Durbin-Watson test (Appendix 10, model summary tables). All values lied within the criteria of 1.5 and 2.5. As a result, independence of errors was assumed. Furthermore, the test whether there is multicollinearity or not, VIF values should be lower than 10 (Hair et al., 2019). The coefficients tables in appendix 10 reveal that all values are lower than 10, which means that there is no multicollinearity involved in the six multiple regression analyses.

4.3.4. Assumption 4: Normality of the residuals

To test the assumption for normality of the residuals, histograms and Normal Probability Plots (Normal P-P) are examined. The six histograms, which can be found in appendix 10, are quite normally distributed. In addition, the normal probability plot (normal p-p plot) is a second way to test the normality of the residuals. As can be seen in appendix 10, do all dots lay on or around the diagonal line which is an indication of normality of residuals. This applies for all six Normal P-P plots. As a result, normality of the residuals can be assumed.

4.4. Hypotheses testing with Multiple Regression

Multiple regression analysis was used to test if the three psychological needs autonomy, competence and relatedness have a significant effect on the six dimensions of PWB. Each dimension of PWB is considered as a dependent variable. Therefore, six separate multiple regression analyses were performed for each dimension of PWB, by means of PROCESS. The relative effects of the three independent variables on each dimension were investigated. The first multiple regression analysis was performed with the dependent variable environmental mastery (Appendix 10.1). The results showed that 34.1% of EM could be explained by the three independent variables (F(3,197)=35.457, p < .001). This is an indication of moderate explanatory power. Since the F test is found significant, it can be concluded that there exists a significant effect of the independent variables on the dependent variable. Autonomy (β = .149, p=0.046) and competence (β =.468, p=.000) were found to have a positive effect on EM. An examination of the t-values for the three independent variables indicated that the most important factor in predicting EM was competence.

		Coefficients ^a		
	β	Std. Error	t	Sig.
Autonomy	.149	.083	2.010	.046*
Competence	.468	.098	6.146	.000**
Relatedness	.038	.057	.572	.568
R^2 (Adjusted R^2)	.351 (.341)			

a. Dependent variable: Environmental Mastery Table 6: N201, *p<0.05, **p<0.001

The second multiple regression analysis was performed with the dependent variable autonomy (Appendix 10.2.) and showed that 26% of autonomy (PAUT) could be explained by the three independent variables (F(3,197)= 24.421, p <.001). This is an indication of moderate explanatory power. Autonomy (β = .273, p= .001) and competence (β = .253, p=.002) indicated a positive effect on PAUT. An examination of the t-values for the three independent variables indicated that the most important factor in predicting PAUT was autonomy.

Coefficients ^a						
	β	Std. Error	t	Sig.		
Autonomy	.273	.082	3.475	.001*		
Competence	.253	.097	3.131	.002*		
Relatedness	.086	.057	1.208	.229		
R ² (Adjusted R ²)	.271 (.260)					

a. Dependent variable: Autonomy (PAUT) Table 7: N201, *p<0.05

The third multiple regression analysis (Appendix 10.3) was performed with the dependent variable positive relations (F(3, 197)= 46.735, p< .001). The adjusted R square for the model was .407, which indicates that 40.7% of positive relations could be explained by the three independent variables. This is an indication of moderate explanatory power. Autonomy (β = .190, p= .007) and relatedness (β = .582, p= .000) were found to have a positive significant effect of which relatedness was the strongest in predicting positive relations.

Coefficients ^a				
	β	Std. Error	t	Sig.
Autonomy	.190	.075	2.703	.007*
Competence	076	.088	-1.046	.297
Relatedness	.582	.051	9.173	.000**
R ² (Adjusted R ²)	.416 (.407)			

a. Dependent variable: Positive relations Table 8: N201, *p<0.05, **p<0.001
The fourth multiple regression analysis included the dependent variable personal growth (Appendix 10.4). The results indicated a significant proportion of variance (Adjusted $R^2=13.2\%$, F(3,197)= 11.141, *p* <.001), which means that 13.2% of the model could be explained by the three independent variables. This is an indication of weak explanatory power. Only relatedness (β = .265, *p*= .001) was found to have a positive significant effect on personal growth.

		Coefficients ^a		
	β	Std. Error	t	Sig.
Autonomy	.115	.105	1.358	.176
Competence	.075	.124	.855	.394
Relatedness	.265	.073	3.451	.001*
R^2 (Adjusted R^2)	.145 (.132)			

a. Dependent variable: Personal growth Table 9: N201, *p<0.05

The fifth multiple regression analysis was performed with the dependent variable selfacceptance (F(3, 197)= 69.321, p<.001). The results indicated an adjusted R-square of 50.6% which is an indication of strong explanatory power. Autonomy (β =.220, p=.001), competence (β =.389, p=.000) and relatedness (β =.254, p=.000) were found to have a positive significant effect on self-acceptance (SA). Competence was found to have the strongest effect on SA (Appendix 10.5).

		Coefficients ^a		
	β	Std. Error	t	Sig.
Autonomy	.220	.075	3.433	.001*
Competence	.389	.088	5.902	.000**
Relatedness	.254	.051	4.396	.000**
R^2 (Adjusted R^2)	.514 (.506)			

a. Dependent variable: Self-acceptance Table 10: N201, *p<0.05, **p<0.001

The sixth multiple regression analysis was performed with the dependent variable purpose in life (F(9, 196)= 3.042, p < .001). The adjusted R square was 4.6%, which is an indication of very weak explanatory power. Only relatedness (β = .176, p= .015) was found to have a positive significant effect on purpose in life (Appendix 10.6).

		Coefficients ^a			
	β	Std. Error	t	Sig.	
Autonomy	.094	.116	1.046	.297	
Competence	067	.136	727	.468	
Relatedness	.176	.048	2.463	.015*	
R^2 (Adjusted R^2)	.089 (.046)				

a. Dependent variable: Purpose in life Table 11: N201, *p<0.05

4.4.1. Testing Hypothesis 1

Table 12 presents a summary of the effect of autonomy on each dimension of PWB, to make clear which effects are significant or not. Note that the beta's cannot be compared to each other, since these come from six different regression analyses. Hypothesis 1 predicts that autonomy has a positive effect on the six dimensions of psychological employee wellbeing (PWB). The hypothesis testing that was conducted for the direct relationship of autonomy on the six dimensions of PWB showed that autonomy was found to have a significant positive effect on four dimensions of psychological employee wellbeing, namely: environmental mastery (β = .149, p<0.05; t-value= 2.010), autonomy (β = .273, p<0.05; t-value= 3.475), positive relations (β = .190, p<0.05; t-value= 2.703) and self-acceptance (β = .220, p<0.05; t-value 3.433). Nevertheless, autonomy was found non-significant with personal growth and purpose in life. Thus, the results do not support H1, because autonomy has found to have a positive significant effect on four dimensions of PWB instead of the hypothesized six dimensions.

	β	Std. Error	t	Sig.
AUT→ EM	.149	.083	2.010	.046*
AUT→ PG	.115	.105	1.358	.176
$AUT \rightarrow PAUT$.273	.082	3.475	.001*
$AUT \rightarrow PR$.190	.075	2.703	.007*
$AUT \rightarrow PL$.094	.116	1.046	.297
AUT→ SA	.220	.075	3.433	.001*
Table 12: N201, *	<i>p</i> <0.05			

4.4.2. Testing Hypothesis 2

Table 13 presents a summary of the effect of competence on each dimension of PWB, to make clear which effects are significant or not. Note that the beta's cannot be compared to each other, since these come from six different regression analyses. Hypothesis 2 predicts that competence has a positive effect on the six dimensions of psychological employee wellbeing. The hypothesis testing to examine the direct relationship of competence on each dimension of

PWB showed that competence was found to have a significant positive effect on three dimensions of psychological employee wellbeing, namely: environmental mastery (β = 468, p<0.05; t-value= 6.146), autonomy (β = .253, p< 0.05; t-value= 3.131) and self-acceptance (β = .389, p<0.05; t-value= 5.902). Nevertheless, the effect of competence on personal growth, positive relations and purpose in life was found non-significant. Thus, the results reject H2.

	β	Std. Error	t	Sig.
COM→ EM	.468	.098	6.146	.000**
$COM \rightarrow PG$.075	.124	.855	.394
$COM \rightarrow PAUT$.253	.097	3.131	.002*
$COM \rightarrow PR$	076	.088	-1.046	.297
$COM \rightarrow PL$	067	.136	727	.468
$COM \rightarrow SA$.389	.088	5.902	.000**

Table 13: N201, *p<0.5, **p<0.001

4.4.3. Testing Hypothesis 3

Table 14 presents a summary of the effect of relatedness on each dimension of PWB, to make clear which effects are significant or not. Note that the beta's cannot be compared to each other, since these come from six different regression analyses. Hypothesis 3 predicts that relatedness has a positive effect on the six dimensions of psychological employee wellbeing. Relatedness has found to have a positive significant effect on four dimensions of Psychological wellbeing, namely: personal growth (β = .265, p<0.05; t-value= 3.451), positive relations (β = .582, p<0.05; t-value= 9.173), purpose in life (β = .176, p<0.05; t-value= 2.463) and self-acceptance (β = 254, p<0.05; t-value= 4.396). The effect of autonomy on environmental mastery and autonomy was found non-significant. Thus, the results reject H3.

	β	Std. Error	t	Sig.
$REL \rightarrow EM$.038	.057	.572	.568
REL PG	.265	.073	3.451	.001*
$REL \rightarrow PAUT$.086	.057	1.208	.229
REL PR	.582	.051	9.173	.000**
REL PL	.176	.048	2.463	.015*
REL SA	.254	.051	4.396	.000**

Table 14: N201, *p<0.5, **p<0.001

4.5. Additional analyses with demographic variables

The existence of possible differences in effects between respondents from different demographic backgrounds is an avenue worth pursuing. However, in contrast to the main effects hypothesized, the current literature does not provide a solid foundation to develop substantive hypotheses regarding these effects. Therefore, a more exploratory stance was taken to investigate if there are any significant interaction effects of gender, managerial function, amount of telework, months of working experience and sectors. Thus, some additional multiple regression analyses were performed to check whether there exist any differences in effects between respondents from different demographic backgrounds. Note that only the significant effects will be discussed below.

The first additional analysis was performed with the demographic variable 'gender'. The respondents were divided into male, female and 'other'. Interaction effects were created, to check whether this variable operates as a moderator. Six multiple regression analyses were performed for each dependent variable. The multiple regression analysis demonstrated two significant interaction effects of autonomy and gender for the dimension purpose in life (F(6, 6)) 194) = 2.096, p< 0.05. For the female respondents, autonomy was found to have a negative effect on purpose in life (β =.321, p<0.05; t-value=2.233), whereas a positive effect of autonomy on purpose in life was found for the male respondents (β = -.249, p<0.05; t-value= -2.224). The interaction effects for the other dependent variables were found non-significant. The second additional analysis was performed with the variable managerial function, to investigate whether there exist any differences in effects between employees who have a managerial function and employees who do not have a managerial function. The multiple regression analyses showed no significant interaction effects, which is an indication that no differences occur. The third additional analysis was performed with the variable 'amount of telework'. Respondents were asked to indicate their amount of telework per week during the first quarter of 2021. Two dummy variables were created for this variable, in which one group worked less than 50% of their weekly working hours from home and one group worked more than 50% of their weekly working hours from home. These groups were made since each group needed a particular size to have statistical power to assess any differences between both groups. The multiple regression analysis showed two significant interaction effects of competence and the variable amount of telework on the dependent variable autonomy (F(7,193) = 12.469, p < 0.001). For employees who worked less than 50% of their weekly working hours from home, competence was found to have a positive effect on the dependent variable autonomy (β = .217, p<0.05; t-value= 2.314). For employees who worked more than

50% of their weekly working hours from home, competence was found to have a negative effect on the dependent variable autonomy (β = -.604, p<0.05; t-value= -2.314). Therefore, it can be concluded that the amount of telework operates as a moderator for the dependent variable autonomy. The interaction effects for the other dependent variables were found non-significant. A fourth additional analysis was performed to see whether there exist any differences in effects between months or years of working experience. The interaction effects were found non-significant for all six dependent variables.

A fifth additional analysis was performed to see whether there exist any differences in effects between sectors. Dummies were made with interaction effects and six multiple regression analyses were performed. First, significant interaction effects between competence and sector were found for the dependent variable environmental mastery (F(28,172)=4.822, p<0.001). Competence was found to have a negative effect on environmental mastery for employees working in the service sector (β =-.247, p<0.05; t-value= -2.181) and for employees working in the technical sector (β = -.206, p<0.05; t-value= -2.150). Second, a significant interaction effect was found of relatedness and sector on the dependent variable autonomy (F(28,172))= 3.334, p < 0.05). Relatedness was found to have a positive effect on the dependent variable autonomy, for employees working in the technical sector (β = 0.222, p<0.05; t-value= 2.745). Third, significant interaction effects were found for the dependent variable personal growth (F(28,172)=3.224, p<0.001). Competence was found to have a negative effect on the dependent variable personal growth, for employees working in the service sector (β = -.365, p<0.05; t-value= -2.874) and technical sector (β = -.239, p<0.05; t-value= -2.216). In addition, autonomy was found to have a negative effect on personal growth for employees working in the sector of education (β = -.297, p<0.05; t-value= -2.136).

Fourth, one significant interaction effect was found of relatedness and sector for the dependent variable positive relations (F(28,172)= 5.781, p< 0.001). Relatedness was found to have a negative effect on positive relations, for employees working in the public administration sector (β = -.180, p<0.05; t-value= -2.196).

At last, no significant interaction effects were found for the dependent variable purpose in Life and self-acceptance.

5. Discussion

This chapter starts with presenting the conclusions of this research by answering the research question and interpreting the results. The theoretical and managerial implications are described in paragraph two and three. At last, limitations and suggestions for future research are addressed in the fourth paragraph.

5.1. Conclusion

The research question of this research is formulated as: *What is the effect of autonomy, competence and relatedness on psychological employee wellbeing of Dutch employees who work from home during the COVID-19 pandemic?*

In order to answer this research question, three hypotheses are formulated, which can be found in the table below. As can be seen from table 15, none of the hypotheses is supported. The first hypothesis is not supported, since autonomy is found to have a positive significant effect on only four dimensions of PWB instead of all six, namely: environmental mastery, autonomy (PAUT), positive relations and self-acceptance. The second hypothesis is not supported, because competence has a positive significant effect on only three dimensions of PWB instead of all six, namely: environmental mastery, autonomy (PAUT) and self-acceptance. At last, the third hypothesis is not supported, since relatedness is only found to have a significant positive effect on personal growth, positive relations, purpose in life and self-acceptance. The dimension which is most explained by the three independent variables is self-acceptance, with an adjusted R-square of 50.6%.

Hypothesis	Description	Result
1	Autonomy has a positive influence on the six dimensions	Not supported
	of psychological employee wellbeing of Dutch employees	
	who work from home during the COVID-19 pandemic	
2	Competence has a positive influence on the six dimensions	Not supported
	of psychological employee wellbeing of Dutch employees	
	who work from home during the COVID-19 pandemic	
3	Relatedness has a positive influence on the six dimensions	Not supported
	of psychological employee wellbeing of Dutch employees	
	who work from home during the COVID-19 pandemic	

Table 15: Summary results hypotheses

The results also provide insights in which independent variable has the strongest effect on which dependent variable. First, autonomy and competence have a significantly positive effect on environmental mastery, of which competence has the strongest effect. Second, autonomy and competence both have a positive significant effect on the dimension autonomy (PAUT) of which the independent variable autonomy was the strongest. Third, autonomy and relatedness have both a positive significant effect on positive relations, of which relatedness has the strongest effect. Fourth, relatedness was the only independent variable with a positive significant effect on personal growth. Fifth, autonomy, competence and relatedness have a positive significant effect on self-acceptance, of which competence has the strongest effect. Relatedness was the only independent variable with a positive significant effect on purpose in life.

5.2. Theoretical implications

From a theoretical perspective, this research contributes to existing literature in many ways. First, it contributes to the SDT since the positive effect of the three psychological needs on wellbeing is tested under teleworkers in the unprecedented situation of the COVID-19 pandemic. The psychological needs have not been tested under teleworkers in the context of these exceptional circumstances before. Second, this research fills a gap in literature by investigating the three psychological needs from the SDT in combination with and examining its influence on the six dimensions of PWB. Autonomy, competence and relatedness were found to have a direct positive effect, especially on the psychological aspect of wellbeing in all contexts (Deci, Ryan, Gagné, Leone, Usunov & Kornazheva, 2001; Deci & Ryan, 2001). However, these positive effects are not tested before, in combination with a multidimensional approach for the measurement of psychological wellbeing from Ryff (1989). The results of this research show that the three hypotheses are rejected since not every psychological need has a significant positive effect on all six dimensions as was expected beforehand. Besides, some results are surprising. For instance, relatedness is the only variable with a significant positive effect on personal growth whereas a positive effect of competence on personal growth would be more expected, since competence is concerned with possibilities to develop employees' skills, which in turn would increase personal growth (Van Den Broeck et al., 2016). Another surprising result is that although the effect of competence on purpose in life and positive relations is non-significant, the direction of the effect is negative. This is in contrast with what the SDT states (Deci & Ryan, 2001). In addition, purpose in life is less explained by the three independent variables which is an indication that the three psychological needs do not substantially impact this dependent variable.

Furthermore, although the SDT (Deci & Ryan, 2001) states that autonomy, competence and relatedness have a positive and direct effect on PWB in all contexts, some negative effects are found when making distinctions between respondents based on socio-demographic variables. The additional analyses demonstrate that the positive effects of the SDT of autonomy,

42

competence and relatedness do not hold for differences in sectors and gender. This is in contrast with what the SDT states (Deci & Ryan, 2001). As a result the positive effects of the three psychological needs on psychological wellbeing in all contexts is not established in this research.

5.3. Managerial implications

From a managerial perspective, the results of this research concerning PWB have direct practical implications. Particularly, the results provide practical contribution by advising managers how they could best encourage the six dimensions of PWB, since the results indicate which psychological need is most effective in having a positive effect on a specific dimension of PWB. The importance of PWB is widely recognized as an important part of internal marketing. As a result, managers may assess the six dimensions of PWB under the personnel of their department or company. The assessments may show in which dimension there is room for improvement. When this dimension is known, the manager may conclude for which of the three psychological needs there is room for improvement. This means that when the weakly spotted psychological need is identified, a corrective action can be initiated to stimulate that specific psychological need. Stimulating this need will eliminate the weakness of the spotted dimensions and thereby enhances PWB as a whole. For instance, when managers would like to increase the environmental mastery of their employees, they should enhance the competence of their employees, since competence has found to have the strongest positive effect on this dimension. Another example, when managers would like to increase the personal growth of their employees, they should enhance the relatedness of their employees, since relatedness has found to have the strongest positive effect on this dimension. Based on these insights, managers can take specific root-cause related actions to stimulate the psychological need with the biggest influence on the weakly spotted dimensions. Monitoring employee wellbeing is an important focus for internal marketing managers. Failure to recognize the importance of employee wellbeing, could harm organizational outcomes, since it would have implications for the services that employee deliver towards their customers. In summary, understanding the effects of the three psychological needs on the dimensions of PWB enable managers to make decisions and plan their internal marketing strategies. The importance of the positive effects on PWB of personnel should not be underestimated. When the PWB of the personnel is at a high level, the personnel will have a positive mindset, not only towards the work they are doing but also towards the company which makes this possible. In particular for service employees who have direct contact with customers (Yang et al., 2015).

5.4. Limitations and suggestions for future research

This research includes limitations that point to avenues for further research. First, this research was conducted during the COVID-19 pandemic, which must have influenced the results. The question may arise, whether these results still hold when the COVID-19 pandemic is over. Replicating this research on a larger scale after the COVID-19 pandemic, in different work contexts by extending geographic scopes and in different cultures will improve the external validity of this research. The concept of working from home may strongly depend on the specific business in which the company operates. This research shows the positive effects on the six dimensions of PWB, under the exceptional circumstances of the COVID-19 pandemic. However, in general this research cannot support the continuation of working from home for the future, since no information is available about the PWB of teleworkers before the COVID-19 pandemic. Therefore, it may be interesting for further researchers to investigate whether there are any differences in the effects of autonomy, competence and relatedness on the six dimensions of PWB, after the COVID-19 pandemic. Second, this research is in particular focused on teleworkers. Further research should

investigate whether there exist any differences between teleworkers and office workers in order to be able to dig deeper in the subject of PWB.

Third, for further research it may be interesting to include some moderators such as for example the number of days that an employee works from home. Brunelle & Fortin (2021) state that when employees pass the psychological threshold of working at least 50% of their working hours from home, it creates differences in experience between office workers and teleworkers. These differences in effects were also found in the additional analyses of this research. Therefore, further research is needed to investigate whether differences in PWB between teleworkers and office workers can be found. In addition, further research should make distinctions between sectors and gender.

Fourth, according to Deci & Ryan (2009) requires psychological wellbeing the satisfaction of the three basic needs since they are complementary to each other, which means that the three needs together need to be satisfied. However, the authors do not indicate when a need is considered as satisfied, since this is individually determined. The personal characters and personalities may be an important factor to include for further research. For instance, a person who is introvert may consider relatedness or positive relations as less important than a person with an extravert personality. Furthermore, some psychological needs may be less meaningful in some situations. For instance, according to van den Broeck et al (2016) is the need for relatedness is in certain situations of less importance because a certain activity may be

satisfying itself, without having any contact with others.

Fifth, due to the lack of literature in measurement scales of psychological wellbeing, this research relied heavily on the six dimensions of Ryff (1989). Therefore, the concept psychological wellbeing and in particular psychological employee wellbeing desires more measurement attention. The importance is also recognized by Warr & Wall (1979). However, despite the lack in literature about measurement scales of psychological wellbeing, another theory seems fruitful as well. For example, the nine environmental features of Warr (1987) that are considered to predict psychological wellbeing could also have been used for this research as a substitution for the dimensions of Ryff (1989). These nine dimensions include: opportunity for control, opportunity for skill use, external generated goals, variety, environmental clarity, availability of money, physical security, opportunity for interpersonal contact and valued social position. These nine features have some similarities with the six dimensions from Ryff (1989), but are more extensive. Given the importance of having more measurement scales of psychological wellbeing, the researchers consider this an important avenue for further research.

Another limitation of this research that can be linked with the fifth limitation is that the hypotheses imply that each psychological need has a positive effect on each dimension of PWB. However, it may be debatable whether each psychological need must have a positive effect on each specific dimension. There can be assumed that some psychological needs are more effective for specific dimensions. Therefore, further research is needed to explore whether a positive effect of each independent variable on each dependent variable is needed to experience optimal psychological wellbeing.

Finally, since this research is only concerned with psychological wellbeing, it may be intriguing to investigate other aspects of wellbeing as well in order to get a complete insight of employee wellbeing. In addition, two psychological needs from the SDT had some overlap with two dimensions of PWB. Particularly, relatedness (from SDT) with positive relations (from PWB) and autonomy (from SDT) with autonomy (from PWB, PAUT). This can be explained theoretically since these constructs in essence measure the same. This resulted in some implications for determining discriminant validity. Nonetheless, the construct were measured with different items, that were not comparable. When investigating another aspect of wellbeing, this overlap can be avoided.

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Questions about d	lemographics
Age	20 years, 21-25, 26-35, 36-45, 46-55, 56-65, 65 or more
Gender	Male, female, none, other
Highest level of	- High school
education	- Post-secondary vocational education (MBO)
	- Higher vocational education (HBO)
	- Bachelor's degree (WO)
	- Doctorate degree (PhD)
	- Other (please specify)
Business sector	- Health care and welfare
	- Services
	- ICT
	- Law, security and public administration
	- Agriculture
	- Media & communication
	- Education, culture and science
	- Technique
	- Tourism
	- Transport and logistics
Working	- One month or less
experience current	- 1-6 months
organization	- 6-12 months
	- 1-2 years
	- > 2 years

Appendix 1: Demographic variables

Appendix 2: Overview adjustments survey

Translation survey and amendments made to survey as a result to pretests

Deteled items are indicated in red

Added items are indicated in pink

Negatively formulated items that are adjusted in positively formulated items are indicated in yellow \rightarrow appendix 3 shows how these items are positively formulated

Psychological needs

Autonomy

1. Ik heb het gevoel dat ik mezelf kan zijn in mijn werk, wanneer ik thuiswerk (+)

I feel like I can be myself at my job, when working from home

2. Wanneer ik thuiswerk, heb ik vaak het gevoel dat ik andermans bevelen moet opvolgen (-) *When working from home, I often feel like I have to follow other people's commands*

3. Als ik mocht kiezen, zou ik dingen anders aanpakken vanuit de thuiswerksetting (-)

If I could choose, I would do things differently when working from home

4. De taken die ik tijdens het thuiswerken moet uitvoeren, stemmen overeen met wat ik echt wil doen (+)

The tasks I have to do when working from home are in line with what I really want to do

5. Ik voel me vrij om bij het thuiswerken mijn werk uit te voeren, op een manier waarvan ik denk dat dat de beste is (+)

I feel free to do my job the way I think it could best be done, when working from home **6.** In de thuiswerksetting, voel ik me gedwongen dingen te doen die ik niet wil doen (-) *When working from home, I feel forced to do things I do not want to do*

Competence

1. Ik voel me niet echt competent in mijn job, wanneer ik thuis werk (item deleted because it has overlap with item 3)

I don't really feel competent in my job, when working from home

2. Ik heb de taken van mijn werk goed onder de knie, terwijl ik thuiswerk (+)

I really master tasks in my job, when working from home

3. Wanneer ik thuiswerk, voel ik me bekwaam in mijn werk (+)

I feel competent in at my job, when working from home

4. Ik twijfel eraan of ik mijn werk goed kan uitvoeren, vanuit de thuiswerksetting (-)

I doubt whether I am able to execute my job properly, when working from home

5. Ik ben goed in mijn werk, wanneer ik thuiswerk (+)

I am good at the things I do in my job, when working from home

6. Ik heb het gevoel dat ik ook de moeilijke taken op mijn werk tot een goed einde kan brengen, wanneer ik thuiswerk (+)

I have the feeling that I can even accomplish the most difficult tasks at work, when working from home

Relatedness

1. Ik voel vanuit de thuiswerksetting niet echt een band met andere mensen op mijn werk (-) *I don't really feel connected with other people at my job, when working from home*

2. Vanuit de thuiswerksetting, voel ik me onderdeel van een groep (+)

When working from home, I feel part of a group

3. Wanneer ik thuiswerk, ga ik niet echt om met andere mensen op mijn werk (-)

When working from home, I don't really mix with other people at my job

4. Wanneer ik thuiswerk, kan ik met andere mensen van het werk praten over wat ik echt belangrijk vind (+)

When working from home, I can talk with people about things that really matter to me (+) 5. Ik voel me vaak alleen als we onder collega's zijn wanneer ik thuiswerk (item deleted because pretests showed that it was not applicable in telework context)

I often feel alone when I am with my colleagues

6. De mensen op mijn werk zijn echte vrienden (+) Some people I work with are close friends of mine

Six dimensions psychological wellbeing

1. Ik heb de neiging om beïnvloed te worden door collega's met sterke meningen

(I tend to be influenced by colleagues with strong opinions (-AUT)

2. Ik heb vertrouwen in mijn eigen meningen, zelfs als die in strijd zijn met de algemene consensus

(I have confidence in my own opinions, even if they are contrary to the general consensus (+AUT)

3. Ik beoordeel mezelf op wat ik zelf als belangrijk acht en niet op wat mijn collega's denken *I judge myself by what I think is important, not by what colleagues think (+AUT)*

4. Tijdens het thuiswerken vind ik het niet moeilijk om mijn mening te delen over

controversiële zaken (+AUT)

(It is difficult for me to voice my opinions on controversial matters)

5. Als ik vanuit thuis werk, heb ik over het algemeen het gevoel dat ik de leiding heb over de situatie waarin ik leef

In general, when working from home I feel I am in charge of the situation in which I live (+EM)

6. Als ik thuiswerk word ik vaak teleurgesteld door de eisen van het dagelijks leven

The demands of everyday life often get me down, when working from home (-EM)

7. Ik ben redelijk goed in het beheren van de verantwoordelijkheden van mijn dagelijks leven, wanneer ik vanuit huis werk

I am quite good at managing the responsibilities of my daily life, when working from home (+EM)

8. Tijdens het thuiswerken, ben ik goed in het managen van mijn tijd, zodat ik alles kan doen wat gedaan moet worden (+EM)

During telework, I am good at juggling my time so that I can fit everything in that needs to get done

9. Ik vind het belangrijk om nieuwe werkervaringen op te doen die uitdagen hoe je over jezelf en de wereld denkt

I think it is important to have new experiences in work that challenge how you think about yourself and the world (+PG)

10. Voor mij is het leven een continu proces van leren, veranderen en groeien als ik thuis werk

For me, life has been a continuous process of learning, changing and growth, when working from home (+PG)

11. Ik heb het lang geleden opgegeven om grote verbeteringen of veranderingen in mijn leven aan te brengen \rightarrow positively formulated: Tijdens het thuiswerken breng ik graag grote verbeteringen of veranderingen aan in mijn leven

I gave up trying to make big improvements or changes in my life a long time ago (-PG) 12. Ik heb het gevoel dat ik me als person heb ontwikkeld, tijdens het thuiswerken (+PG)

I have the sense that I have developed a lot as a person in the period of telework.

13. Het onderhouden van hechte relaties was moeilijk en frustrerend voor mij als ik vanuit thuis werkte

Maintaining close relationships has been difficult and frustrating for me, when working from home (-PR)

14. Collega's zouden mij omschrijven als een gul person, bereid om mijn tijd met anderen te delen

Colleagues would describe me as a giving person, willing to share my time with others (+PR)

15. Ik heb geen warme en vertrouwensvolle relaties met collega's ervaren bij het werken vanuit thuis

I have not experienced may warm and trusting relationships with colleagues, when working from home(-PR)

16. Tijdens het thuiswerken beleef ik plezier aan persoonlijke en wederzijdse gesprekken met collega's (+PR)

During telework, I enjoy personal and mutual conversations with colleagues **17.** Ik leef dag voor da gen denk niet echt aan de toekomst

I live life one day at a time and don't really think about the future (-PL)

18. Ik heb soms het gevoel dat ik alles heb gedaan wat er te doen is in het leven, wanneer ik vanuit huis werk

I sometimes feel as if I have done all there is to do in life, when working from home (-PL) 19. Sommige mensen dwalen doelloos door het leven sinds ze thuis werkten, maar ik ben niet een van hen

Some people wander aimlessly through life since working from home, but I am not one of them (+PL)

20. Tijdens het thuiswerken heb ik een duidelijk beeld van wat ik probeer te bereiken in het

leven.(+PL)

I have a good sense of what it is I am trying to accomplish in life

21. Als ik thuis werk, voel ik me in veel opzichten teleurgesteld over mijn prestaties in het leven

In many ways, when working from home I feel disappointed about my achievements in life (-SA)

22. Als ik naar het verhaal van mijn leven kijk, ben ik tevreden met hoe de dingen zijn afgelopen

When I look at the story of my life, I am pleased with how things have turned out (+SA) 23. Ik hou van de meeste aspecten van mijn persoonlijkheid

(*I like most aspects of my personality* $(+SA) \rightarrow$ item deleted and replaced by another item by Ryff, because pretests showed that this question was difficult to answer by respondents and less applicable to telework context) \rightarrow item replaced by: Tijdens het thuiswerken ben ik in zijn algemeenheid zelfverzekerd en positief over mezelf

24. Als ik mezelf vergelijk met collega's, voel ik me goed over wie ik ben (+SA) *When I compare myself to colleagues, it makes me feel good about who I am*

Appendix 3: Survey definitive Complete survey in Dutch

Introductie & privacy verklaring

Beste deelnemer,

Bedankt dat u de tijd wilt nemen om deze enquête in te vullen om mij te helpen met het afronden van de laatste fase van mijn Master in Business Administration (bedrijfskunde) aan de Radboud Universiteit. Middels deze enquête wil ik graag inzicht verkrijgen in het welzijn van werknemers die sinds de Corona pandemie thuiswerken.

Graag wil ik u erop wijzen dat de enquête volledig is geanonimiseerd en uw antwoorden uitsluitend worden gebruikt voor deze masterthesis. Dit houdt in dat uw gegevens

vertrouwelijk worden verwerkt en uw antwoorden niet herleidbaar zijn naar u als persoon.

Uw deelname aan het onderzoek is op vrijwillige basis. Dit betekent dat u het recht heeft om

op elk gewenst moment te stoppen. Er bestaan geen goede of foute antwoorden, omdat de vragen gericht zijn op uw ervaringen.

De tijd voor het invullen van deze enquête bedraagt ongeveer 5 minuten.

Met vriendelijke groet, Lauren Scheepers

Indien u naar de volgende pagina gaat, geeft u aan dat u akkoord gaat met bovenstaande informatie en daarbij toestemming geeft om uw geanonimiseerde antwoorden te gebruiken voor deze masterthesis.

- Ik ga akkoord

Vragen over thuiswerken

- 1. Werkt u momenteel vanuit huis?
- Ja
- Nee

2. Hoe vaak heeft u in het eerste kwartaal van 2021 (periode van 1 januari t/m 31 maart 2021) thuisgewerkt?

- A) Ik heb in deze periode niet thuisgewerkt
- B) Minder dan 25% van mijn wekelijkse contracturen
- C) 25% tot 50% van mijn wekelijkse contracturen
- D) 50% tot 75% van mijn wekelijkse contracturen
- E) 75% of meer van mijn wekelijkse contracturen
- F) Ik heb in deze periode volledig thuisgewerkt

Psychological needs

Voor de volgende vragen is het van belang dat u ze beantwoordt over de periode van 1 januari t/m 31 maart 2021 (1e kwartaal 2021) waarin u heeft thuisgewerkt. Dit betekent dat indien u thuis heeft gewerkt, terug denkt aan de periode van thuiswerken en daarop de vragen beantwoord.

Hierna volgen een aantal stellingen die u kunt beantwoorden met een 7-puntige likertschaal. Geef aan in welke mate u het eens bent met de volgende stellingen: (1= helemaal oneens, 2=oneens, 3=een beetje oneens, 4=neutraal, 5=een beetje eens, 6=eens, 7=helemaal eens).

Autonomy (bevat 1 reversed item; item 3)

1. Ik heb het gevoel dat ik mezelf kan zijn in mijn werk, wanneer ik thuiswerk (AUT1+)

2. Wanneer ik thuiswerk, heb ik zelden het gevoel dat ik andermans bevelen moet opvolgen (AUT2+)

3. Als ik mocht kiezen, dan zou ik dingen anders aanpakken in de thuiswerksetting (AUT3-)

4. De taken die ik tijdens het thuiswerken moet uitvoeren, stemmen overeen met wat ik echt wil doen (AUT4+)

5. Ik voel me vrij om bij het thuiswerken mijn werk uit te voeren zoals ik denk dat het goed is (AUT5+)

6. In de thuiswerksetting, voel ik me niet gedwongen om dingen te doen die ik niet wil doen (AUT6+)

Competence (bevat 1 reversed item; item 3)

1. Ik heb de taken van mijn werk goed onder de knie, als ik thuiswerk (COM1+)

2. Ik voel me bekwaam in mijn werk, wanneer ik thuiswerk (COM2+)

3. Ik twijfel of ik mijn werk goed kan uitvoeren, in de thuiswerksetting (COM3-)

4. Ik ben goed in mijn werk, wanneer ik thuiswerk (COM4+)

5. Ik heb het gevoel dat ik ook de moeilijke taken op mijn werk tot een goed einde kan brengen, wanneer ik thuiswerk (COM5+)

Relatedness (bevat een reversed item; item 1)

1. Ik voel vanuit de thuiswerksetting niet echt een band met andere mensen van mijn werk (REL1-)

2. Vanuit de thuiswerksetting, voel ik me onderdeel van een groep (REL2+)

3. Wanneer ik thuiswerk, ga ik regelmatig om met collega's andere mensen van mijn werk (REL3+)

4. Wanneer ik thuiswerk, kan ik met andere mensen van het werk praten over wat ik echt belangrijk vind (REL4+)

5. Sommige collega's met wie ik werk, zijn goede vrienden van mij (REL5+)

Six dimensions psychological wellbeing

1. Tijdens het thuiswerken heb ik niet de neiging om beïnvloed te worden door collega's met sterke meningen (+PAUT1)

2. Tijdens het thuiswerken heb ik vertrouwen in mijn eigen meningen, zelfs als die in strijd zijn met de algemene consensus (+PAUT2) 3. Tijdens het thuiswerken beoordeel ik mezelf op wat ik zelf belangrijk vind en niet op hetgeen collega's denken (+PAUT3)

4. Tijdens het thuiswerken vind ik het niet moeilijk om mijn mening te delen over controversiële zaken (+PAUT4)

5. Als ik thuiswerk, heb ik over het algemeen het gevoel dat ik de controle heb over de situatie waarin ik leef (+EM1)

6. Als ik thuiswerk word ik zelden teleurgesteld door de eisen van het dagelijks leven (+EM2)7. Ik ben redelijk goed in het beheren van de verantwoordelijkheden van mijn dagelijks leven, wanneer ik thuiswerk (+EM3)

8. Tijdens het thuiswerken, ben ik goed in het managen van mijn tijd, zodat ik alles kan doen wat gedaan moet worden (+EM4)

9. Tijdens het thuiswerken vind ik het belangrijk om nieuwe werkervaringen op te doen die uitdagen hoe je over jezelf en de wereld denkt (+PG1)

10. Tijdens het thuiswerken is mijn leven een continu proces van leren, veranderen en groeien (+PG2)

11. Tijdens het thuiswerken breng ik graag grote verbeteringen of veranderingen in mijn leven aan (+PG3).

12. Ik heb het gevoel dat ik me als person heb ontwikkeld, tijdens het thuiswerken. (+PG4)

13. Het onderhouden van hechte relaties met collega's was niet moeilijk en niet frustrerend voor mij tijdens het thuiswerken (+PR1).

14. Collega's zouden mij omschrijven als een gul person, bereid om mijn tijd met anderen te delen (+PR2)

15. Ik heb warme en vertrouwensvolle relaties met collega's ervaren bij het werken vanuit thuis (+PR3)

16. Tijdens het thuiswerken beleef ik plezier aan persoonlijke en wederzijdse gesprekken met collega's (+PR4)

17. Tijdens het thuiswerken denk ik vaak aan de toekomst (+PL1)

18. Tijdens het thuiswerken heb ik het gevoel dat er nog veel uitdagingen zijn in het leven.(+PL2)

19. Sommige mensen dwalen doelloos door het leven sinds ze thuis werken, maar ik ben niet een van hen (+PL3)

20. Tijdens het thuiswerken heb ik een duidelijk beeld van wat ik probeer te bereiken in het leven.(+PL4)

21. Als ik thuiswerk, voel ik me in veel opzichten tevreden over mijn prestaties in het leven (+SA1)

22. Als ik terugkijk naar de periode van thuiswerken (in het eerste kwartaal van 2021), ben ik tevreden met hoe de dingen zijn gelopen (+SA2)

23. Tijdens het thuiswerken ben ik in zijn algemeenheid zelfverzekerd en positief over mezelf (+SA3)

24. Als ik mezelf vergelijk met collega's, voel ik me goed over wie ik ben (+SA4)

Demografische vragen

- 1.Wat is uw leeftijd?
- 2. Met welk geslacht identificeert u zich?
- Man
- Vrouw
- Geen
- 3. Heeft u een leidinggevende functie?
- ja
- nee

5. In welke sector bent u momenteel werkzaam?

- Gezondheidszorg en welzijn
- Dienstverlening
- ICT
- Openbaar bestuur, veiligheid en juridisch
- Landbouw
- Media en communicatie
- Onderwijs, cultuur en wetenschap
- Techniek
- Toerisme
- Transport en logistiek
- Overig, namelijk:
- 6. Hoe lang bent u werkzaam in uw huidige organisatie?
- Minder dan 1 maand
- 1 maand tot 6 maanden
- 6 maanden tot 12 maanden

- 1 jaar tot 2 jaar
- Meer dan 2 jaar

<u>Einde</u>

Hartelijk dank voor uw deelname! Uw antwoorden zijn geregistreerd. Met behulp van uw respons wordt er inzicht verschaft in het welzijn van thuiswerkers.

Indien u vragen heeft of geïnteresseerd bent in de resultaten van het onderzoek, kunt u mij contacteren via het volgende emailadres: lauren.scheepers@student.ru.nl

Appendix 4: Sample descriptives

	Frequency	Percent	Cumulative Percent
Men	103	51.2	51.2
Women	97	48.3	99.5
Prefer not to say	1	.5	100.0
Total	201	100	

Table 2: Age groups

Age (in numbers)		
N Valid	201	
Missing	0	
Mean	43.77	
Mode	46	
Std. Deviation	11.185	
Range	43	
Minimum	22	
Maximum	65	

Age	Frequency	Percent	Cumulative Percent
< 25	12	6	6
26-35	43	21.4	27.4
36-45	48	23.9	51.2
46-55	63	31.3	82.6
56-65	35	17.4	100
Total	201	100	

Table 3a: Sector

	Frequency	Percent	Cumulative Percent
Healthcare and welfare	37	18.4	18.4
Services	36	17.9	36.3

ICT	66	32.8	69.2
Public administration,	9	4.5	73.6
security and legal			
Agriculture	1	.5	74.1
Media and communication	3	1.5	75.6
Education, culture and	8	4.0	79.6
science			
Technic	11	5.5	85.1
Transport and logistics	3	1.5	86.6
Different, namely:	27	13.4	100
Total	201	100	

Table 3b: Sector, different

	Frequency	Percent	Cumulative Percent
	174	86.6	86.6
-	1	.5	87.1
Bank	1	.5	87.6
Bouw	1	.5	88.1
Consumentenelektronica	1	.5	88.6
Detachering	1	.5	89.1
Detailhandel	1	.5	89.1
Energiesector	1	.5	90.0
Financiele sector	1	.5	90.5
Groothandel	1	.5	91.0
HR	1	.5	91.5
HRM, overheid	1	.5	92.0
Industrie	1	.5	92.5
Inspectie/toezicht	1	.5	93.0
Inspectiedienst	1	.5	93.5
Rijksoverheid			
Overheid	2	1.0	94.5
Overheid-gemeente	1	.5	95.0
Sales	1	.5	95.5
Telecom	1	.5	96.0
Toezicht	1	.5	96.5
Toezicht	1	.5	97.0
gezondheidszorg			
Vastgoed ontwikkeling	1	.5	97.5
Verf en vulmiddelen	1	.5	98.0
Voedselproductie	1	.5	98.5
Waterbedrijven	1	.5	99.0
Woningcorporatie	1	.5	99.5

Zakelijke	1	.5	100.0
dienstverlening			
Total	201	100	

Table 4: Amount of telework

Amount	Frequency	Percent	Cumulative Percent
Less than 25% of	7	3.5	3.5
working hours			
25% - 50% of	15	7.5	10.9
working hours			
50%-75% of	14	7	17.9
working hours			
75% or more of	53	26.4	44.3
working hours			
I completely	112	55.7	100
worked from			
home			
Total	201	100.0	

Table 5: Work from home

Do you still work	Frequency	Percent	Cumulative Percent
from home?			
Yes	194	96.5	96.5
No	7	3.5	100
Total	201	100	

Table 6: Managerial function

Do you have a managerial function?	Frequency	Percent	Cumulative Percent
Yes	59	29.4	29.4
No	142	70.6	100
Total	201	100	

Table 7: Duration of employment

How long have you	Frequency	Percent	Cumulative Percent
been employed in your			
current organization?			
1 to 6 months	7	3.5	3.5
6 to 12 months	18	9.0	12.4
1 to 2 years	20	10.0	22.4
More than 2 years	156	77.6	100.0

201	100.0	

Appendix 5: Discriminant validity

5.1. Discriminant validity iteration 1

				Factor Co	orrelation	Matrix			
Factor	1	2	3	4	5	6	7	8	9
1	1.000	.355	323	.077	.070	.373	.320	.445	.225
2	.355	1.000	301	.268	.138	.196	.115	.268	.144
3	323	301	1.000	057	178	239	238	283	106
4	.077	.268	057	1.000	.140	096	.056	.058	018
5	.070	.138	178	.140	1.000	077	.059	.027	.171
6	.373	.196	239	096	077	1.000	.198	.310	.090
7	.320	.115	238	.056	.059	.198	1.000	.377	.158
8	.445	.268	283	.058	.027	.310	.377	1.000	.290
9	.225	.144	106	018	.171	.090	.158	.290	1.000

KMO and Bartlett's Test					
Kaiser-Meyer-Olkin Measure	.887				
Bartlett's Test of Sphericity	3934.338				
	df	780			
	Sig.	.000			

Satisfactory results KMO & Bartlett's test

Total Variance Explained								
	Initial Eigenvalues			Extrac	Extraction Sums of Squared Loadings			
							SS Load.	
Factor	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	
1	11.554	28.884	28.884	11.122	27.804	27.804	6.806	
2	3.122	7.805	36.690	2.709	6.772	34.575	4.985	
3	2.283	5.708	42.397	1.838	4.595	39.171	5.793	
4	1.950	4.876	47.273	1.447	3.618	42.789	2.076	
5	1.554	3.885	51.159	1.090	2.726	45.515	1.716	

6	1.363	3.407	54.565	.941	2.353	47.868	4.226
7	1.218	3.046	57.612	.751	1.878	49.746	3.810
8	1.169	2.922	60.534	.671	1.677	51.423	6.458
9	1.086	2.714	63.248	.531	1.328	52.751	2.145
10	.988	2.470	65.718				
11	.938	2.344	68.062				
12	.863	2.157	70.219				
13	.856	2.139	72.358				
14	.744	1.860	74.217				
15	.729	1.822	76.039				
16	.692	1.730	77.769				
17	.651	1.627	79.395				
18	.610	1.526	80.921				
19	.594	1.485	82.406				
20	.577	1.442	83.848				
21	.516	1.289	85.137				
22	.501	1.253	86.390				
23	.486	1.214	87.604				
24	.465	1.162	88.767				
25	.442	1.105	89.871				
26	.418	1.045	90.916				
27	.372	.930	91.846				
28	.352	.881	92.727				
29	.348	.869	93.597				
30	.322	.806	94.403				
31	.301	.753	95.156				
32	.288	.720	95.875				
33	.275	.688	96.563				
34	.257	.643	97.207				
35	.248	.619	97.825				
36	.218	.544	98.369				
37	.205	.512	98.881				
38	.165	.413	99.294				

39	.158	.395	99.689		
40	.124	.311	100.000		

Extraction Method: Principal Axis Factoring

	Communalities	
	Initial	Extraction
AUT1	0.492	0.492
AUT2	0.472	0.469
AUT3R	0.355	0.274
AUT4	0.478	0.467
AUT5	0.588	0.568
AUT6	0.391	0.277
COM1	0.615	0.531
COM2	0.731	0.860
COM3R	0.467	0.396
COM4	0.648	0.599
COM5	0.487	0.417
REL1R	0.573	0.546
REL2	0.659	0.654
REL3	0.493	0.514
REL4	0.522	0.474
REL5	0.357	0.330
PAUT1	0.267	0.276
PAUT2	0.490	0.515
PAUT3	0.359	0.383
PAUT4	0.446	0.395
EM1	0.605	0.606
EM2	0.578	0.571
EM3	0.565	0.707
EM4	0.521	0.467
PG1	0.457	0.398
PG2	0.566	0.675
PG3	0.555	0.612

PG4	0.566	0.544
PR1	0.513	0.445
PR2	0.437	0.472
PR3	0.598	0.655
PR4	0.513	0.474
PL1	0.607	0.759
PL2	0.598	0.611
PL3	0.487	0.406
PL4	0.606	0.516
SA1	0.755	0.675
SA2	0.721	0.722
SA3	0.815	0.859
SA4	0.539	0.490

Extraction method: Principal Axis Factoring

				Pat	tern Ma	trix			
		Factor							
	1	2	3	4	5	6	7	8	9
AUT1							0.381		
AUT2							0.481		
AUT3R						0.351			
AUT4							0.428		
AUT5	0.320						0.279		
AUT6									
COM1								0.522	
COM2								0.871	
COM3R								0.319	
COM4								0.574	
COM5								0.395	
REL1R			-0.668						
REL2			-0.743						
REL3			-0.626						
REL4			-0.470						

REL5					0.462				
PAUT1									0.508
PAUT2								0.404	0.372
PAUT3									0.390
PAUT4								0.337	
EM1	0.341						0.361		
EM2						0.413			
EM3						0.814			
EM4						0.536			
PG1		0.604							
PG2		0.847							
PG3		0.752							
PG4		0.578							
PR1			-0.511						
PR2					0.638				
PR3			-0.504		0.416				
PR4			-0.591						
PL1				0.843					
PL2				0.732					
PL3	0.341								
PL4	0.341	0.323							
SA1	0.579								
SA2	0.498		-0.337						
SA3	0.685								
SA4	0.571								

Extraction method: Principal Axis Factoring

Rotation method: Oblimin with Kaiser Normalization

1=self-acceptance (SA), 2= personal growth (PG), 3= relatedness (REL), 4=purpose in life (PL), 5=positive relations (PR), 6=environmental mastery (EM), 7=autonomy (AUT), 8=competence (COM), 9=autonomy dependent variable (PAUT)

5.2. Discriminant validity: Iteration 2

Iteration 2 after deleting the 6 items: PL3, PL4, EM1, AUT3R, REL5, PAUT1

KMO an		
Kaiser-Meyer-Olkin Measure of	of Sampling Adequacy	.882
	I	
Bartlett's Test of Sphericity	Approx. Chi-Square	3309.819
	df	561
	Sig.	.000

Satisfactory results KMO & Bartlett's test

	Communalities	
	Initial	Extraction
AUT1	0.477	0.488
AUT2	0.453	0.472
AUT4	0.450	0.446
AUT5	0.560	0.561
AUT6	0.361	0.299
COM1	0.605	0.525
COM2	0.724	0.878
COM3R	0.446	0.395
COM4	0.637	0.608
COM5	0.451	0.406
REL1R	0.567	0.523
REL2	0.632	0.640
REL3	0.453	0.470
REL4	0.504	0.491
PAUT2	0.468	0.555
PAUT3	0.326	0.326
PAUT4	0.428	0.435
EM2	0.529	0.519
EM3	0.513	0.640
EM4	0.504	0.559
PG1	0.443	0.433
PG2	0.544	0.666

PG3	0.542	0.625
PG4	0.537	0.527
PR1	0.486	0.466
PR2	0.416	0.714
PR3	0.582	0.607
PR4	0.491	0.480
PL1	0.577	0.726
PL2	0.589	0.682
SA1	0.722	0.678
SA2	0.710	0.745
SA3	0.806	0.878
SA4	0.531	0.514

Extraction Method: Principal Axis Factoring

			Total Varia	nce Expla	ined		
		Initial Eigenv	alues	Extrac	Rotation SS Load.		
Factor	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total
1	10.213	30.039	30.039	9.796	28.811	28.811	7.303
2	2.882	8.476	38.515	2.499	7.351	36.162	4.109
3	2.169	6.379	44.894	1.728	5.081	41.243	5.671
4	1.805	5.308	50.202	1.348	3.965	45.208	3.884
5	1.384	4.072	54.274	.984	2.894	48.102	1.933
6	1.289	3.790	58.064	.904	2.659	50.761	3.420
7	1.150	3.382	61.446	.696	2.046	52.807	.967
8	.987	2.903	64.348	.588	1.730	54.538	6.309
9	.890	2.618	66.966	.433	1.273	55.811	1.249
10	.855	2.514	69.481				
11	.800	2.352	71.832				
12	.781	2.296	74.128				
13	.701	2.063	76.191				
14	.673	1.979	78.169				
15	.615	1.809	79.979				
16	.595	1.750	81.728				

17	.578	1.700	83.429		
18	.528	1.554	84.983		
19	.499	1.468	86.451		
20	.489	1.437	87.888		
21	.472	1.388	89.276		
22	.425	1.250	90.526		
23	.395	1.162	91.688		
24	.372	1.094	92.782		
25	.333	.979	93.761		
26	.331	.972	94.733		
27	.306	.901	95.634		
28	.276	.811	96.445		
29	.262	.769	97.215		
30	.249	.731	97.946		
31	.221	.649	98.595		
32	.173	.508	99.103		
33	.169	.496	99.599		
34	.136	.401	100.000		

Extraction Method: Principal Axis Factoring

	Pattern Matrix									
	Factor									
	1	2	3	4	5	6	7	8	9	
AUT1				.343						
AUT2				.552						
AUT4				.283						
AUT5	.386			.200				.312		
AUT6				.502						
COM1								.499		
COM2								.935		
COM3R								.420		
COM4								.605		
COM5								.451		

REL1R			616					
REL2			730					
REL3			671					
REL4			523					
PAUT2							544	
PAUT3				.404			223	
PAUT4							373	
EM2				.278		.327		
EM3						.738		
EM4						.647		
PG1		.589						
PG2		.837						
PG3		.751						
PG4		.557						
PR1			537					
PR2								823
PR3			583					318
PR4			644					
PL1					.800			
PL2					.782			
SA1	.690							
SA2	.726							
SA3	.798							
SA4	.673							

Extraction Method: Principal Axis Factoring. Rotation Method: Oblimin with Kaiser Normalization

a. Rotation converged in 23 iterations
Appendix 6: Convergent validity 6.1. Convergent validity independent variables

Autonomy (except AUT3R)

KMO and Bartlett's Test			
Kaiser-Meyer-Olkin Measure of	.775		
Bartlett's Test of Sphericity	166.185		
	df	10	
	Sig.	.000	

Satisfactory results KMO & Bartlett's test

Communalities			
	Initial	Extraction	
AUT1	.288	.416	
AUT2	.207	.279	
AUT4	.265	.380	
AUT5	.286	.419	
AUT6	.160	.208	

Extraction Method: Principal Axis Factoring

Total Variance Explained						
Initial Eigenvalues		Extraction Sums of Squared Loadings				
Factor	Total % of Variance Cumulative %		Total	% of Variance	Cumulative %	
1	2.346	46.916	46.916	1.703	34.059	34.059
2	.820	16.400	63.315			
3	.711	14.230	77.545			
4	.573	11.463	89.009			
5	.550	10.991	100.000			

Extraction Method: Principal Axis Factoring

Factor Matrix		
Factor		
1		
AUT5	0.647	
AUT1	0.645	

AUT4	0.616
AUT2	0.529
AUT6	0.457

Competence

KMO and Bartlett's Test			
Kaiser-Meyer-Olkin Measure of	.828		
Bartlett's Test of Sphericity	Bartlett's Test of Sphericity Approx. Chi-Square		
df		10	
	Sig.	.000	

Satisfactory results KMO & Bartlett's test

Communalities			
	Initial	Extraction	
COM1	.429	.461	
COM2	.627	.782	
COM3R	.524	.613	
COM4	.343	.390	
COM5	.295	.346	

Extraction Method: Principal Axis

Total Variance Explained						
Initial Eigenvalues			Extrac	tion Sums of Squ	ared Loadings	
Factor	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.035	60.699	60.699	2.592	51.835	51.835
2	.641	12.811	73.510			
3	.601	12.023	85.533			
4	.455	9.094	94.627			
5	.269	5.373	100.000			

Factor Matrix		
	Factor	
	1	
COM2	.884	

COM4	.783
COM1	.679
COM5	.625
COM3R	.588

Extraction Method: Principal Axis Factoring

Relatedness

KMO and Bartlett's Test			
Kaiser-Meyer-Olkin Measure of	.757		
Bartlett's Test of Sphericity Approx. Chi-Square		244.205	
	df	6	
	Sig.	.000	

Satisfactory results KMO & Bartlett's test

Communalities			
	Initial	Extraction	
REL1R	.442	.531	
REL2	.510	.696	
REL3	.326	.391	
REL4	.309	.390	

Extraction Method: Principal Axis Factoring

Total Variance Explained						
	Initial Eigenvalues			Extrac	ared Loadings	
Factor	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.483	62.080	62.080	2.008	50.199	50.199
2	.609	15.227	77.307			
3	.570	14.260	91.567			
4	.337	8.433	100.000			

Extraction Method: Principal Axis Factoring

Factor Matrix			
	Factor		
	1		
REL2	.834		
REL1R	.729		

REL3	.626
REL4	.624

Extraction Method: Principal Axis Factoring a. 1 factors extracted. 9 iterations required

6.2. Convergent validity dependent variables

Environmental Mastery (EM)

KMO and Bartlett's Test				
Kaiser-Meyer-Olkin Measure of	.658			
Bartlett's Test of Sphericity	Bartlett's Test of Sphericity Approx. Chi-Square			
	df	3		
	Sig.	.000		

Satisfactory results KMO & Bartlett's test

Communalities				
Initial Extraction				
EM2	.251	.336		
EM3	.384	.685		
EM4	.316	.433		

Extraction Method: Principal Axis Factoring

Total Variance Explained						
		Initial Eigenvalues Extraction Sums of Squared Loadings				
Factor	Total% of VarianceCumulative %		Total	% of Variance	Cumulative %	
1	1.941	64.691	64.691	1.454	48.482	48.482
2	.626	20.867	85.557			
3	.433	14.443	100.000			

Extraction Method: Principal Axis Factoring

Factor Matrix			
Factor			
	1		
EM3	.828		
EM4	.658		
EM2	.580		

Autonomy (PAUT)

KMO and Bartlett's Test				
Kaiser-Meyer-Olkin Measure	.632			
Bartlett's Test of Sphericity	Approx. Chi-Square	86.140		
	df	3		
	Sig.	.000		

Satisfactory results KMO & Bartlett's test

Communalities					
	Initial	Extraction			
PAUT2	.289	.612			
PAUT3	.174	.256			
PAUT4	.232	.352			

Extraction Method: Principal Axis Factoring

Total Variance Explained						
		Initial Eigenva	alues	Extrac	tion Sums of Squ	ared Loadings
Factor	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	1.778	59.254	59.254	1.220	40.678	40.678
2	.708	23.591	82.845			
3	.515	17.155	100.000			

Extraction Method: Principal Axis Factoring

Factor Matrix			
Factor			
1			
PAUT2	.782		
PAUT4	.593		
PAUT3	.506		

Extraction Method: Principal Axis Factoring

a. 1 factors extracted. 19 iterations required

Personal Growth (PG)

KMO and Bartlett's Test				
Kaiser-Meyer-Olkin Measure	.780			
Bartlett's Test of Sphericity	Approx. Chi-Square	260.433		
	df	6		
	Sig.	.000		

Satisfactory results KMO & Bartlett's test

Communalities				
	Initial	Extraction		
PG1	.315	.366		
PG2	.484	.644		
PG3	.487	.648		
PG4	.363	.426		

Extraction Method: Principal Axis Factoring

Total Variance Explained						
	Initial Eigenvalues		Extrac	tion Sums of Squ	ared Loadings	
Factor	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.539	63.486	63.486	2.084	52.100	52.100
2	.656	16.398	79.884			
3	.432	10.811	90.696			
4	.372	9.304	100.000			

Extraction Method: Principal Axis Factoring

Factor Matrix		
Factor		
	1	
PG3	.805	
PG2	.803	
PG4	.653	
PG1	.605	

Extraction Method: Principal Axis Factoring a. 1 factors extracted. 7 iterations required

Positive relations (PR)

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure	of Sampling Adequacy	.706
Bartlett's Test of Sphericity	Approx. Chi-Square	173.013
	df	6
	Sig.	.000

Satisfactory results KMO & Bartlett's test

Communalities			
	Initial	Extraction	
PR1	.296	.360	
PR2	.200	.201	
PR3	.428	.695	
PR4	.321	.426	

Extraction Method: Principal Axis Factoring

Total Variance Explained						
	Initial Eigenvalues		Extrac	tion Sums of Squ	ared Loadings	
Factor	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.204	55.100	55.100	1.682	42.044	42.044
2	.839	20.977	76.077			
3	.537	13.421	89.498			
4	.420	10.502	100.000			

Extraction Method: Principal Axis Factoring

Factor Matrix			
Factor			
1			
PR3	.834		
PR4	.652		
PR1	.600		
PR2	.448		

Extraction Method: Principal Axis Factoring a. 1 factors extracted. 13 iterations required

Purpose in Life (PL)

KMO and Bartlett's Test			
Kaiser-Meyer-Olkin Measure of Sampling Adequacy		.500	
Bartlett's Test of Sphericity	Approx. Chi-Square	116.703	
	df	1	
	Sig.	.000	

Satisfactory results KMO & Bartlett's test

Communalities			
	Initial	Extraction	
PL1	.445	.666	
PL2	.445	.666	

Extraction Method: Principal Axis Factoring

Total Variance Explained						
	Initial Eigenvalues Extraction Sums of Squared Loading					ared Loadings
Factor	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	1.667	83.336	83.336	1.332	66.586	66.586
2	.333	16.664	100.000			

Extraction Method: Principal Axis Factoring

Factor Matrix		
	Factor	
	1	
PL2	.816	
PL1	.816	

Extraction Method: Principal Axis Factoring

a. 1 factors extracted. 8 iterations required

Self-Acceptance (SA)

KMO and Bartlett's Test			
Kaiser-Meyer-Olkin Measure	of Sampling Adequacy	.808	
Bartlett's Test of Sphericity	Approx. Chi-Square	473.356	
	df	6	
	Sig.	.000	

Satisfactory results KMO & Bartlett's test

Communalities				
	Initial	Extraction		
SA1	.609	.667		
SA2	.636	.699		
SA3	.723	.872		
SA4	.433	.436		

Extraction Method: Principal Axis Factoring

Total Variance Explained							
		Initial Eigenv	alues	Extrac	ction Sums of Squ	ared Loadings	
Factor	Total % of Variance Cumulative %		Total	% of Variance	Cumulative %		
1	2.978	74.450	74.450	2.675	66.866	66.866	
2	.537	13.425	87.874				
3	.283	7.084	94.958				
4	.202	5.042	100.000				

Extraction Method: Principal Axis Factoring

Factor Matrix			
Factor			
1			
SA3	.934		
SA2	.836		
SA1	.817		
SA4	.660		

Extraction Method: Principal Axis Factoring b. 1 factors extracted. 8 iterations required

Appendix 7: Reliability analysis

7.1. Reliability analysis independent variables

7.1.1. Reliability analysis Autonomy (AUT)

Reliability statistics Autonomy (AUT				
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items		
0.681	0.708	6		

Item total statistics						
	Scale Mean if	Scale variance if	Corrected	Squared Multiple	Cronbach's	
	Item deleted	Item Deleted	Item-Total	Correlation	Alpha if Item	
			Correlation		Deleted	
AUT1	25.1542	24.911	0.497	0.290	0.617	
AUT2	26.3532	22.530	0.458	0.222	0.623	
AUT3R	26.8557	25.124	0.278	0.100	0.691	
AUT4	25.7811	23.322	0.485	0.274	0.614	
AUT5	24.8706	26.803	0.513	0.293	0.664	
AUT6	26.0597	23.696	0.354	0.162	0.664	

7.1.2. Reliability analysis Competence (COM)

Reliability statistics Competence (COM)					
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items			
0.812	0.835	5			

Item total statistics						
	Scale Mean if	Scale variance if	Corrected	Squared Multiple	Cronbach's	
	Item deleted	Item Deleted	Item-Total	Correlation	Alpha if Item	
			Correlation		Deleted	
COM1	22.9502	14.578	0.593	0.429	0.785	
COM2	22.9701	13.149	0.749	0.627	0.742	
COM3R	23.6169	11.208	0.542	0.295	0.817	
COM4	23.2338	12.870	0.683	0.524	0.753	

COM5	23.3682	12.674	0.568	0.343	0.786
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7.1.3. Reliability analysis Relatedness (REL)

Reliability statistics Relatedness (REL)				
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items		
0.733	0.735	5		

Item total statistics						
	Scale Mean if	Scale variance if	Corrected	Squared Multiple	Cronbach's	
	Item deleted	Item Deleted	Item-Total	Correlation	Alpha if Item	
			Correlation		Deleted	
REL1R	17.2886	23.536	0.524	0.460	0.676	
REL2	16.2189	21.392	0.652	0.513	0.624	
REL3	16.2886	21.406	0.595	0.364	0.644	
REL4	16.3383	22.905	0.543	0.315	0.667	
REL5	16.7711	27.517	0.201	0.116	0.794	

7.2. Reliability analysis dependent variables (6 dimensions PWB)

7.2.1. Reliability analysis Autonomy (PAUT)

Reliability statistics Autonomy (PAUT)				
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items		
0.584	0.604	4		

Item total statistics						
	Scale Mean if Item deleted	Scale variance if Item Deleted	Corrected Item-Total	Squared Multiple Correlation	Cronbach's Alpha if Item	
			Correlation		Deleted	
PAUT1	15.52	9.991	0.213	0.053	0.646	
PAUT2	14.54	9.579	0.502	0.297	0.426	
PAUT3	15.05	9.252	0.410	0.189	0.477	

PAUT4	14.77	9.220	0.387	0.232	0.495
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7.2.2. Reliability analysis Environmental Mastery (EM)

Reliability statistics Environmental Mastery (EM)						
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items				
0.758	0.766	4				

Item total statistics						
	Scale Mean if	Scale variance if	Corrected	Squared Multiple	Cronbach's	
	Item deleted	Item Deleted	Item-Total	Correlation	Alpha if Item	
			Correlation		Deleted	
EM1	15.72	11.344	0.552	0.340	0.704	
EM2	16.59	9.674	0.595	0.398	0.684	
EM3	15.36	12.481	0.590	0.386	0.697	
EM4	15.68	11.118	0.523	0.336	0.721	

7.2.3. Reliability analysis Positive Relations (PR)

Reliability statistics Positive Relations (PR)					
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items			
0.723	0.722	4			

Item total statistics						
	Scale Mean if	Scale variance if	Corrected	Squared Multiple	Cronbach's	
	Item deleted	Item Deleted	Item-Total	Correlation	Alpha if Item	
			Correlation		Deleted	
PR1	15.44	9.978	0.506	0.296	0.672	
PR2	13.73	13.827	0.367	0.200	0.735	
PR3	14.19	10.154	0.648	0.428	0.577	
PR4	13.86	10.530	0.551	0.321	0.636	

7.2 Rettability analysis I in pose in Life (I L)						
Reliability statistics Purpose in Life (PL)						
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items				
0.613	0.611	4				

7.2.4. Reliability analysis Purpose in Life (PL)

Item total statistics						
	Scale Mean if	Scale variance if	Corrected	Squared Multiple	Cronbach's	
	Item deleted	Item Deleted	Item-Total	Correlation	Alpha if Item	
			Correlation		Deleted	
PL1	15.51	9.101	0.429	0.465	0.515	
PL2	15.44	8.617	0.483	0.456	0.472	
PL3	14.88	10.849	0.216	0.222	0.664	
PL4	15.36	8.851	0.458	0.276	0.492	

7.2.5. Reliability analysis Personal Growth (PG)

Reliability statistics Personal Growth (PG)					
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items			
0.807	0.806	4			

Item total statistics						
	Scale Mean if	Scale variance if	Corrected	Squared Multiple	Cronbach's	
	Item deleted	Item Deleted	Item-Total	Correlation	Alpha if Item	
			Correlation		Deleted	
PG1	12.67	16.423	0.538	0.315	0.797	
PG2	13.06	13.511	0.692	0.484	0.724	
PG3	13.58	14.094	0.694	0.487	0.724	
PG4	13.16	15.068	0.577	0.363	0.781	

Reliability statistics Self-Acceptance (SA)						
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items				
0.885	0.884	4				

Item total statistics						
	Scale Mean if	Scale variance if	Corrected	Squared Multiple	Cronbach's	
	Item deleted	Item Deleted	Item-Total	Correlation	Alpha if Item	
			Correlation		Deleted	
SA1	15.92	12.464	0.762	0.609	0.848	
SA2	15.87	11.883	0.776	0.636	0.843	
SA3	15.78	11.655	0.850	0.723	0.812	
SA4	15.63	14.765	0.623	0.433	0.897	

Appendix 8: Descriptives table

		Statis	tics	
		AUTONOMY	COMPETENCE	RELATEDNESS
Ν	Missing	201	201	201
	Valid	0	0	0
Mean		5.3711	5.8070	4.1928
Median		5.4000	6.0000	4.2500
Mode		6.00	6.00	4.00
Std. Deviation		1.00248	.87735	1.31142
Skewness		641	-1.032	227
Std. Error of Ske	ew-ness	.172	.172	.172
Kurtosis		.428	1.549	737
Std. Error of Ku	rtosis	.341	.341	.341
Range		4.60	4.40	5.75
Minimum		2.40	2.60	1.00
Maximum		7.00	7.00	6.75
Sum		1079.60	1167.20	842.75

			Stat	istics			
		EM	PAUT	PG	PR	PL	SA
Ν	Missing	201	201	201	201	201	201
	Valid	0	0	0	0	0	0
Mear	1	5.2388	5.1725	4.3737	4.7687	4.9204	5.2662
Medi	an	5.3333	5.3333	4.5000	4.7500	5.0000	5.7500
Mode	e	6.00	6.00	4.00	5.50	6.00	6.00
Std. 1	Deviation	1.12270	1.05362	1.24200	1.06358	1.29658	1.16541
Skew	ness	927	-1.040	.012	440	699	-1.144
Std. 1	Error of	.172	.172	.172	.172	.172	.172
Skew	-ness						
Kurto	osis	.858	1.714	683	.198	.172	1.311
Std. 1	Error of	.341	.341	.341	.341	.341	.341
Kurto	osis						
Rang	je	5.67	6.00	5.00	5.50	6.00	6.00
Mini	mum	1.33	1.00	2.00	1.50	1.00	1.00
Maxi	mum	7.00	7.00	7.00	7.00	7.00	7.00
Sum		1053.00	1039.67	879.00	958.50	989.00	1058.50

Appendix 9: Testing linearity with polynomials

Extra check for linearity with polynomials:

	Coefficients ^a							
	Unstand	dardized	Standardized		Collinearity	ý		
	Coeffic	ients	Coefficients			Statistics		
	В	Std.	Beta	Т	Sig.	Tolerance	VIF	
		Error						
(constant)	5.207	.103		50.737	.000			
AUTcentered	.076	.129	.068	.592	.555	.247	4.046	
COMcentered	.803	.132	.627	6.069	.000	.308	3.251	
RELcentered	.084	.099	.098	.852	.395	.247	4.045	
AUTcentered2	.027	.082	.037	.331	.741	.256	3.901	
AUTcentered3	.040	.042	.155	.958	.339	.126	7.942	
COMcentered2	070	.121	090	580	.563	.137	7.303	
COMcentered3	084	.050	303	-1.662	.098	.099	10.091	
RELcentered2	.012	.041	.021	.298	.766	.661	1.513	
RELcentered3	011	.023	061	491	.624	.212	4.725	

Table 7: Inclusion of polynomial terms for Environmental Mastery (EM)

Coefficients ^a										
	Unstan	dardized	Standardized			Collinearity	у			
	Coefficients		Coefficients			Statistics				
	В	Std.	Beta	Т	Sig.	Tolerance	VIF			
		Error			-					
(constant)	5.122	.102		49.977	.000					

AUTcentered	.427	.129	.406	3.312	.001	.247	4.046
COMcentered	.281	.132	.234	2.126	.035	.308	3.251
RELcentered	013	.099	016	130	.897	.247	4.045
AUTcentered2	.027	.082	.040	.333	.739	.256	3.901
AUTcentered3	042	.042	174	-1.011	.313	.126	7.942
COMcentered2	.056	.121	.076	.460	.646	.137	7.303
COMcentered3	.025	.050	.097	.503	.616	.099	10.091
RELcentered2	011	.041	021	275	.784	.661	1.513
RELcentered3	.019	.023	.110	.826	.410	.212	4.725

 Table 8: Inclusion of polynomial terms for (P)Autonomy (PAUT)

Coefficients ^a									
	Unstan	dardized	Standardized		Collinearity	Collinearity			
	Coefficients		Coefficients			Statistics			
	В	Std.	Beta	Т	Sig.	Tolerance	VIF		
		Error							
(constant)	4.764	.093		51.275	.000				
AUTcentered	.211	.117	.199	1.807	.072	.247	4.046		
COMcentered	212	.120	175	-1.768	.079	.308	3.251		
RELcentered	.489	.089	.603	5.471	.000	.247	4.045		
AUTcentered2	056	.074	081	749	.455	.256	3.901		
AUTcentered3	016	.038	064	412	.681	.126	7.942		
COMcentered2	.146	.110	.197	1.329	.185	.137	7.303		
COMcentered3	.076	.046	.290	1.667	.097	.099	10.091		
RELcentered2	007	.037	013	199	.843	.661	1.513		
RELcentered3	006	.021	032	272	.786	.212	4.725		

Table 9: Inclusion of polynomial terms for Positive relations (PR)

Coefficients ^a									
	Unstan	dardized	Standardized		Collinearity	y			
	Coeffic	eients	Coefficients			Statistics			
	В	Std.	Beta	Т	Sig.	Tolerance	VIF		
		Error							
(constant)	4.361	.129		33.828	.000				
AUTcentered	.230	.162	.185	1.416	.159	.247	4.046		
COMcentered	.375	.166	.265	2.257	.025	.308	3.251		
RELcentered	.212	.124	.224	1.709	.089	.247	4.045		
AUTcentered2	097	.103	120	936	.350	.256	3.901		
AUTcentered3	041	.052	146	794	.428	.126	7.942		
COMcentered2	.158	.153	.182	1.035	.302	.137	7.303		
COMcentered3	042	.063	139	672	.502	.099	10.091		
RELcentered2	037	.052	057	716	.475	.661	1.513		
RELcentered3	.009	.029	.043	.305	.761	.212	4.725		

 Table 10: Inclusion of polynomial terms for Personal Growth (PG)

	Coefficients ^a									
	Unstan	dardized	Standardized	Collinearity	Collinearity					
	Coefficients		Coefficients			Statistics				
	В	Std.	Beta	Т	Sig.	Tolerance	VIF			
		Error								
(constant)	5.372	.093		57.991	.000					
AUTcentered	.207	.117	.178	1.778	.077	.247	4.046			
COMcentered	.572	.119	.430	4.789	.000	.308	3.251			
RELcentered	.263	.089	.296	2.953	.004	.247	4.045			
AUTcentered2	014	.074	019	194	.847	.256	3.901			
AUTcentered3	.015	.038	.055	.388	.698	.126	7.942			
COMcentered2	178	.110	219	-1.627	.105	.137	7.303			
COMcentered3	065	.045	226	-1.428	.155	.099	10.091			
RELcentered2	.004	.037	.006	.095	.924	.661	1.513			
RELcentered3	008	.021	044	403	.688	.212	4.725			

Table 11: Inclusion of polynomial terms for Self-Acceptance (SA)

Coefficients ^a								
	Unstan	dardized	Standardized		Collinearity	Collinearity		
	Coefficients		Coefficients			Statistics		
	В	Std.	Beta	Т	Sig.	Tolerance	VIF	
		Error						
(constant)	4.776	.143		33.458	.000			
AUTcentered	.029	.180	.023	.163	.871	.247	4.046	
COMcentered	192	.184	130	-1.041	.299	.308	3.251	
RELcentered	.284	.137	.287	2.069	.040	.247	4.045	
AUTcentered2	158	.114	189	-1.388	.167	.256	3.901	
AUTcentered3	.001	.058	.002	.012	.991	.126	7.942	
COMcentered2	.185	.169	.205	1.097	.274	.137	7.303	
COMcentered3	.074	.070	.234	1.065	.288	.099	10.091	
RELcentered2	.116	.057	.172	2.027	.044	.661	1.513	
RELcentered3	026	.032	120	801	.424	.212	4.725	

Table 12: Inclusion of polynomial terms for Purpose in Life (PL)

Appendix 10: Outcomes MRA

Model Summary^b R Square Adjusted R R Std. Error of Model Durbin-Square the Estimate Watson .592ª 2.006 .351 .91158 1 .341

10.1. Outcomes MRA Environmental mastery (EM)

a. Predictors: (Constant), Relatednesstotal, Autonomytotal, Competencetotal

b. Dependent variable: EMtotal

	ANOVA ^a									
Model		Sum of	df	Mean	F		Sig			
		Squares		Square						
1	Regression	88.391	3	29.464		35.457		.000 ^b		
	Residual	163.702	197	.831						
	Total	252.093	200							

a. Dependent variable: EMtottal

b. Predictors: (Constant), Relatednesstotal, Autonomytotal, Competencetotal

	Coefficients ^a									
	Unstand	dardized	Standardized			Collinearity Statistics				
	Coeffic	ients	Coefficients							
	В	Std.	Beta	Т	Sig.	Tolerance	VIF			
		Error								
(constant)	.725	.445		1.630	.105					
Autonomy	.167	.083	.149	2.010	.046	.601	1.665			
Competence	.599	.098	.468	6.146	.000	.567	1.762			
Relatedness	.033	.057	.038	.572	.568	.738	1.356			

a. Dependent Variable: EMtotal

Residuals Statistics ^a										
	Minimum	Maximum	Mean	Std.	Ν					
				Deviation						
Predicted Value	2.7247	6.3011	5.2388	.66480	201					
Residual	-2.99900	2.40505	.00000	.90472	201					
Std. Predicted Value	-3.782	1.598	.000	1.000	201					
Std. Residual	-3.290	2.638	.000	.992	201					

a. Dependent Variable: EMtotal









10.2. Outcomes MRA Autonomy (PAUT)

Model Summary ^b								
Model		R		R Square	Adjusted R	Std. Error of	Durbin-	
					Square	the Estimate	Watson	
1			.521	.271	.260	.90636	2.020	
	_						-	

a. Predictors: (Constant), Relatednesstotal, Autonomytotal, Competencetotalb. Dependent variable: PAUTtotal

ANOVA ^a									
Model		Sum of	df	Mean	F	Sig			
		Squares		Square					
1	Regression	60.186	3	20.062	24.421	.000 ^b			
	Residual	161.835	197	.821					
	Total	222.021	200						

a. Dependent variable: PAUTtotal

b. Predictors: (Constant), Relatednesstotal, Autonomytotal, Competencetotal

Coefficients ^a									
	Unstandardized		Standardized	ed		Collinearity Statistics			
	Coefficients		Coefficients						
	В	Std.	Beta	Т	Sig.	Tolerance	VIF		
		Error							
(constant)	1.582	.442		3.575	.000				
Autonomy	.287	.082	.273	3.475	.001	.601	1.665		
Competence	.304	.097	.253	3.131	.002	.567	1.762		
Relatedness	.069	.057	.086	1.208	.229	.738	1.356		

a. Dependent Variable: PAUTtotal

Residuals Statistics ^a								
	Minimum	Maximum	Mean	Std.	Ν			
				Deviation				
Predicted Value	3.1448	6.1602	5.1725	.54857	201			
Residual	-3.43894	2.02354	.00000	.89954	201			
Std. Predicted Value	-3.696	1.801	.000	1.000	201			
Std. Residual	-3.794	2.233	.000	.992	201			

a. Dependent Variable: PAUTtotal



Normal P-P Plot of Regression Standardized Residual





10.3. Outcomes MRA Positive Relations (PR)

Model Summary ^b								
Model	R	R Square	Adjusted R	Std. Error of	Durbin-			
			Square	the Estimate	Watson			
1	.645 ^a	.416	.407	.81911	2.013			

a. Predictors: (Constant), Relatednesstotal, Autonomytotal, Competencetotal

b. Dependent variable: Positiverelationstotal

ANOVA ^a									
Model		Sum of	df	Mean	F	Sig			
		Squares		Square					
1	Regression	94.068	3	31.356	46.735	.000 ^b			
	Residual	132.174	197	.671					
	Total	226.243	200						

a. Dependent variable: Positiverelationstotal

b. Predictors: (Constant), Relatednesstotal, Autonomytotal, Competencetotal

Coefficients ^a								
	Unstandardized		Standardized			Collinearity Statistics		
	Coefficients		Coefficients					
	В	Std.	Beta	Т	Sig.	Tolerance	VIF	
		Error						
(constant)	2.240	.400		5.605	.000			
Autonomy	.202	.075	.190	2.703	.007	.601	1.665	
Competence	092	.088	076	-1.046	.297	.567	1.762	
Relatedness	.472	.051	.582	9.173	.000	.738	1.356	

a. Dependent Variable: Positiverelationstotal

Residuals Statistics ^a								
	Minimum	Maximum	Mean	Std.	Ν			
				Deviation				
Predicted Value	2.9027	6.1536	4.7687	.68581	201			
Residual	-2.87435	1.69707	.00000	.81294	201			
Std. Predicted Value	-2.721	2.019	.000	1.000	201			
Std. Residual	-3.509	2.072	.000	.992	201			

a. Dependent Variable: Positiverelationstotal



Normal P-P Plot of Regression Standardized Residual





10.4. Outcomes MRA Personal Growth (PG)

Model Summary ^b								
R	R Square	Adjusted R	Std. Error of	Durbin-				
		Square	the Estimate	Watson				
.381 ^a	.145	.132	1.15711	1.915				
	R .381 ^a	R R Square	Model Summary ⁵ RR SquareAdjusted R.381 ^a .145.132	RR SquareAdjusted R SquareStd. Error of the Estimate.381a.145.1321.15711				

a. Predictors: (Constant), Relatednesstotal, Autonomytotal, Competencetotal

b. Dependent variable: Personalgrowthtotal

ANOVA ^a								
Model		Sum of	df	Mean	F	Sig		
		Squares		Square		-		
1	Regression	44.751	3	14.917	11.141	.000 ^b		
	Residual	263.764	197	1.339				
	Total	308.515	200					

a. Dependent variable: Personalgrowthtotal

b. Predictors: (Constant), Relatednesstotal, Autonomytotal, Competencetotal

	Coefficients ^a									
	Unstandardized		Standardized			Collinearity Statistics				
	Coeffic	ients	Coefficients	Coefficients						
	В	Std.	Beta	Т	Sig.	Tolerance	VIF			
		Error			-					
(constant)	1.939	.565		3.434	.001					
Autonomy	.143	.105	.115	1.358	.176	.601	1.665			
Competence	.106	.124	.075	.855	.394	.567	1.762			
Relatedness	.251	.073	.265	3.451	.001	.738	1.356			

a. Dependent Variable: Personalgrowthtotal

Residuals Statistics ^a									
	Minimum	Maximum	Mean	Std.	Ν				
				Deviation					
Predicted Value	2.8711	5.3448	4.3731	.47303	201				
Residual	-2.15856	3.37894	.00000	1.14840	201				
Std. Predicted Value	-3.175	2.054	.000	1.000	201				
Std. Residual	-1.865	2.920	.000	.992	201				

a. Dependent Variable: Personalgrowthtotal







Normal P-P Plot of Regression Standardized Residual

10.5. Outcomes MRA Self-Acceptance (SA)

Model Summary ^b									
R	R Square	Adjusted R	Std. Error of	Durbin-					
		Square	the Estimate	Watson					
.717 ^a	.514	.506	.81900	1.746					
	R .717 ^a	R R Square	R R Square Adjusted R Square .717 ^a .514 .506	RR SquareAdjusted R SquareStd. Error of the Estimate.717a.514.506.81900					

c. Predictors: (Constant), Relatednesstotal, Autonomytotal, Competencetotal

d. Dependent variable: Selfacceptancetotal

ANOVA ^a									
Model		Sum of	df	Mean	F		Sig		
		Squares		Square					
1	Regression	139.494	3	46.498		69.321		.000 ^b	
	Residual	132.141	197	.671					
	Total	271.635	200						

a. Dependent variable: Selfacceptancetotal

b. Predictors: (Constant), Relatednesstotal, Autonomytotal, Competencetotal

Coefficients ^a									
	Unstan	dardized	Standardized			Collinearity	y Statistics		
	Coeffic	ients	Coefficients						
	В	Std.	Beta	Т	Sig.	Tolerance	VIF		
		Error							
(constant)	059	.400		148	.882				
Autonomy	.256	.075	.220	3.433	.001	.601	1.665		
Competence	.517	.088	.389	5.902	.000	.567	1.762		
Relatedness	.226	.051	.254	4.396	.000	.738	1.356		

b. Dependent Variable: Selfacceptancetotal

Residuals Statistics ^a									
	Minimum Maximum Mean Std. N								
				Deviation					
Predicted Value	2.1821	6.8269	5.2662	.83515	201				
Residual	-3.49934	2.29032	.00000	.81284	201				
Std. Predicted Value	-3.693	1.869	.000	1.000	201				
Std. Residual	-4.273	2.796	.000	.992	201				

b. Dependent Variable: Selfacceptancetotal





10.6. Outcomes MRA Purpose in Life (PL)

Model Summary ^b									
Model	R	R Square	Adjusted R	Std. Error of	Durbin-				
			Square	the Estimate	Watson				
1	.298	.089	.046	1.26638	1.935				
			~						

a. Predictors: (Constant), RELcentered2, Competencetotal, RELcentered, Autonomytotalb. Dependent variable: Purposelifetotal

ANOVA ^a									
Model		Sum of	df	Mean	F	Sig			
		Squares		Square		-			
1	Regression	19.654	9	4.913	3.042	.018 ^b			
	Residual	316.573	196	1.615					
	Total	336.226	200						

a. Dependent variable: Purposelifetotal

b. Predictors: (Constant), , RELcentered2, RELcentered, Competencetotal, Autonomytotal

Coefficients ^a									
	Unstan	dardized	Standardized			Collinearit	у		
	Coeffic	ients	Coefficients			Statistics			
	В	Std.	Beta	Т	Sig.	Tolerance	VIF		
		Error							
(constant)	4.640	.736		6.307	.000				
Autonomy	.121	.116	.094	1.046	.297	.596	1.677		
Competence	099	.136	067	727	.468	.567	1.764		
RELcentered	.183	.080	.185	2.279	.024	.727	1.376		
RELcentered2	.119	.048	.176	2.463	.015	.946	1.057		

a. Dependent Variable: Purposelifetotal

Residuals Statistics ^a									
	Minimum	Maximum	Mean	Std.	N				
				Deviation					
Predicted Value	4.3994	6.0169	4.9204	.31348	201				
Residual	-4.08294	2.15925	.00000	1.25812	201				
Std. Predicted Value	-1.662	3.498	.000	1.000	201				
Std. Residual	-3.213	1.699	.000	.990	201				

a. Dependent Variable: Purposelifetotal



Normal P-P Plot of Regression Standardized Residual





Appendix	11:	Correlation	matrix
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	Correlationmatrix									
	1	2	3	4	5	6	7	8	9	
AUT	1									
COM	.612**	1								
REL	.433**	.482**	1							
EM	.452**	.578**	.328**	1						
PAUT	.465**	.461**	.325**	.286**	1					
PG	.276**	.273**	.351**	.287**	.316**	1				
PR	.395**	.321**	.627**	.261**	.314**	.320**	1			
PL	.100	.050	.158*	.018	.172*	.369**	.236**	1		
SA	.569**	.647**	.537**	.588**	.461**	.407**	.421**	.075	1	

**Correlation is significant at the 0.01 level (2-tailed) *Correlation is significant at the 0.05 level (2-tailed)

Note that factor 1 up and till 9 are respectively: autonomy, competence, relatedness, environmental mastery, autonomy, personal growth, positive relations, purpose in life, selfacceptance