Self-Regulation and Well-Being: The Moderating Role of Perceived Stress from an Outpatient Care Perspective

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Abstract

The COVID-19 pandemic has introduced several work challenges, particularly for outpatient nurses around the world, such as in Germany. Research has explored factors that interplay with nurses' well-being, including stress and coping techniques, such as self-regulation. However, nurses' well-being in the final stages of the pandemic received limited attention. Therefore, the study on hand investigated the moderating role of perceived stress on the proposed relationship between self-regulation and well-being. It was hypothesised that nurses' self-regulation capacity would significantly predict their well-being, accompanied by the assumption that perceived stress acts as a moderator. Accordingly, a survey design was conducted with 51 German outpatient nurses working in public hospitals to explore the expected interaction effect. The participants' age ranged from 25 to 65 and above, whereby the majority was female ($n = 30$), followed by 20 males, and one respondent who preferred not to indicate their gender. To measure well-being, self-regulation, and stress, three distinct scales were used for each variable. The findings of the online study showed that German outpatient nurses scored high on the Perceived Stress Scale and Self-Regulation Questionnaire, but scored moderately on the Mental Health Continuum. A Pearson correlation test showed a significant relationship between self-regulation and well-being $(r(49) = .46, p < .001)$, indicating that nurses who are high in self-regulation tend to have an increased well-being. However, the moderation analysis indicated a non-significant interaction effect between nurses' perceived stress levels and self-regulation capacity, $b = -0.07, t(49) = -0.19, p = .852$. This finding suggests that the effect between self-regulation and well-being did not vary as a function of perceived stress. Future research could integrate longitudinal studies with larger scales to be able to draw valid conclusions about nurses' well-being, self-regulation, and stress levels over a longer period of time, as the time frame may have played a role in the variety of nurses' reported experiences.

Keywords: self-regulation, perceived stress, mental well-being, outpatient care, COVID-19, public hospitals, Germany

Stress caused by work is becoming a major problem worldwide. The World Health Organisation (WHO, 2020) defines work-related stress as "the response people may have when presented with work demands and pressures that are not matched to their knowledge and abilities and which challenge their ability to cope" (para. 1). Already prior to the COVID-19 pandemic, employees from different work branches reported to increasingly suffer from daily work stress and high work demands (Start, 2022). Similarly, a survey conducted by the Gallup Organisation (2022) for the 'State of the Global Workplace 2022 Report', revealed that there is a rising work-stress epidemic in more than 100 countries. According to this work-stress survey, worker's daily stress reached a record high, increasing from 38% in 2019 to 44% in 2021. At a European level, more than half of European workers encounter stress at the workplace with associated poor mental health (Start, 2022). Surprisingly, there is a considerable difference in unhealthy stress levels experienced per country, whereas German workers take the lead among European employees. With up to 71% of German labourers reported to suffer from a considerable high degree of unhealthy work stress and thus, represent the highest work-stress epidemic among their neighbouring countries (Start, 2022).

Stress in German Healthcare Settings

Considering different work branches in Germany, the most stressful professions are represented by the healthcare industry. Strikingly, Germany has one of the world's leading healthcare systems (Blümel et al., 2020; Kramer et al., 2021). It encompasses inpatient and outpatient care, as well as a broad range of preventive services for each disease-specific group (Kramer et al., 2021).

However, maintaining a strong healthcare system to ensure high attainable standards of care to all citizens comes at a cost (Ebrahimi Rigi et al., 2022; Gupta et al., 2011). The daily work stress experienced by healthcare workers (HCWs) is a result of their work environment, as they are subjected to high work expectations (Ruotsalainen et al., 2014). A HCW is anyone who works in a healthcare or social care facility, including frontline HCWs, doctors and nurses, as well as other HCWs, such as laboratory technicians, who have indirect contact with patients (Health Protection Surveillance Centre, 2021). Frontline HCWs often may not have enough time, lack skills, and social support at work, but are expected to act functionally to provide individual patients with high quality care in line with the needs and expectations of the population they serve (Gupta et al., 2011; National Institute for Occupational Safety and Health [Niosh], 2016;

Ruotsalainen et al., 2014). Offering high quality care includes being exposed to demanding physical work, which brings the risk of getting injured from patient treatment. Moreover, HCWs encounter intensely strained and emotional situations when caring for those who are ill and it is part of their occupation to resist unique pressures from their employers, patients, and their relatives (Niosh, 2016). For instance, the mere exposure to human suffering, since HCWs have to deal with life-or-death situations, reflects the emotional challenges and pressure under which they have to work (Start, 2022; Watson, 2022). Furthermore, HCWs commonly face long and unpredictable working hours through unexpected double shifts and an unpredictable extent of on-call work (Niosh, 2016). However, despite unpredictable work lives, HCWs attempt to withstand the work pressure to ultimately offer high quality care and save lives, but also due to individual financial strain.

COVID-19 and Stress among HCWs

Past epidemics showed that stress can be elevated during epidemic or pandemic states (Pan American Health Organisation, 2009). Also, the COVID-19 pandemic (Coronavirus Disease 2019) has introduced additional elements of demands that challenged German HCWs' stress receptivity (Bernburg et al., 2022). Research suggests that HCWs, especially nurses, reported shortages in personal protective equipment (PPE), the implementation of occupational safety measures against an infection, and the adaptation to new treatments and therapies for infected patients, as major work stressors in the early stage of the pandemic (Bernburg et al., 2022; Eslami et al., 2017; Paffenholz et al., 2020; Wolf-Ostermann et al., 2020). In short, the pandemic state contributed to HCWs' stress amount due to changed work routines and unfamiliar pandemic-related stressors (Frenkel et al., 2022).

Bolken et al. (2020) identified several determinants that seem to predict HCWs' severity of psychological stress during the pandemic. For instance, age, gender, occupational group, occupational specialisation, type of work, and contact to COVID-19 positive patients have an enhanced effect on HCWs' stress experience. In this regard, recent studies provided evidence that pandemic-related stressors had an even greater effect on outpatient care than on inpatient care in Germany (Bernburg et al., 2022; Bolken et al., 2020; Lützerath et al., 2022; Paffenholz et al., 2020). This finding is consistent with Bolken et al.'s (2020) conclusion that certain occupational groups and specialisations are at higher risk of mental work stress. As further illustration, a large country-wide cohort study by Kramer et al. (2021) investigated HCWs' stress

levels in the context of the COVID-19 pandemia. The findings indicated that nurses reported higher levels of subjective burden and stress than doctors and other hospital staff. Moreover, nurses working in a COVID-19 environment, such as in the outpatient care (emergency department), suffer from higher levels of subjective burden and stress compared to nurses working in a non-COVID-19 environment (Karia et al., 2020; Kramer et al., 2021). As a result, outpatient care facilities announced that 10% of the staff were temporarily missing, mainly due to sickness-related absences caused by the work overload (e.g., working 40 minutes more per shift) leading to staff shortage in the emergency department (Arentz & Läufer, 2021; Mojtahedzadeh et al., 2021; Schmucker, 2020; Wolf-Ostermann et al., 2020). Accordingly, the excessive workload had a significant impact on nurses' stress levels, as it requires higher work intensification and dedication. Briefly, among all healthcare personnel and settings, nursing staff from the outpatient care are most affected by job-related stressors, making work in a COVID-19 environment a stressful challenge.

Well-being of Nurses

A wide range of literature suggests that nurses' exposure to work-related stress during the pandemic can have a detrimental effect on their mental health and well-being. According to the WHO (2004), mental health is "a state of well-being in which the individual realizes his or her own abilities, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to his or her community" (p. 10). It includes emotional, psychological, and social well-being (Keyes, 2006). Emotional well-being encompasses an individual's happiness, interest in life, and satisfaction, whereas psychological well-being includes liking most parts of one's own personality, managing responsibilities of daily life well, having positive relationships with others, and being satisfied with one's own life (Keyes, 2006). The last component of mental health, which is social well-being, refers to positive functioning and includes having something to contribute to society (social contribution), feeling part of a community (social integration), believing that society is becoming a better place for all individuals (social actualisation), and that the way society functions makes sense to them (social coherence) (Galderisi et al., 2015; Keyes, 2006). Overall, mental health is influenced by hedonic (subjective) and eudaimonic (psychological) traditions, which set positive emotions and excellence in functioning, respectively, as requirements for high well-being (Galderisi et al., 2015). Thus, mental health plays a role in how individuals think, feel, and act.

Moreover, mental health can help determine how individuals handle stress and make healthy choices, such as during work time (WHO, 2020; WHO, 2022). In the scenario of HCWs, nurses face an unprecedented public health situation, implying a professional challenge and greater health burden (Schaller et al., 2022). It is evident from previous research that outpatient nurses in Germany face greater stress symptoms than nurses in inpatient care due to the increased risk of being exposed to critical pandemic-related situations and dealing with several unfavourable work conditions (Carmassi et al., 2021; Paffenholz et al., 2020). Accordingly, outpatient nurses appear to be more frequently affected by the consequences of their psychological distress that might extend to mental and physical health symptoms (Drupp & Meyer, 2020; Que et al., 2020). As work stress can exacerbate mental health issues, the experience of chronic stress seems to be associated with greater serious mental health problems (Schmucker, 2020). Multiple systematic reviews and meta-analyses have consistently demonstrated an increased incidence of frontline nurses facing a greater risk of poor mental health conditions due to occupational stress (Fiorillo & Gorwood, 2020; Luo et al., 2020; Serrano-Ripoll et al., 2020; Wang et al., 2020). If prolonged, serious mental illnesses may arise (Preti et al., 2020). For instance, longitudinal studies pre-pandemic indicated that being exposed to a higher quantitative workload, lower job control, lower social support, and higher job strain was related to an increased risk of depressive symptoms accompanied by emotional exhaustion (Barello et al., 2020; Kim et al., 2020).

Further, a cross-sectional study provided evidence that HCWs, often nurses, reported high levels of stress-related symptoms that were associated with deteriorated sleep quality and fatigue compassion (Alharbi et al., 2020; Xiao et al., 2020). Another study that was involved in the management of epidemics declared that individuals who work in units for infectious patients were two to three times more likely to suffer from post-traumatic stress symptoms (Wu et al., 2009). Nonetheless, a few years later a considerable amount of HCWs still reported symptoms of post-traumatic stress. However, besides the influencing role of stress on mental health, various biopsychosocial factors may play an important role in the onset of mental disorders and thus, should be considered as well (Huang et al., 2020). In the context of frontline nurses, these illustrations reflect the increased risk of low wellbeing as a result of distress due to work overload. Over time, HCWs develop low mental health, as a stress reaction, which can affect nurses' professional performance and tendency to take sickness absence due to a mental disorder

compared to other workers with no exposure to those demands (Alharbi et al., 2020; Duchaine et al., 2020).

During the pandemic, the magnitude and severity of the COVID-19 crisis, as well as the scarcity of means in German hospitals have forced nurses to work beyond their capacities (Walton et al., 2020). In the long term, nurses may face a decline in job and life satisfaction, which can lead to a reluctance to work due to infection with the virus or work contemplation of resignation (Bai et al., 2004; Maunder et al., 2003; Pelly et al., 2022). Despite awareness strikes, the mental health problems of frontline nurses and other HCWs are often neglected (Kang et al., 2020; Wichterich, 2020). Instead, work stress and mental health consequences are often regarded as issues, for which nurses are responsible themselves, as they would be able to manage themselves well (Kang et al., 2020).

The Importance of Stress Coping through Self-Regulation (SR)

The excessive distress and its negative impact on nurses' mental health at work imply a neglect of approaching effective stress-coping strategies. Coping refers to "constantly changing cognitive and behavioral efforts to manage specific external and/or internal demands that are appraised as taxing or exceeding the resources of the person" (Lazarus & Folkman, 1984, p. 141). Several types of coping strategies exist and can be generally divided into approach and avoidance coping (Mezuk et al., 2017). When individuals use approach-oriented coping, they actively try to change or decrease the perceived stressor (Bakker & de Vries, 2021). For instance, a nurse who is confronted with excessive work pressure may actively try to optimise the way of working by using cognitive strategies, such as planning, acceptance, or tries to decrease the workload (Bakker & de Vries, 2021; Mezuk et al., 2017). In contrast, when individuals use avoidance coping strategies, they try to avoid the stressor. Thus, to cope with stressful situations, nurses can choose active and volitional ways of solving one's perceived work stress, namely through pro-health or evasive strategies (Betke et al., 2021).

In connection with stress coping, SR may play an important role as well. Although there is limited empirical literature about this junction, several definitions of coping include SR processes (Rueda & Rothbart, 2009). From an applied perspective, SR refers to the process of managing cognition and emotions to capacitate goal-directed actions, such as organising behaviour, controlling impulses, and solving problems constructively (Murray et al., 2016). This individual ability has a major impact on one's health, psychological well-being, and it is

positively associated with better psychological adjustment (Gagnon et al., 2016; Hofer et al., 2011). When individuals face difficulties to achieve their goals in a changing environment, the systematic process involved in the construct of SR makes conscious effort to influence one's thoughts, feelings, and behaviours to achieve the goal (Singh & Sharma, 2018). Hereby a recent study has shown that SR capacity is strongly correlated with well-being (Simon & Durand-Bush, 2015). Accordingly, being high in SR may be regarded as the extent of an individual's positive proactivity, with which one adequately manages the regulation of one's health and well-being (Brown, 1998). Thus, SR does not solely play a role when individuals face stress, but it also predicts how individuals act and feel (Simon & Durand-Bush, 2015). In sum, while general coping strategies include solely controlled and volitional processes in stress contexts, SR requires the capacity of the self to regulate affects, cognitions, and behaviours in both controlled and automatic processes, which can affect individuals' well-being (Gross, 2013; Singh & Sharma, 2018).

However, the capacity to SR may vary within individuals and depend on the temporary resources available to them (Roczniewska et al., 2021). According to Lanaj et al. (2016), self-regulatory resources represent "internal energy that is consumed when regulating attention, persevering at difficult tasks, and managing emotions" (p.1098), and allude to the number of practices individuals employ to exercise their behavioural-regulation skills (de la Fuente et al., 2015). These resources vary contingent on, for instance, biology, the experienced emotions, past efforts in self-control, and amount of sleep (Chester et al., 2016; Prem et al., 2016). Also, external, and environmental factors, such as demands or stressors placed on individuals may play a role in individuals' ability to SR (Murray et al., 2016). In professional context, SR at work is a dynamic process through which nurses have to control and direct their cognitive and affective resources to work-related tasks to attain work-related goals effectively (Lord et al., 2010). Nurses must engage in operations that require focusing attention, resisting distractions, and managing behaviours, drawing from the same pool of limited self-regulatory resources (Roczniewska et al., 2021). Hence, nurses start each workday with different levels of self-regulatory resources, whereas these levels may determine the extent to which they use adaptive or maladaptive regulation during work time (Lanaj et al., 2016). Being exposed to subjective moderate stress, self-regulation practices may lead to choosing positive coping behaviours and thus, appear to be crucial for overcoming work stress and an increasing well-being (Mackey & Perrewe, 2014).

This is consistent with the findings of past studies that revealed a significant relationship between SR and job stress, whereas SR negatively predicts occupational stress (Elliot et al., 2011; Kondratyuk & Morosanova, 2014).

Accordingly, when nurses face prolonged stress and adversities, including trauma experiences at work, SR can be disrupted (Murray et al., 2016). The reason is that the stressors in nurses' working environment activate internal stress response systems for prolonged periods of time, which lower self-regulatory resources. When psychological distress is experienced, that is, perceiving a situation out of control, nurses must be able to respond in a timely, creative, and flexible manner to cope with the situation (Khoshkesht, 2021). Otherwise, their SR capacity may begin to diminish at a lower stress threshold, resulting in impaired SR (Murray et al., 2016). Consequently, a range of negative outcomes can occur at work, including difficulties in managing one's attention, emotions, and behaviour effectively, as well as enhanced deviance behaviour and decreased work engagement (Christian & Ellis, 2011, Lanaj et al., 2016; Wehrt et al., 2020). Similarly, experimental research has shown that when resources are drained, individuals become mentally and physically passive (Vonasch et al., 2017). In addition, they commonly struggle to maintain effort and are more likely to lose focus during activities (Englert et al., 2015; Hagger et al., 2010). As an example, depleted individuals would spend more time engaging in off-task behaviours due to low self-regulatory capacity (Bazzy & Woehr, 2017). Thus, low self-regulatory capacity is likely to make individuals dysfunctional in their actions, as it generates additional problems through which individuals engage in maladaptive behaviours, such as self-undermining, that create obstacles undermining performance (Bakker & Costa, 2014).

Several pandemic-related studies investigated how frontline nurses cope with work stress to maintain an enhanced well-being (Ellis & Del Giudice, 2014; Fathizadeh et al., 2016). High psychological distress seems to be associated with low levels of coping, as frontline nurses commonly reported struggling to maintain effective strategies for caring for themselves (Elsayed et al., 2022; Lewis et al., 2022). The neglect of taking care of their own well-being seems to result from the increased caring responsibilities of others at work and at home. The uncertainty associated with the pandemic combined with the retraction of many of their usual coping strategies, meant that nurses had to be inventive in finding new ways of caring for themselves (Elsayed et al., 2022). A pre-COVID study demonstrated that the most common stress-coping

strategy used by nurses was the acceptance of the critical situation and the adoption of a positive attitude in the workplace (Khalid et al., 2016). Similarly, a recent study revealed that nurses maintained a positive attitude towards the perceived stressful pandemic, which served as the main protective factor in coping with work stress and an increased well-being (Babore et al., 2020). On the other hand, with greater stress exposure, nurses tend to seek social support and engage in avoidance strategies as a way of self-regulating emotional distress. Across all settings in the German healthcare sector, most outpatient nurses in Germany mentioned that they neglect ergonomic ways of working when they are under time pressure and when colleagues or equipment are not directly available, such as in emergency situations (Lützerath et al., 2022). In sum, there are several ways of how frontline nurses in Germany cope with work stress to protect their well-being, but more research is required about nurses' SR behaviours during the final stages of the pandemic.

Theoretical Background

In the following, the phenomena of (work) stress, self-regulation (coping), and well-being among nurses will be further elaborated by presenting theoretical ground from a psychological perspective.

The Transactional Model of Stress and Coping (TMSC)

The TMSC, proposed by Lazarus and Folkman (1984), suggests that individuals experience stress as a result of transactions between them and their environment. More precisely, stress occurs when a discrepancy is perceived between environmental demands made on them and their available coping resources. Demands encountered by nurses may be related to time pressure or the amount of work (quantitative demands), but they may also refer to the difficulty of the work (cognitive demands) (Eurofund, 2010). In addition, demands may also be physical or emotional, as empathy is required at work.

The theory comprises two central concepts, which are appraisal and coping (Folkman, 2020). Appraisal refers to an individual's assessment of the current events' importance in their life, whereas coping describes the effort one makes to fulfil their needs. In terms of appraisal, there are three specific patterns that lead to stress, namely harm (already suffered damage), threat (expected damage), and challenge (demands that must be met) (Folkman, 2020). If environmental demands are perceived as threatening stressors, individuals first appraise the stressor by classifying it as positive, negative, or irrelevant for a person. In case of a negative

assessment of the stressor, a secondary appraisal is performed, which assesses their available coping resources to determine whether they feel capable of coping with the stressor (Eurofund, 2010). If the demands exceed the available resources of the individual, stress is perceived (Folkman, 2020). During times of excessive demands, such as during the pandemic, individuals' coping resources can help to proactively work toward reducing external and internal conflicts between one's needs and demands (Cohen et al., 2007; Folkman, 2020). Moreover, it should be noted that individuals' evaluations of demands and capacities can be influenced by several factors, including one's personality, situational demands, previous experiences, any present stress states that have been experienced, and coping skills (Prem et al., 2017). In sum, the TMSC provides relevant theoretical background for the context of work stress among nurses, since COVID-19 poses a range of challenges, threats, and harm for nurses and commonly coping resources turn out to be inadequate among nursing staff (Cohen et al., 2007).

Self-Regulation Model

While much is known about the direct effects of stress exposure on nurses' well-being, self-regulatory behaviours, as a way of coping with stress, may be essential as well. As aforementioned, SR is the ability to develop, implement, and flexibly control one's own behaviour, thoughts, and feelings to achieve desired goals (Miller & Brown, 1991). According to Beal et al.'s (2005) model on SR, there are three types of forces that influence SR at work, namely regulatory resources, task attentional pull, and off-task attentional demands. Concerning regulatory resources, strain reactions are likely to drain those resources, as psychological strain involves an evaluation of coping potential, self-accountability, and individual expectations. When individuals engage in these assessment processes, they occupy immediate cognitive resources, representing cognitive demands (Beal et al., 2005). Along with these cognitive reactions, when situations are appraised by individuals as rare or abnormal, negative affective reactions commonly require effortful regulation, whereas a high amount of available resources may be consumed (Wang et al., 2011). In essence, the increased demands on regulatory resources, caused by strain reactions from earlier stress episodes, will most likely undermine the available resources for energising and maintaining subsequent SR (Zhou et al., 2017). Regarding task attentional pull factors, these help individuals to focus their attention on focal tasks and may alleviate the negative effect of resource drain on SR (Beal et al., 2005). In

contrast, off-task attentional demands may increasingly withdraw resources from focal tasks, which can enhance the negative impact of strain on SR.

In routine situations, it is simpler for individuals to self-regulate because they are accustomed to automatically perform certain behaviours (Good et al., 2016). In contrast, SR will be more challenging for individuals when facing a situation that is rare or abnormal. In terms of nurses, an abnormal situation might be the pandemic crisis since it is a new situation that nurses have to get used to. When coping with stressful demands, SR efforts are required, which are more likely to fail when SR resources are depleted (Li et al., 2020). As a consequence, there is an associated risk of poor wellbeing, which may over time lead to symptoms of mental illness (Bakker & Costa, 2014; Bakker & Wang, 2019).

The Connection between SR, Job Stress, and Well-Being

Comparable with the theoretical grounds of the TMSC and SR model, past research indicated that there is a negative relationship between SR and job stress (Elliot et al., 2011; Kondratyuk & Morosanova, 2014). In other words, when individuals engage in SR, it leads them to choosing self-regulatory coping techniques, whereby work stressors are decreased (Fathizadeh et al., 2016). Moreover, recent studies confirmed that SR capacity positively predicts psychological well-being and negatively predicts mental illness (Gagnon et al., 2016; Simon & Durand-Bush, 2015). Further comparable findings were demonstrated by Extremera and Rey's research (2015), where emotional regulation predicted perceived stress, depression, and happiness among individuals. Thus, it can be said that self-regulatory coping abilities can enhance one's well-being and reduce perceived stress under favourable work conditions.

Theoretical Model

Combining these psychological theories in connection with outpatient nurses in Germany and given that previous studies revealed a significant relationship between SR, (job) stress, and well-being, whereas SR seems to function as a predictor for the latter variables, it is expected that SR positively predicts well-being. Furthermore, it is anticipated that work stress influences nurses' ability to cope with perceived stressors. The reason is that job stress could affect individuals' SR resources negatively, which in turn decreases one's well-being when coping with work stress. The expected interaction effect between stress and SR on outpatient nurses' well-being can be seen in Appendix A.

Gap in the Literature and Relevance

While the COVID-19 pandemic has continued for more than a year, its psychological effects on outpatient nurses may have further increased post the pandemic (Deguchi et al, 2022). Although recent studies have described high stress levels, poor mental well-being, and various stress-coping techniques among nurses during the COVID-19 pandemic, the impact of pandemic-related stressors on frontline nurses' self-regulatory capacities and well-being has not been thoroughly investigated (Elsayed et al., 2022; Fathizadeh et al., 2016). Particularly, the association between various coping strategies and nurses' mental health during the pandemic were found to be investigated primarily in other countries than Germany and across various work facilities and settings, most frequently in the inpatient care (Bernburg et al., 2022). It is still unknown whether and to what extent outpatient nurses engage in self-regulatory behaviours in Germany (Lützerath et al., 2022). Hence, the interplay between the three variables of perceived (work) stress, SR capacity, and well-being among outpatient nurses, working in German hospitals, is yet to be explored in a post-COVID-19 context. Finally, the findings of the present study may help to identify nurses' current stress prevalence, whether and to what extent they engage in SR and finally, their overall well-being.

Research Question and Hypotheses

Given the current state of research, the aim of the present study is to gain more insight into outpatient nurses' post-pandemic work stress in German hospitals by examining whether nurses' perceived (job) stress moderates the relationship between SR and mental well-being. In this respect, the resulting research question is 'To what extent has perceived stress a moderating effect on the relationship between self-regulation and well-being?' Accompanying the research question, the first hypothesis (H1) proposes that self-regulation (SR) predicts well-being, whereas the second hypothesis (H2) predicts that perceived stress moderates the relationship between outpatient nurses' self-regulation capacity and levels of well-being.

Methods

Design

The present bachelor's thesis is a quantitative study employing a survey to investigate the effect of perceived stress on SR and mental well-being. For this examination, a main effect of SR capacity on well-being was expected, accompanied by the assumption that perceived stress would moderate the relationship between SR and mental well-being. The units of analysis were represented by nurses working in different outpatient cares in German hospitals. In terms of the

investigated variables, the dependent variable was represented by mental well-being. Additionally, the independent variables were SR capacity and perceived stress, whereas the latter was treated as the moderating variable. For measuring the expected main and moderating effects, a survey was conducted among the subjects to collect data through self-report about their current experiences with stress, SR ability, and well-being in a post-pandemic work context.

Participants

During the sampling procedure, participation was advertised through informative emails sent to nursing directors of three different German public hospitals. Outpatient nurses working in three different German hospitals in North Rhine-Westphalia were recruited through a snowball-sampling strategy. Through this approach, a total number of 67 German-speaking participants were willing to voluntarily take part in the study. As 16 respondents did not fulfil the inclusion criteria for research requirements, their data was omitted after the data collection. More precisely, 12 subjects were ruled out due to inadequate mental health status, three of them had a different job position than the required outpatient nursing profession, and one subject worked in another facility than in an emergency department in a public German hospital. Additional inclusion criteria included legal age of the participants (+18) and work experience during the pandemic, as they were required to answer the survey in a post-pandemic context. Lastly, respondents' mental health status was essential, and individuals diagnosed with mental illnesses were excluded from the study as well, as their mental state could possibly affect and bias the way respondents answer questions in the survey. After excluding participants, a final sample of 51 participants with usable data was eligible for the study. The demographic data of the participants can be retrieved from Table 1. Regarding the characteristics of the final sample ($N = 51$), the majority of the respondents were female ($n = 30$) and between the ages of 45 and 54. The complete demographic details about the sample's age and gender can be found in Table 1.

Table 1

Demographic Data of the Sample ($N = 51$) *by Age and Gender*

Sample characteristic	n
Gender	

Women	30
Men	20
Prefer not to say	1
Age	
25 to 34 years	2
35 to 44 years	12
45 to 54 years	19
55 to 64 years	17
65 and older	1

Materials

The following instruments, accompanied by an information sheet, informed consent form, and debriefing form, were created on the online survey tool "Qualtrics" (see Appendices B, C, and H).

Socio-Demographic Questionnaire

A short questionnaire was created based on the exclusion criteria of participants (see Appendix D). The multiple-choice questions were six closed-ended questions about participants' age, gender, job position, and work facility. The remaining questions included participants' work experience during the pandemic and mental health status.

Perceived Stress Scale (PSS-10)

The revised version of the PSS by Cohen et al. (1983) consists of 10 items and was employed to measure the degree to which different situations are appraised by outpatient nurses as stressful. Each item begins with "In the last month, how often have you …" and asks about participants' feelings and thoughts that they perceived during the last month (see Appendix E). Moreover, the scale determines how unpredictable, uncontrollable, and overloaded participants find their lives, relative to their subjective coping abilities (Cohen et al., 1983). Following reviews of psychometric properties of all three versions of the PSS, the PSS-10 seemed to be superior to those of the original PSS-14 and PSS-4, as it proved a high internal consistency as well as high test-retest reliability (> .70) in more than 10 past studies (Lee, 2012; Nielsen et al.,

2016). Therefore, the PSS with 10 items was chosen as a reliable measure to assess the construct of perceived stress.

Regarding response options, all items were assessed with a five-point Likert scale ranging from *never* (1), *almost never* (2), *sometimes* (3), *fairly often* (4), to *very often* (5). The total PSS score was computed by reversing the PSE items and summing up all items. Accordingly, lower scores imply lower levels of perceived stress and vice versa. The scoring of the items can be retrieved from Appendix E. Furthermore, as the items assess perceived stress generally rather than focusing on specific events or experiences, the context in the instruction of the questionnaire was adjusted to the working context of outpatient nurses in the final phase of the pandemic. An example of the contextual instruction was "*You will be asked to indicate how often you have encountered several experiences at work in the final stages of the pandemic.*" Moreover, in order to adjust the scale to a German population, all items were adopted from Schneider et al. (2020) who tested the German version of the PSS-10 in a German non-clinical sample and yielded highly satisfactory psychometric properties. The internal consistency of the PSS-10 in the present study was acceptable ($\alpha = .71$).

To date, most studies have agreed on the two-factorial structure with a subset of 10 items, as it reflects higher psychometric properties than in a unidimensional structure (Cohen et al., 1983; Taylor, 2015; Schneider et al. 2020). Hence, the corresponding items of the scale can be divided into two subscales that are perceived helplessness (PH) and perceived self-efficacy (PSE). While the PH scale measures an individual's feelings of lacking control over their circumstances and consists of six negative worded items (1, 2, 3, 6, 9, and 10; $\alpha = .73$), the PSE scale examines an individual's perceived inability to cope with problems and is composed of four positive worded items (4, 5, 7, and 8; $\alpha = .76$). As an example, one item of the PH subscale was "In the last month, how often have you been upset because of something that happened unexpectedly", while one of the PSE items included questions, such as "In the last month, how often have you felt confident about your ability to handle your personal problems?"

Short form Self-regulation Questionnaire (SSRQ)

The SSRQ by Carey et al. (2004), based on the Self-Regulation Questionnaire (SRQ; Brown, et al., 1998), was used to assess participants' self-regulatory capacity through self-report; that is, the capability to plan, guide, and monitor behaviours in the light of changing circumstances (Miller and Brown, 1991). The short version of the scale consists of 31 items and

was scored on a five-point Likert scale ranging from *strongly disagree* (1) to *strongly agree* (5). Higher scores on the SSRQ indicate a higher SR capacity. The complete scoring of the SSRQ can be retrieved from Appendix F.

The questionnaire was compiled in English and subsequently translated into the local language of the target population, which is German. For accurate translation of the items, the translation program 'DeepL' was used. The instructions of the questionnaire were adjusted to the work context after the pandemia and indications about participants' SR capacity were intentionally omitted to avoid response bias of the participants. Alternatively, the aim of the questionnaire was introduced by saying "In the following, a number of statements are given that ask about your coping experience at work in the final stages of the pandemic."

Moreover, items with negative loadings were reverse scored, including items 2, 3, 4, 6, 7, 9, 10, 11, 16, 19, 22, 23, 27 and 31. Examples of the SSRQ items include statements, such as "I usually keep track of my progress towards my goals." and "I get easily distracted from my plans." To create a total score, all items can be summed up after reverse-coding the above-mentioned items. Besides, the SSRQ is a single-factor scale with an excellent internal consistency ($\alpha = .94$) that represents overall SR capacity and highly correlates with the original 63-item SRQ ($r = .96$) (Carey et al., 2004; Neal and Carey, 2005; Hustad et al., 2009). These findings are in line with previous studies that supported the use of the SSRQ, as it appears to be a reliable alternative to measure the underlying construct of SR and additionally reduces respondent burden (Carey et al., 2004; Pichardo et al., 2014). In addition, the shorter version of the scale showed high validity in multiple past studies (Šebeňa et al., 2018; Vosloo et al., 2013). To conclude, the SSRQ was used as a reliable measurement instrument to assess outpatient nurses' self-regulatory processes.

Mental Health Continuum Short Form (MHC-SF)

The MHC-SF is an abbreviated form of the original Mental Health Continuum-Long Form (MHC-LF) with 40 items and is based on the conception of positive mental health (Keyes 2002, 2005). Comprising 14 items, the scale measures positive human functioning with a hedonic and eudaimonic tradition of well-being. For example, each question starts with "During the past month, how often did you feel …?" (see Appendix G). The MHC-SF is a suitable tool for cross-cultural research studies of well-being and there are currently several versions of the MHC-SF in different languages (Jovanović, 2015). As there is no official German version of the

scale, all items were translated by following the same procedure as for the previous scale (SSRQ).

Usually, items are scored on a six-point Likert scale ranging from *never* (1), *once or twice* (2), *about once a week* (3), *two or three times a week* (4), *almost everyday* (5), to *every day* (6). However, due to translational purposes of the local language, there was no significant difference between the fourth and fifth response option. Therefore, an equivalent five-point Likert scale was selected without the fifth response option (*almost everyday*) to avoid confusion among respondents. The scoring of the scale indicates the level of emotional well-being and the state to which respondents are flourishing (complete mental health), languishing (incomplete mental health), or floundering (complete mental illness), whereby higher scores represent greater levels of positive well-being. The complete scoring of the items can be retrieved from Appendix G.

Besides, the scale was used in multiple studies and indicated high measurement accuracy as well as moderate test-retest reliability, which seem to remain stable over time (Lamers et al., 2011). Similarly, in the present study, the Cronbach's alpha was .81, showing a high internal consistency. Moreover, the MHC-SF encompasses three dimensions, including emotional (EWB), psychological (PWB), and social (SWB) well-being (Keyes et al., 2008). The EWB subscale comprises hedonic aspects of positive affect and life satisfaction, and is assessed with items 1, 2, and 3 ($\alpha = .80$). An example item of the EWB subscale was introduced by questions, such as "During the past month, how often did you feel happy?" Furthermore, the SWB subscale, with eudaimonic properties, is represented by five items (4, 5, 6, 7, and 8; $\alpha = .61$) and assesses social contribution, social integration, social actualisation, social acceptance, and social coherence, respectively (Keyes, 1998). A question, such as "During the past month, how often did you feel that you had something important to contribute to society?", reflects items that measure the SWB dimension. The last eudaimonic dimension (PWB) contains six items (9, 10, 11, 12, 13, and 14; $\alpha = .83$) that represent self-acceptance, environmental mastery, positive relations with others, personal growth, autonomy, and purpose in life, respectively (Ryff, 1989; Żemojtel-Piotrowska et al., 2018). For this subscale, participants were asked questions, as presented in the following: "During the past month, how often did you feel that your life has a sense of direction or meaning to it?" Overall, the MHC-SF was used as a reliable measure of positive well-being.

Procedure

   Prior to the start of the data collection phase, the study was introduced to the BMS Ethical Committee of the University of Twente (UoT) and was granted approval on the 25th of October 2022. The survey was created in an online environment on the software tool "Qualtrics", where all materials were uploaded in German and a link was created that allowed participants to access the survey. Afterwards, an Email was sent to nursing directors of three different German public hospitals in North Rhine-Westphalia. The Email was written in German and contained information about the bachelor's thesis, including short details about the student researcher, study background, purpose, and relevance of the study, as well as the structure and duration of the online survey, and the requirements for participation. After consultation with the German nursing directors, it was agreed that the study link would be shared by them with the nursing staff who comply with the participation requirements. This sampling technique resulted in a snowball effect, since participants who took part in the survey were asked by their superiors to recruit other eligible subjects to form part of the study sample. The data collection lasted within a month from November 10, 2022, until December 10, 2022.

   In total, the estimated duration of the online survey was 15 to 20 minutes for each individual participant. Once the participants reached Qualtrics, they were asked to read the given information sheet, accompanied by an informed consent form of the study (see Appendices B and C). These materials consisted of specific information about the research study, whereby specific relational details about the variables perceived stress, SR capacity, and well-being were left out.

   After participants agreed to the consent form, they were presented with questions that they had to answer in four blocks. The first questionnaire was based on socio-demographic questions. Following an equal structure, participants had to follow the same procedure for the subsequent scales asking about their perceived stress, SR experiences, and well-being at work in a post-pandemic context, respectively. To avoid missing data, forced responses were set for all survey materials in the Qualtrics system to remind respondents of answering missed questions. At the end of the survey, participants were enlightened about the true nature of the research by a debriefing form (see Appendix H). For this, the actual aim and hypothesis of the study were presented. Ultimately, participants were asked to re-confirm their prior consent concerning their

data usage and the survey ended by thanking respondents for their participation, followed by the student researcher's contact details for concerns.

Data Analysis

Data Preparation

To analyse the raw data of the previously conducted survey on Qualtrics, the software IBM SPSS Statistics 27 was used. The final data set was determined by excluding cases that did not fulfil the inclusion criteria, as well as those that failed to give their consent and to end the survey in general. With the 16 omitted participants, the patterns of findings in the following analyses did not change drastically. In addition, the positively stated items of the PSS-10 (4, 5, 7, and 8) and items of the SSRQ with negative loadings (2, 3, 4, 6, 7, 9, 10, 11, 16, 19, 22, 23, 27 and 31) were reversed and recoded into new variables by inverting the numerical scoring for the Likert scales.

Descriptive Statistics

To obtain an overview of the participants' responses, means (Ms), standard deviations (SDs), as well as minimum and maximum scores were computed for the PSS-10, SSRQ, and MHC-SF. In addition, total scores with Ms and SDs were calculated for each scale to allow accurate comparisons and categorisations of cut-off scores, respectively.

Inferential Statistics

The Pearson product-moment correlation coefficients were computed for the variables age, gender, SR, perceived stress, and well-being to identify possible correlations. Furthermore, the assumptions for the appropriateness of conducting a simple linear regression analysis were reviewed for the first hypothesis (H1). The first assumption (1) holds that the relationship between the independent variable (SR) and the dependent variable (well-being) is linear. This assumption was examined and confirmed by means of a scatterplot of the two variables. Further, there must be an independence of errors (2). A scatterplot of "residuals versus fits" demonstrated an independence of the dependent variable from residuals. The third assumption (3) suggests a normality of errors and has been clarified by creating a histogram of the residuals that showed an approximate normal distribution. Lastly, equal variances (4) are required for performing a simple linear regression. The last assumption was examined through a scatterplot of "residuals versus fits" and showed homoscedasticity. As these assumptions were fulfilled, a simple linear regression analysis was performed for SR and well-being.

For the second hypothesis, a comprehensive test of different moderation assumptions was conducted by reconstructing the regression model that the PROCESS macro by Hayes would run by hand in SPSS to review each assumption via different statistics and graphs. First, to verify uncorrelatedness of the residuals, the Durbin-Watson statistic for first degree autocorrelation was used and indicated an independence of errors. Second, to check for non-multicollinearity, the variance inflation factors (VIF) for both independent variables (Stress, SR) were identified. Both VIF-values revealed non-multicollinearity (< 10) and thus, the second assumption was met. Third, the assumption of homoscedasticity was checked by means of a scatterplot of predicted values (standardised residuals) and demonstrated a homogeneity of variance through the random shape. Fourth, the assumption of normality was verified by a histogram of standardised residuals and indicated the data being approximately normally distributed errors. Similarly, the normal P-P plot of standardised residuals showed that some points were completely on the line, while other points were very close. Fifth, for linearity, partial regression plots were created for well-being and both SR and perceived stress, whereas the assumption of linearity was met. Lastly, there were no extreme outliers. Since all assumptions were met for a moderation analysis, the Process macro by Hayes was conducted to examine the moderation effect of perceived stress on the relationship between SR and well-being.

Results

Descriptive Statistics

Scales

Descriptive statistics, including average scores and standard deviations were calculated to obtain a summary of participants' responses on the PSS-10, SSRQ, and MHC-SF. The descriptives can be found in Table 2, showing the average answers of participants for each scale.

Perceived stress. Regarding the total scores of the PSS-10, participants scored on average 37.14 ($SD = 4.31$), whereby a mean score of 13.10 was identified for perceived self-efficacy ($SD = 2.73$) and an average score of 24.10 ($SD = 3.0$) for perceived helplessness. For the scoring range, a minimum score of 10 and a maximum score of 50 could be reached in this scale (see Appendix E).

Self-regulation (SR). For the SSRQ, participants showed an average score of 123.57 ($SD = 18.89$), with a score range from 31 to 155 possible.

Well-being. A total average score of 47.35 (*SD* = 7.97) was detected for participants' overall well-being. Regarding the components of well-being, respondents' emotional well-being was on average 9.94 (*SD* = 2.34), their social well-being indicated a mean of 14.10 (*SD* = 3.67), and lastly, there was an average score of 23.35 (*SD* = 4.54) for psychological well-being. The total scores that could be reached in the MHC-SF ranged from 14 to 70 points.

Table 2

Descriptive Statistics of the PSS-10, SSRQ, and MHC-SF

Scales and Subscales	*Mean*	*SD*
Perceived Stress	3.71	0.43
Perceived Helplessness	4.0	0.50
Perceived Self-Efficacy	3.26	0.68
Self-Regulation	3.99	0.61
Wellbeing	3.34	0.57
Emotional Well-Being	3.31	0.78
Social Well-Being	2.81	0.73
Psychological Well-Being	4.0	0.76

Note. Response range: (1) to (5); higher answer scores indicate greater levels of the respective variables. (*N*= 51).

Inferential Statistics

Correlations

The bivariate correlations of the socio-demographic variables (age, gender), SR, perceived stress, and well-being can be inferred from Table 3. The findings of the Pearson correlation indicated that there is no significant relationship between age and the concepts of gender (*r*(49) = .03, *p* = .821), SR (*r*(49) = .16, *p* = .277), and well-being (*r*(49) = -.02, *p* = .876), respectively. In contrast, a weak significant positive correlation was found between age and

perceived stress $(r(49) = .35, p = .013)$, indicating that the older a nursing person is, the more stress is perceived by those. Moreover, the Pearson's product-moment correlation tests showed no significant relationship between gender and SR $(r(49) = .06, p = .692$, perceived stress $(r(49) = .27, p = .058)$, and well-being $(r(49) = .11, p = .426)$, respectively. Additionally, the bivariate correlation test demonstrated a non-significant relationship between SR and perceived stress $(r(49) = .27, p = .053)$. However, there was a moderate significant positive correlation between SR and well-being $(r(49) = .46, p < .001)$, which aligns with the first hypothesis (H1) that suggests the higher an individual's SR capacity is, the higher the levels of well-being will be. Additionally, a simple linear regression was performed to test if the independent variable, SR predicted the dependent variable, well-being. As expected, the overall regression was statistically significant, $R^2 = .22, F(1, 49) = 13.44, p < .001$. In line with H1, a significant positive main effect of SR on well-being was found, $\beta = 0.46, t(49) = 3.67, p < .001$, 95% CI [0.20, 0.67]. This finding indicates that a higher score on SR is positively associated with well-being, whereby individuals who engage in SR have an increase of 0.46-units in reported well-being, as measured with the SSRQ and MHCF-SF. The last Pearson correlation test indicated that perceived stress is not significantly correlated with well-being $r(49) = .06, p = .677$. To conclude, the obtained positive correlation between age and perceived stress were highly significant (at $\alpha = 0.05$), but weak in nature, while the positive relationship between SR and well-being was moderately linear at a significance level of 0.01.

Table 3

Correlation Matrices for the Variables Age, Gender, SR, Perceived Stress, and Well-Being

Variable	1.	2.	3.	4.	5.
1. Age		.03	.16	.35*	-.02
2. Gender			.06	.27	.11
3. SR				.27	.46**
4. Perceived Stress					.06
5. Well-being					

Note. * indicates $p < .05$; correlation is significant at the 0.05 level (2-tailed). ** indicates $p <$ .01; correlation is significant at the 0.01 level (2-tailed).

Moderation Analysis

The second hypothesis (H2) proposed that stress moderates the relationship between SR and well-being. To answer this hypothesis, a moderation analysis with PROCESS macro was conducted to determine whether the interaction of the independent variables perceived stress and SR significantly predicted well-being. The overall model was significant, $F(3, 47) = 4.44$, $p = .008$, predicting 22.07 % of the variance in well-being scores. Furthermore, the findings of the moderation analysis revealed a non-significant interaction effect between perceived stress and SR on well-being, $R^2\Delta = 0.06\%$, $F(1, 47) = 0.04$, $b = -0.07$, $t(49) = -0.19$, $p = .852$, 95% CI [-0.86, 0.71]. In other words, in this model, the relationship between SR capacity and well-being did not vary as a function of perceived stress, as the non-significant interaction allowed nearly no explained variances in well-being. As stress does not seem to affect individuals' SR capacity and well-being, H2 cannot be confirmed, and the second hypothesis can be rejected. To conclude, support was found for the first hypothesis, as SR was a significant predictor of well-being. In contrast, the second hypothesis was rejected, since no confirmation was found for the assumption that perceived stress would moderate the relationship between SR and well-being.

Discussion

Conclusion

The purpose of this research was to investigate the moderating role of perceived stress on individuals' capacity to regulate themselves and its effect on their well-being in a German outpatient setting at the final phase of the COVID-19 pandemic. The overarching aim was to answer the research question: "To what extent has perceived stress a moderating effect on the relationship between self-regulation and well-being?" In accordance with previous research, it was hypothesised that outpatient nurses' capacity to self-regulate would have a significant positive effect on their well-being (H1), followed by the assumption that nurses' perceived (work) stress would moderate the relationship negatively between their SR capacity and well-being (H2). As expected, a simple linear regression analysis as well as correlational analysis indicated a significant positive relationship between SR and well-being. However, no support was found for the interaction effect between perceived stress and SR on the response variable, well-being, but a significant positive correlation was detected between stress and the

sociodemographic variable, age. In sum, the current findings highlight the fact that perceived stress does not have a moderating role in the relationship between SR and well-being among the representative sample in German hospitals. These findings and their implications will be discussed in the following.

Theoretical Reflection and Implications

As measured with the PSS-10, the outcomes of the study demonstrated that outpatient nurses in Germany seem to experience high perceived stress in their work settings, particularly through nurses' high scores on the perceived helplessness subscale and lower scores on the perceived self-efficacy subscale. This finding was expected based on recent research in German hospital settings that provided evidence that nurses in the outpatient care suffer from greater stress levels than other healthcare settings due to the pandemic-related stressors at their work environment (Bernburg et al., 2022; Herraiz-Recuenco et al., 2022; Lützerath et al., 2022; Paffenholz et al., 2020). Moreover, the present study's outcomes are consistent with Kramer et al. (2021) who conducted a large cohort study in German hospitals to examine emergency nurses' stress levels in the COVID-19 work context. Similar to the research criteria of the present study, they discovered that outpatient nurses who gained work experience in a COVID-19 environment seemed to be most affected by stress due to the pandemic-related work overload. In the current study, the great stress amount by outpatient nurses was composed of an increased perceived helplessness and lower levels of perceived self-efficacy. This finding might be explained by the fact that the perceived excessive workload is seen as difficult tasks that must be performed (obligatory task) by nurses, where higher work intensification and dedication is required, but the available coping resources are exceeded due to several reasons (Karia et al., 2020). For instance, one's age, personality, situational demands, previous experiences, or any present stress states that have been experienced may influence nurses' ability to cope with perceived work stressors (Karia et al., 2020; Kramer et al., 2021; Prem et al., 2017). As put forward by Bolken et al. (2020), nurses' age can have an increased impact on their stress experience. In accordance with Bolken et al. (2020), there was a significant correlation between perceived stress and age, implying the older nurses are, the more stress is perceived by them in an outpatient work context. A further explanation for participants' high stress levels can be derived from the TMSC by Lazarus and Folkman (1984), which suggests that individuals experience stress when a discrepancy is perceived between environmental demands made on

them and their available coping resources. Nurses might appraise the importance of their work demands as harmful (already suffered damage), threatful (expected damage), and challenging (demands that must be met) (Folkman, 2020). As pandemic states require greater demands and workoverload is usually appraised as a threatening stressor by individuals, outpatient nurses' might not feel capable of coping with the negative stressors and avoid it, as it exceeds their available resources (Eurofund, 2010; Folkman, 2020). As a result, nurses report to suffer from high perceived stress (Folkman, 2020).

Regarding nurses' SR capacity, the outcomes of the SSRQ indicated that outpatient nurses exhibit high self-regulatory resources. In other words, the study's sample showed a strong ability to understand and manage their behaviour, to control their reactions, feelings, as well as well-being (Singh & Sharma, 2018). Based on past studies that revealed a negative relationship between SR and job stress, whereas SR was the predictor of stress, it was expected that nurses' SR ability would be disrupted (lower) through the increased experience of nurses' work stress (Elliot et al., 2011; Kondratyuk & Morosanova, 2014). Similarly, Murray et al. (2016) stated when nurses face prolonged stress, including trauma experiences at work (e.g., pandemic states), their SR resources will be lowered due to activated internal stress response systems. Unexpectedly, the findings of the current study's sample demonstrated the opposite effect, as nurses scored high in SR despite severe stress, and correlational analyses showed no significant relationship between SR and perceived stress. Moreover, according to Beal et al.'s (2005) model on SR, when situations are appraised as abnormal, such as workdays during the pandemic, where extreme work demands are made on one, effortful regulation is commonly required. However, due to strain reactions from earlier stress episodes, the increased demands on regulatory resources will most likely undermine the available resources for energising and maintaining subsequent SR (Wang et al., 2011; Zhou et al., 2017). An alternative explanation for the study's sample might be that nurses are used to reacting in a timely manner to cope with their perceived work stress, where their SR capacity does not diminish at a lower stress threshold. By using stress-coping strategies, such as acceptance of the critical situation and the adoption of a positive attitude, as reported earlier by Khalid et al. (2016), nurses might have developed a higher stress tolerance, with which they have allowed the maintenance and protection of SR resources for energising. As stated by Good et al. (2016), in routine situations, it is simpler for individuals to self-regulate because they are accustomed to automatically perform certain behaviours and since

the participants of the study were asked to indicate their SR experiences at the final phase of the pandemic, it might be the case that they viewed dealing with pandemic-related stress as a routine activity. Therefore, it would be valuable to include factors, such as past efforts in SR and routine situations in Beal et al.'s model (2005) to also provide an explanation for individuals who are high in SR when exposed to stressful events (Chester et al., 2016; Prem et al., 2016). Despite the given theoretical background for this proposed assumption, it can be concluded that more research is required.

Concerning nurses' well-being, it was assumed, according to recent literature, that it would be low due to the increased work stress, as a result of the work overload, and the implied neglect of effective SR techniques (Elsayed et al., 2022; Lewis et al., 2022). The findings of the MHC-SF that measured nurses' well-being revealed that outpatient nurses scored extremely close to having high well-being, however, insufficiently to be classified as the latter. Thus, participants were categorised as having moderate well-being, with which they do not fit the criteria for flourishing or languishing. Accordingly, it can be said that the participants of this study were moderately mentally healthy, whereby their psychological well-being seemed to be highest (Keyes, 2002). This outcome was not expected, as past research demonstrated a neglect of nurses taking care of their own well-being due to the increased responsibilities at work (Elsayed et al., 2022; Lewis et al., 2022). In addition, multiple studies have indicated that frontline nurses face a greater risk of low well-being, as they are more frequently exposed to critical situations and several unfavourable work conditions, as a result of occupational stress (Fiorillo & Gorwood, 2020; Luo et al., 2020; Serrano-Ripoll et al., 2020; Wang et al., 2020). Furthermore, there is evidence that perceived stress has a negative impact on individuals' well-being (O'Connor et al., 2020). However, studies that revealed a strong link between perceived stress and well-being, examined the latter variable as an occupational operator rather than psychologically, which reflects a difference to the present study (Miranda et al., 2020; Suleman et al., 2018). As participants' overall well-being, including emotional, social, and psychological well-being, was measured in an occupational context, but not as a concept of occupational well-being, it is possible that confounding variables, such as socioeconomic status and past life events of participants, have affected the accuracy of the current study's response variable (Huang et al., 2020; Mckenzie et al., 2014). Therefore, nurses' well-being might be moderate rather than low in its nature. Similarly, Dhingra and Dhingra (2020) investigated HCWs' perceived stress and well-

being during COVID-19 and confirmed that perceived stress has a significant effect on well-being, under the condition that subjective happiness mediates the relationship. This finding implies that well-being is exclusively affected by stress when a third variable with a mediating function is included. Based on the correlational analysis of the present study, no significant correlation was found between perceived stress and well-being, which might be explained by the lacking mediating variable.

On the other hand, it is known from multiple studies that well-being is increased when individuals are high in SR, which might explain the almost high, but moderate well-being of the participants (Gagnon et al., 2016; Hofer et al., 2011). According to Mackey and Perrewe (2014) when nurses are exposed to subjective stress, their SR practices lead them to choose positive coping behaviours, with which their well-being is increased. As explained earlier, although outpatient nurses reported to experience high stress at work, they have a high SR capacity, which facilitates coping with the subjective stress, which in turn prevents them from suffering from low well-being (Good et al. (2016). Thus, it can be said that the study's results of participants experiencing moderate well-being is partially supported by previous research by providing evidence that SR has a significant positive effect on well-being, but is fully advocated by the fact that nurses' well-being is increased rather than lowered to poor well-being (Mackey & Perrewe, 2014). This determination aligns with the first hypothesis (H1) that SR has a significant positive effect on outpatient nurses' well-being. Hence, it can be concluded that self-regulatory coping can enhance one's well-being. However, it should be noted that being high in SR does not automatically correspond to being high in well-being, but having an enhanced well-being than usual (Gagnon et al., 2016).

With respect to the second hypothesis, it was expected that outpatient nurses who experience high stress levels would have a lower capacity to regulate themselves, which would result in lower levels of well-being. However, this assumption was rejected, as the PROCESS macro analysis showed no statistically significant support for an interaction effect. Thus, perceived stress has no moderating role in the relationship between SR and well-being. As indicated by the Pearson correlation test, there is no significant relationship between well-being and perceived stress. In view of the extensive research background, the non-direct relationship between these two variables is reflected by well-being being exclusively affected by perceived stress when a third variable acts upon as a mediator (Dhingra & Dhingra, 2020; Fathizadeh et al.,

2016). In addition, SR seems to play an important role in both relationships with reducing stress and increasing well-being, respectively (Extremera & Rey, 2015; Kondratyuk & Morosanova, 2014). For instance, in past studies, SR was commonly used as a mediator for well-being and stress, respectively (Hofer et al., 2011; van Genugten et al., 2017). Furthermore, considering Extremera and Rey's research (2015), where emotional regulation moderated the relationship between perceived stress and mental health, implies that individuals' ability to deal with stress can be facilitated by means of regulating one's emotions and behaviour and has a positive outcome on one's well-being. Moreover, as stated earlier, individuals who are used to frequent stress, act more stress-preventive than individuals who are not used to frequent stress at work, as less effort is required for the SR process (Good et al., 2016). When taking these findings and prior studies into account, it appears reasonable to propose an alternative model, where the relationship between perceived stress and well-being is mediated possibly by SR, as it seems to have a significant role in relation to the latter variables. A further alternative would be to treat SR as a moderator on perceived stress and well-being, as demonstrated by Extremera and Rey (2015). For these model proposals, more research is needed to test for a possible mediating and moderating effect of SR on perceived stress and well-being, respectively.

Consequently, to answer the research question, the study on hand shows that perceived stress, which is experienced by outpatient nurses, is neither associated with SR nor with well-being, but SR and well-being are significantly correlated. Nevertheless, prior research has found support for the relationship between these three variables, respectively.

Strengths, Limitations, and Recommendations for Future Research

Concerning the strengths of the present study, one strong point was the recruited sample. With characteristics, including different age groups and gender, work experience during the COVID-19 pandemic, and workers from several public hospitals, the sample was more representative for outpatient nurses than in previous studies. In respect to prior well-being and SR studies, individuals with other specific characteristics were sampled. For instance, Gomes and Teixeira (2016) studied outpatient nurses and other nursing professions based on the medical services they provide, whereas other researchers focused exclusively on female nurses (Robat et al., 2021). An additional strong point of the present study is that validated and reliable measurement instruments were applied to address the research question. Despite their short version, the PSS-10, SSRQ, and MHC-SF are international widely used tools that measure the

original constructs as intended, and thus, offer additional value to research of stress, SR, and well-being (Lamers et al., 2011; Nielsen et al., 2016; Pichardo et al., 2014). Furthermore, as these assessment tools show high psychometric properties, they allow robust conclusions, whereby it can be assumed that the findings of the current study are precise in measurement accuracy (Sullivan, 2011).

Besides the positive aspects of the study, there are some potential limitations that should be considered when generalising the research results. One limitation refers to the research design. An online survey was conducted, where participants were asked about their experiences with stress, SR, and well-being at the final phases of the COVID-19 pandemic. However, as the pandemic continued for three years and the respondents participated solely once, the collected data could possibly be a simple reflection of a momentary "snapshot" of their perceived impressions regarding their stress levels, SR capacity, and overall well-being. It should be noted that individuals' coping capacities regarding stress might be reinforced in the final pandemic stages, since they were dealing with the stressful pandemic situation for years, and therefore, current variable levels might be high due to habit or practice (Good et al., 2016). Thus, to allow more accurate and comparable results of participants' experiences with the study parameters, it would be more useful to apply a longitudinal study design in future research. In this way, the so-called snapshot could be avoided, as participants could take part in the online survey on more occasions over a longer period, whereby valuable information, such as developments or changes in the variable levels could be detected at both the group and individual level (Caruana et al., 2015). Thus, one could draw more precise conclusions about the function of stress and possible interaction effects between stress and SR.

A further limitation refers to the range restriction of age and gender of the sample. With the majority of participants being 45 to 54 years and female, there is the possibility that the collected data does not represent the full range of possible scores of stress, SR, and well-being that might exist in the population. Statistically, older nurses and females in general are more stress receptive than their younger and male counterparts, respectively (Bolken et al., 2020). Despite greater stress susceptibility, it is possible that the present study's sample, consisting of female nurses with older ages, may be more resilient to stress due to many years of professional experience. This assumption might account for their high SR capacity and the non-significant interaction effect between stress and SR. Similarly, Memon et al. (2019) suggested that when

sample variance is less than population variance, including a small amount of variance, the statistical power for detecting a moderation effect is significantly reduced. Therefore, as an alternative to this study's sample characteristics, future research could avoid the issue of range restriction by including diverse age and gender groups to allow a variety in scores of the variables under consideration and possible moderation effects of stress on SR.

 Overall, outpatient nurses working in public German hospitals face multiple work demands. Hence, it is of utmost importance to offer the necessary resources related to the job demands and the individual needs (Rigotti et al., 2020). For this to happen, the present study's theoretical suggestion should be taken into account, as the findings imply the demand for a new theoretical model than as proposed in the onset of the research procedure. More precisely, instead of stress operating as a moderator on SR and well-being, recent literature suggests SR to have a predictive role in perceived stress and one's well-being (Extremera & Rey, 2015; Hofer et al., 2011; van Genugten et al., 2017). A further examination of whether SR functions best as a moderator or mediator in the relationship between stress and well-being would be valuable for future research, as it would help to re-think previously set theoretical ground. In this way, working models and interventions for outpatient nurses could be refined and elaborated to target not solely nurses with a high stress receptivity and low well-being, but also individuals with a stress proactivity and moderate well-being for improvement (Laranjeira, 2012). Following the study's future recommendations, current work challenges regarding stress and its consequences on their SR capacity as well as well-being, could be addressed in nursing education to prevent nursing students from serious mental health consequences in exceptional situations and to strengthen self-regulatory coping behaviour (Broughton, 2010; Laranjeira, 2012). Since there is a potential for future pandemics, nurses should be aware of how to deal with daily work hassles without suffering from poor mental health (Laranjeira, 2012; Shadbolt et al., 2022).

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Appendix A

Theoretical Model

Figure 1

A Negative Interaction Effect: The Expected Relationship between Self-Regulation Skills and Well-Being could differ among HCWs in Germany due to the Influence of their Perceived Stress Levels (Moderator).
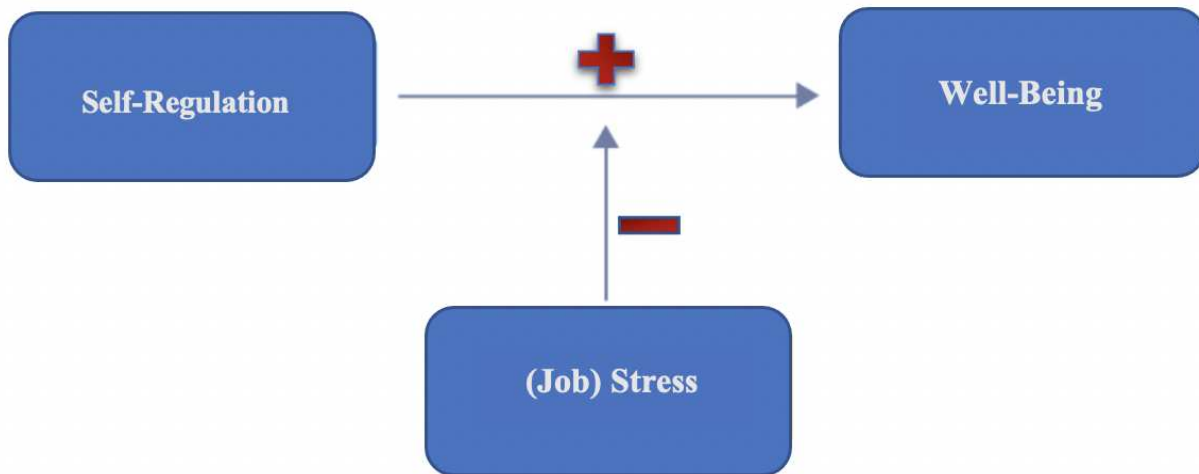
Note. The relationship might be stronger for HCWs experiencing high levels of stress than for healthcare staff with low stress levels.

Appendix B

Information Sheet of the Study on Qualtrics

You are being invited to participate in a research study titled "Outpatient Nurses' Experience with Work Stress". This study is being done by Narjis Rahouti in fulfilment of the requirements of the bachelor's program of Psychology, under the supervision of Martha Kreuzberg, from the Faculty of Behavioural, Management and Social Sciences at the University of Twente.

Research Background

Experiencing stress at work is different in every work branche, such as in the healthcare industry. By participating in this research, you will provide valuable information to our understanding of the role of work stress on stress-coping styles and mental health in a post-pandemic context.

Purpose of the Study

The purpose of this research study is to explore outpatient nurses' work stress experiences in Germany, with regard to mental health after the exposure of the COVID-19 crisis. These findings might be relevant for organisations in the healthcare sector to understand the current situation of outpatient nurses' work experience and for possible intervention development in the emergency department.

Why Have I Been Chosen?

The reason why you have been chosen is that you fulfil these requirements:

- You are an outpatient nurse with a legal age (+18).
- You work in a German public hospital.
- You worked before and during the COVID-19 pandemic in an emergency department.

Do I have to Take Part?

Your participation in this study is entirely voluntary. While we would be pleased to have you participate, we respect your right to decline. You can withdraw from the study at any time without giving a reason, as well as refuse to answer any questions you do not wish to.

- If you decide to withdraw from the study, your data will be removed from the data collection.
- However, once your responses have been analysed and de-identified, you will be unable to withdraw from the study.

If you decide to take part in this research study, you will be directed to the next page, where you will be asked to agree to the accompanying consent form.

If you refuse to give consent to the terms and conditions of this study, you will not be able to participate in this project.

What Does This Study Involve?

The study consists of an online survey, in which you will be asked to answer a series of multiple-choice questions about

- Your background information, taking you approximately 2 minutes.
- Your work stress experiences, which might take you 5 minutes.
- Your stress coping at work, taking you 5 minutes.
- Your well-being at your workplace, which might take you 5 minutes.

In total, participating in this study might have a duration of approximately 15-20 minutes. Please, take your time while reading the questions in the survey.

Potential Benefits of Participation

With your participation, you contribute to the advancement of science in the context of healthcare in Germany. The findings may enhance individual and public awareness of outpatient nurses' current work experiences and mental health under job stress.

There will be any rewards or payments for your participation.

Potential Risks of Participation

The research project has been reviewed and approved by the BMS Ethics Committee and there are no potential risks associated with your participation in this study. In case you feel distress after answering the survey, please feel free to contact the researcher to find a solution.

As with any online related activity, the risk of data breach is always possible. To the best of our ability, your answers in this study will remain confidential and we will minimise any risks by storing your data securely in a safe data source (see below).

Your Data

The collected data will not be used for any other purpose than for this research project.

- Your identity will be kept private and anonymous, and your data will be stored securely.
- Your personal information will be treated confidentially.
- Personal data that can detect your identity will be de-identified and is accessible only to members of the research team.
- Your responses to the survey will form part of a larger data response set, which will initially be stored by Qualtrics.
- Research data from Qualtrics will be downloaded and the collected de-identified information about you will be assigned as a code number that is unique to this study, and analytically processed by means of a statistical software, called SPSS.
- Data will be stored securely on the University of Twente Google Drive or OneDrive allocation, which is password-protected and accessible only to members of the research team.
- As required by the University of Twente, all research data (survey responses and analysis) will be saved in a password-protected electronic file for a minimum of five years before being destroyed.
- Participants' data will not be identifiable in any publication or reporting.
- The research findings will be reported in an academic thesis, written in English, and will be presented only in summary form.
- The research findings may also be disseminated via journal articles and/or conference presentations.

If you have any questions concerning your participation in this study, please contact the researcher mentioned below.

Study contact details for further information:
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There will be no automatic feedback given to you after you have participated in this study. If interested, participants can be informed about the study results once the research has been completed by sending a request via Email to the researcher.

The University of Twente conducts research in line with the National Statement on Ethical Conduct in Human Research. If you have any concerns or complaints regarding the ethical conduct of this research project, you may contact the Manager for Research Ethics on ethicscommittee-bms@utwente.nl.

This study has received ethical approval from the University of Twente, Human Research Ethics Committee BMS/Domain Humanities and Social Science.

Appendix C

Informed Consent Form for Study Participation

1. I have read and understood the information sheet for participation.

2. I understand that all information will be treated with high confidence and used for research purposes only.

3. I understand that there will be any rewards or payments for my participation.

4. I understand that all my personal information will be treated anonymously.

5. I understand how my data will be handled and protected by the researcher.

6. I understand that my data will be included in a large data set and immediately de-identified.

7. I understand that identifiable personal information collected about me, such as [e.g, my email address or my identity code, my IP-address, and work facility], will not be shared beyond the study team and immediately de-identified once the data collection has been completed.

8. I understand that I will not be personally identified on any reports from this project.

9. I understand that this survey contains an initial questionnaire, followed by three several questionnaires about my work experience in the emergency department.

10. I understand that my personal data will be used for an academic thesis and may also be disseminated via journal articles and/or conference presentations.

11. I give permission for the survey database that I provide to be archived in the data repository of the University of Twente, so it can be used for future research and learning.

12. I consent voluntarily to be a participant in this study and understand that I have the right to refuse to answer questions, and I can withdraw from the study at any time without having to give a reason.

13. I understand that I have the right to ask for additional information about the project as it goes on.

14. I understand that this study has been approved by the University of Twente Human Research Ethics Committee and that if I have any questions, I can contact them via ethicscommittee-bms@utwente.nl.

15. I understand that this research will comply with the National Health and Medical Research Council' National Statement on Ethical Conduct in Research Involving Humans and with the privacy politics of the University of Twente.

16. I assign and waive all claims to patents, commercial exploitation, property or any material or products which may form part of or arise from this study.

Do you agree to the above terms and conditions?

Please indicate your answer by highlighting one of the boxes below.

- I hereby **agree** to the terms and conditions and would like to participate in this research project.

- I hereby **do not agree** to the terms and conditions and would not like to participate in this research project.

Appendix D

Socio-Demographic Questionnaire on Qualtrics

Instruction

In the following, you will be asked to answer questions about your background. Please indicate your answers by selecting the information that applies to you. If some response options do not apply to you, please specify your answers by filling in the blank spaces.

Gender

What gender do you identify as?

A. Male

B. Female

C. Non-binary

D. Prefer to self-describe _____.

D. Prefer not to answer.

Age

What is your age?

A. 17 or younger

B. 18 - 24 years old

C. 25 - 34 years old

D. 35 - 44 years old

E. 45 - 54 years old

F. 55-64 years old

G. 65 and over

H. Prefer not to answer.

Job Position

What is your job position?

   A. Outpatient nurse

   B. Inpatient nurse

   C. Doctor

D. Other (If other, please specify:)

E. Prefer not to answer.

Work Facility

In which facility are you currently working?

A. Public hospital

B. Private hospital

C. Other (If other, please specify:)

D. Prefer not to answer.

Work Experience during the COVID-19 Pandemic

Have you worked in a public hospital during the pandemic?

A. Yes.

B. No.

C. I worked somewhere different. (Please specify)

D. Prefer not to answer.

Mental Health Status

Have you been diagnosed with a mental illness in the past months?

A. Yes. I have been diagnosed with ____.

B. Yes, but I prefer not to specify the mental illness.

C. No, never.

Appendix E

Perceived Stress Scale (PSS-10)

Instruction

In the following, a number of questions are given that ask about your work-stress experience. You will be asked to indicate how often you have encountered several experiences at work in the final stages of the pandemic.

You may feel that some questions are similar to others in the questionnaire, but there are differences between them. Hence, it is important that you treat each question separately and answer each of them.

1. In the last month, how often have you been upset because of something that happened unexpectedly?
2. In the last month, how often have you felt that you were unable to control the important things in your life?
3. In the last month, how often have you felt nervous and "stressed"?
4. In the last month, how often have you felt confident about your ability to handle your personal problems?
5. In the last month, how often have you felt that things were going your way at work?
6. In the last month, how often have you found that you could not cope with all the things that you had to do?
7. In the last month, how often have you been able to control irritations in your life?
8. In the last month, how often have you felt that you were on top of things?
9. In the last month, how often have you been angered at work because of things that were outside of your control?
10. In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?

Note. The PSS-10 in English by Cohen et al., (1983). Response range: *never* (1) to *very often* (5); the PH subscale is computed by summing up items 1, 2, 3, 6, 9 and 10; the PSE subscale is computed by adding up items 4, 5, 7 and 8; the total PSS score is the sum of all PH and reversed

PSE items, ranging from 10 to 50 points; score range: 10-23 (low stress), 24-36 (moderate stress), and 37-50 (high perceived stress); higher scores indicate higher perceived stress.

Appendix F

Short Form Self-Regulation Questionnaire (SSRQ)

Instruction

In the following, a number of statements are given that ask about your coping experience at work in the final stages of the pandemic. You will be asked to indicate how much you agree or disagree with them.

You may feel that some statements are similar to others, but there are differences between them. Therefore, it is important that you treat each statement separately to indicate how much you agree or disagree with each one.

Please answer the statements as honestly as possible, in a way that shows how you really are at work, not how you would like to be, or how you think you should be.

1. I usually keep track of my progress towards my goals.
2. I have trouble making up my mind about things.
3. I get easily distracted from my plans.
4. I don't notice the effects of my actions until it is too late.
5. I am able to accomplish goals I set for myself.
6. I put off making decisions.
7. It's hard for me to notice when I've "had enough" (alcohol, food, sweets).
8. If I wanted to change, I am confident that I could do it.
9. When it comes to deciding about a change, I feel overwhelmed by the choices.
10. I have trouble following through with things once I've made up my mind to do something.
11. I don't seem to learn from my mistakes.
12. I can stick to a plan that's working well.
13. I usually only have to make a mistake one time in order to learn from it.
14. I have personal standards and try to live up to them.
15. As soon as I see a problem or challenge, I start looking for all possible solutions.
16. I have a hard time setting goals for myself.

17. I have a lot of willpower.

18. When I'm trying to change something, I pay a lot of attention to how I'm doing.

19. I have trouble making plans to help me reach my goals.

20. I am able to resist temptation.

21. I set goals for myself and keep track of my progress.

22. Most of the time I don't pay attention to what I'm doing

23. I tend to keep doing the same thing, even when it doesn't work.

24. I can usually find several different possibilities when I want to change something.

25. Once I have a goal, I can usually plan how to reach it.

26. If I make a resolution to change something, I pay a lot of attention to how I'm doing.

27. I often don't notice what I'm doing until someone calls it to my attention.

28. I usually think before I act.

29. I learn from my mistakes.

30. I know how I want to be.

31. I give up quickly.

Note. The SSRQ by Carrey (2004) with 31 items. Answer range: *strongly disagree* (1) to *strongly agree* (5); all item scores can be summed (after reverse-coding items 2, 3, 4, 6, 7, 9, 10, 11, 16, 19, 22, 23, 27 and 31) to obtain a total SR score; score range: 31-155; 31-72 (low), 73-113 (moderate), 114-155 (high); higher scores on the SSRQ reflect greater self-regulatory capacity.

Appendix G

Mental Health Continuum Short Form (MHC-SF)

Instruction:

In the following, a number of questions are given that ask about your well-being at work. You will be asked to indicate how often you have felt in several ways at work in the final stages of the pandemic.

You may feel that some questions are similar to others in the questionnaire, but there are differences between them. Hence, it is important that you treat each question separately and answer each of them.

During the past month, how often did you feel ...

1. … happy?
2. … interested in life?
3. … satisfied with life?
4. … that you had something important to contribute to society?
5. … that you belonged to a community (like a social group or your neighbourhood)?
6. … that our society is a good place, or is becoming a better place, for all people?
7. … that people are basically good?
8. … that the way our society works makes sense to you?
9. … that you liked most parts of your personality?
10. … good at managing the responsibilities of your daily life?
11. … that you had warm and trusting relationships with others?
12. … that you had experiences that challenged you to grow and become a better person?
13. … confident to think or express your own ideas and opinions?
14. … that your life has a sense of direction or meaning to it?

Note. The MHC-SF by Keyes (2005) with 14 items. Answer range: *never* (1) to *every day* (5); the total score of the scale ranges from 14 to 70 points; 14-32 (low); 33-51(moderate), 52-70(high); higher scores represent greater levels of positive well-being.

Appendix H

Debriefing Form

Your participation is highly appreciated, as your responses will help us to investigate the relationship between outpatient nurses' work stress experiences, their ability to self-regulate, and its effect on their well-being. Multiple studies have shown that outpatient nurses seem to be affected the most by work stress in Germany during the COVID-19 outbreak, and that this could have a negative impact on their way they cope with work stress (self-regulation capacity) and overall well-being. Therefore, it was hypothesised that it is expected that work stress moderates the relationship between outpatient nurses' self-regulation capacity and levels of well-being.

This specific information was left out in the information sheet, as it could have potentially biassed your responses regarding how you cope with work stress. More precisely, participants often want to present their best side, that is, a version that is socially desirable (known as the *social desirability bias*). Hence, it can be difficult for participants to fully open up when it comes to sensitive topics, such as perceived stress, stress-coping capacity, and mental health (Dodou & de Winter, 2014; Joinson, 1999).

Moreover, participants tend sometimes to second-guess what the researcher is after or change their answers in different ways, depending on the research topic (Gove & Geerken, 1977; McCambridge et al., 2012). This is called participant bias or response bias, and it can have an enormous impact on research findings. Therefore, to avoid the aforementioned types of reporting bias, this information was left for the end of the survey.

! As data collection for this study is still ongoing, please do not share specific information about this study with anyone to protect the validity of the data collected.

After you learned about the true nature of this research study, do you still agree with the research use of your recorded data?
- **Yes, I still agree with having been a participant in this study and allow the researcher to use my collected data for the research purpose.**

- **No, I do not agree with having been a participant in this study and want my data to be removed from the data set of the research.**