The Moderating Role of Gender in the Relationship between General Work Stress and Different Sources of Work Stress

Cailin Reid

Thesis presented in partial fulfilment of the requirements for the degree of Master of Commerce (Industrial Psychology) in the Faculty of Economic and Management Sciences at Stellenbosch University

Study Leader: Prof. G. P. de Bruin

April 2022

Declaration

By submitting this thesis electronically, I declare that the entirety of the work contained therein is my own, original work, that I am the sole author thereof (save to the extent explicitly otherwise stated), that reproduction and publication thereof by Stellenbosch University will not infringe any third-party rights and that I have not previously in its entirety or in part submitted it for obtaining any qualification.

Date: April 2022

Abstract

Stress and burnout have quickly become buzzwords in the modern-day workplace. As such, work stress and different sources thereof, began attracting a large amount of research interest, with several studies pointing towards gender being a significant demographic characteristic to explore in the study of different stressors and strain at work. The main aim of the study was to explore potential moderating effects of gender in the relationships between subjectively experienced, general work stress and eight key sources of work stress, namely role ambiguity, relationships, tools and equipment, lack of career advancement, job insecurity, lack of autonomy, work-home interface and workload, as measured by the Sources of Work Stress Inventory (SWSI; de Bruin & Taylor, 2006a). Gender differences were studied in the meanings and manifestations, and levels of general work stress and the eight sources thereof; as well as in the relations between the eight sources of work stress and general work stress. The relative importance of the different sources of work stress in predicting general work stress across gender, was also explored. Operationally, this study was performed on archival data of 1256 South African working adults (1256 men and 802 women), using moderated multiple regression (MRR) as the primary method of analysis. The results of the study revealed greater similarities than differences in the men's and women's manifestations and levels of the eight sources of work stress and general work stress. Further and most notably, the results showed that gender did not moderate the relationships between any of the eight sources of work stress and general work stress. However, separate regression equations were still needed for men and women for seven of the sources of work stress, with the exception of work-home interface. Slight differences were also found in the relative importance of the different sources of work stress in the predication of general work stress, specifically within the experience of job insecurity, workload and lack of autonomy. Theoretically, these results contribute by providing answers to many inclusive and conflicting studies of the role of

gender in work stress. Practically, these results suggest that men and women are more similar in their experiences of stressors and strain than most research or general public opinion might suggest. With this being said, however, a gender gap still exists, in that women still remain underrepresented in positions of power and authority, especially in male-dominated industries in South Africa, making it necessary to explore and address unique stressors for women as well as other, non-stress-related barriers to entry and advancement for women.

Opsomming

Stres en uitbranding het vinnig gonswoorde in die hedendaagse werkplek geword. Sodanig het werkstres en verskillende bronne daarvan 'n groot hoeveelheid navorsingsbelangstelling begin lok, met verskeie studies wat daarop dui dat geslag 'n beduidende demografiese kenmerk is om te verken in die studie van verskillende stressors en spanning by die werk. Die hoofdoel van die studie was om potensiële modererende effekte van geslag in die verhoudings tussen subjektief ervaarde, algemene werkstres en agt sleutelbronne van werkstres te ondersoek, naamlik roldubbelsinnigheid, verhoudings, gereedskap en toerusting, gebrek aan loopbaanvordering, werksonsekerheid, gebrek aan outonomie, werk-huis-koppelvlak en werklading, soos gemeet deur die Sources of Work Stress Inventory (SWSI; de Bruin & Taylor, 2006a). Geslagsverskille is bestudeer in die betekenisse en manifestasies, en vlakke van algemene werkstres en die agt bronne daarvan; asook in die verband tussen die agt bronne van werkstres en algemene werkstres. Die relatiewe belangrikheid van die verskillende bronne van werkstres in die voorspelling van algemene werkstres oor geslag, is ook ondersoek. Operasioneel is hierdie studie uitgevoer op argiefdata van 1256 Suid-Afrikaanse werkende volwassenes (1256 mans en 802 vroue), met behulp van gemodereerde veelvuldige regressie (MVR) as die primêre metode van analise. Die resultate van die studie het meer ooreenkomste geopenbaar as verskille in die mans- en vroue se manifestasies en vlakke van die agt bronne van werkstres en algemene werkstres. Verder en veral, het die resultate getoon dat geslag nie die verwantskappe tussen enige van die agt bronne van werkstres en algemene werkstres modereer nie. Afsonderlike regressievergelykings was egter steeds nodig vir mans en vroue vir sewe van die bronne van werkstres, met die uitsondering van werk-huis-koppelvlak. Geringe verskille is ook gevind in die relatiewe belangrikheid van die verskillende bronne van werkstres in die voorspelling van algemene werkstres, spesifiek binne die ervaring van werksonsekerheid, werklading en gebrek aan outonomie. Teoreties dra

hierdie resultate by deur antwoorde te verskaf op baie inklusiewe en teenstrydige studies van die rol van geslag in werkstres. Prakties dui hierdie resultate daarop dat mans en vroue meer soortgelyk is in hul ervarings van stressors en spanning as wat die meeste navorsing of algemene publieke opinie kan voorstel. Met dit gesê, bestaan daar egter steeds 'n geslagsgaping, aangesien vroue steeds onderverteenwoordig bly in magsposisies en gesagsposisies, veral in manlike gedomineerde bedrywe in Suid-Afrika, wat dit nodig maak om unieke stressors vir vroue sowel as ander, nie-stresverwante hindernisse tot toegang en vooruitgang vir vroue te ondersoek en aan te spreek.

Acknowledgements

First and foremost, I would like to express my sincere gratitude to my study leader, Prof. de Bruin, without the guidance and mentorship of whom, this thesis would not have been possible. Thank you for sharing your wealth of knowledge and wisdom with me. It has been an honour working with you over the years and I am privileged to have been led and taught by you.

I would also like to thank JvR Psychometrics for providing the data necessary to conduct this study. The extensiveness of the data provided, contributed significantly to the accuracy of the results obtained in the study.

A debt of gratitude is owed to my parents, John and Adele Reid. Thank you for granting me the opportunity to pursue my Master's degree and for your constant love and support throughout its completion. To the rest of my support system - all of my close friends and family - thank you for cheering me on at every step of the way.

Most importantly, all glory, honour and praise go to my Lord and Saviour for gracing and strengthening me throughout the completion of my studies. Your faithfulness and unconditional love carried me through each day.

.

Contents

Page

List of Tables

List of Figures

Chapter 1: Introduction

Work stress is a major issue facing individuals and organisations across continents and professions (Cooper & Quick, 2017). Work stress has increased dramatically over the last few decades, with recent years seeing a considerable spike in work-related stress levels (Bhui et al., 2016). The reasons for this could be attributed to several challenges facing the twenty-first century workplace, including rapid developments in technology, globalisation, changes in work structure and most recently, the COVID-19 pandemic (Rabenu, 2021). As a result, modern society has begun glamourising the idea of work stress, to the extent that it would seem achievement and success are being measured against one's stress levels, and burnout is now being worn as a badge of honour. The negative influence this is having on employee health and well-being, as well as on company performance and productivity, is making it increasingly important for organisations to be aware of, and sensitive and reactive to, the levels of work-related stress experienced by employees (Hamidi & Eivazi, 2010).

Over the years, more and more research has been conducted on the topic of work-related stress, primarily in terms of its causes and possible solutions (Che et al., 2017; Yasin & Naqvi, 2016). Certain of these studies have indicated that gender may be a significant demographic characteristic to consider in the study of stress in the workplace (Baruch et al., 1987; Bielecky et al., 2017; Gyllensten & Palmer, 2005). However, despite the advancement of research on work stress over the years, most studies are inconclusive as to whether or not gender plays a role in the experience of work stress (Gyllensten & Palmer, 2005).

According to Brooker and Eakin (2001), although researchers have focused on empirically testing and establishing the association between gender and work stress, less effort has been made to theorise the pathways that explain these findings. In a study conducted by Bielecky et al. (2017), it was found that work stress did, in fact, affect men

and women differently, however, it was concluded that further research needed to be conducted on the reasons for these differences.

Against this background, one angle from which these gender differences in work stress can be investigated, is through the different sources of stress experienced by men and women. While some of the research from this standpoint suggests that gender has little effect on work stress and sources thereof, and that no differences exist between men and women, most research on the topic suggests that there are differences in both the types of stressors and the severity of stress experienced by the different genders. Most of these studies suggest that women are disproportionately exposed to and influenced by a variety of job and workplace stressors and thus, experience higher levels of stress in general (Rivera-Torres et al., 2013).

While it is possible that gender differences might exist in the experience of work stress and different sources thereof, it is also possible that this may be an outdated view, based on traditional gender roles and societal norms of the past, and that the changing roles of men and women in the twenty-first century and the increase in legislation and advocacy for working women, have helped to close this gender gap. This poses an important question as to whether or not gender has an influence on stress and its various sources in the work environment.

General Work Stress

Stress is defined as a subjectively experienced internal state, occurring as a result of the perception that environmental and/or internal demands exceed one's resources to cope with such demands (Palmer & Cooper, 2007). These demands, commonly referred to as stressors, are perceived as threats to one's mental, physical, emotional and spiritual health, leading to a series of physiological responses (Seaward, 2006). When approaching the

concept of stress, it is also important to distinguish between the terms: ‘stressor’ and ‘strain’. Stressors are environmental factors that cause stress, while strain relates to an individual’s experience of stress in response to these stressors (Cooper & Quick, 2017).

Stress has different meanings in various contexts, where it presents itself in different forms, including financial, marital, health- and work-related (Khamisa et al., 2015). This study focuses specifically on subjectively experienced work stress. The term ‘work stress’ is often used interchangeably with terms such as ‘job stress’, ‘occupational stress’ and ‘workplace stress’. In simple terms, work stress is the stress that an individual experiences as a result of circumstances in his/her job and work environment (Chan, 2007). Moreover, it is an adverse response to excessive demands and pressures placed on an individual at work, resulting from the perception of the individual that he/she is unable to cope or adjust (Chan, 2007).

With stress becoming a buzzword in most workplaces globally, work stress has become a particularly active research area in recent years (Che et al., 2017; Yasin & Naqvi, 2016). This is primarily due to the negative impact that stress and burnout have had on employee health and well-being, which has been found to lead to negative organisational outcomes, such as increased absenteeism and accidents, tense working environments as well as decreased engagement and productivity (Yasin & Naqvi, 2016).

Sources of Work Stress

Sources of work stress, or work stressors, refer to excessive demands and pressures in an individual’s job and work environment, which do not fit or correspond with the individual’s resources, knowledge or abilities and that are, therefore, perceived as threats to the individual’s well-being (Chan, 2007; Chandola, 2012). Stressors can differ in type and intensity, which is thought to be influenced by factors including occupation and gender

(Brooker & Eakin, 2001; Gyllensten & Palmer, 2005; Rivera-Torres et al., 2013).

Although this is not addressed in the present study, it is noteworthy to mention that an individual's profession has been shown to have a significant impact on his/her level of work stress as well as on the stressors to which he/she is exposed (Yasin & Naqvi, 2016). For example, emotionally demanding occupations, such as police work and social work, are considered to be more stressful due to stress of conscience and exposure to death, illness and crime (Backteman-Erlanson et al., 2013). However, even when men and women hold the same job title or are in the same occupation, they are said to experience different stressors as well as different levels of work stress (Brooker & Eakin, 2001).

The Sources of Work Stress Inventory (SWSI) is a South African-developed instrument, measuring overall levels of work-related stress, while also identifying the key sources of this stress (de Bruin & Taylor, 2005). The SWSI measures eight commonly experienced sources of work stress, namely role ambiguity, relationships, tools and equipment, career advancement, job security, lack of autonomy, work-home interface and workload (de Bruin & Taylor, 2006a). These sources of work stress form the basis of the stressors explored in the present study.

The first of the stressors explored in this study (as operationalised by the SWSI) is that of role ambiguity, which occurs when an individual's job is ill-defined or vague and the individual lacks clear direction or guidelines about what is expected of him/her within a particular job or workplace role (Barling et al., 2005). This can lead to stress and anxiety over not understanding one's role or what one's priorities should be, as well as over the risk of exceeding one's authority or making the wrong decisions (Beena & Poduval, 1999). Most of the available literature argues that this is one of the most prevalent sources of stress for working women (Beena & Poduval, 1999; Zunker, 2008), with women's work roles usually

being less specified and more unclear than those of men (Pandey & Pestonjee, 2013).

Secondly, the relationships dimension of the SWSI measures stress due to poor interpersonal work relationships and abuse from colleagues and superiors (de Bruin & Taylor, 2005). Employees who are isolated from others, in conflict with others, or are the victims of abuse, often experience severe stress and anxiety, which can lead to both behavioural and physical strain (Rayner et al., 2002). According to Matuszek (as cited in Brooker & Eakin, 2001), organisational politics and social status could be major indicators of gender differences in levels of work stress, with most research indicating that interpersonal work relations are more stressful for women than for men (Chrisler & McCreary, 2010; Miner-Rubino & Cortina, 2004; Morrison, 2007).

Thirdly, the tools and equipment dimension of the SWSI relates to stress experienced when working with unsuitable, broken or complicated machinery, or when there is a lack of the necessary tools and equipment to perform a job properly (de Bruin & Taylor, 2005). Insufficient physical resources in the workplace can interfere with an employee's ability to perform his/her duties, often resulting in high levels of work-related stress (Barling et al., 2005). Gervais and Millear (2016) are of the opinion that while more women have started entering male-dominated professions, men are still usually more involved in high-risk jobs, which require the use of dangerous machinery and equipment, thus resulting in more stress and physical strain for men. Men are also thought to find it more difficult than women to work in circumstances where the appropriate supplies are lacking (Stafyla et al., 2013).

The fourth source of work stress explored in this study is a lack of career advancement. This stressor relates to a perceived lack of opportunity to progress further in one's career within one's current company (de Bruin & Taylor, 2005). While men and women both experience stress and frustration over achieving higher organisational status

and rankings, women generally face more difficulty in advancing up the corporate hierarchy, primarily due to social isolation and glass ceilings[1] (Cooper & Quick, 2017). As such, career progression has been found to be a key source of stress for working women in particular (Gyllensten & Palmer, 2005).

The fifth source of work stress explored in this study is that of job insecurity, where an individual lacks confidence about his/her future in the current workplace (de Bruin & Taylor, 2005). When employees feel that their jobs are not safe, they often experience stress and anxiety over how they will survive financially and make a living, should they lose their current jobs (Heery & Salmon, 2000). Most research on this source of work stress indicates that men experience higher levels of stress due to job insecurity, as a result of men traditionally being expected to fulfil the role of the primary breadwinner in most households (Heery & Salmon, 2000; Klandermans & Van Vuuren, 1999).

Yet another dimension of the SWSI explored in this study is a lack of autonomy, relating to stress due to a lack of empowerment, job control and authority over work-related decisions (de Bruin & Taylor, 2005). Employees with monotonous jobs, involving limited learning, autonomy and problem-solving, tend to experience lower job satisfaction and greater emotional stress at work (Barling et al., 2005). In this regard, most researchers agree that women's work is more likely to involve repetitive tasks, which offer little control or decision-making authority (Abbott et al., 2006; Rivera-Torres et al., 2013), making this a more significant source of stress for women than for men (Goldman et al., 2013). However, the results of empirical research suggest a stronger relationship between job control and general work stress for men than for women (de Bruin & Taylor, 2006b).

The seventh source of work stress explored in this study is based on the work-home

[1] Glass ceilings refer to barriers that restrict career advancement and success, particularly for women and other minorities in large companies and male-dominated industries.

interface scale of the SWSI, which measures stress due to work/non-work spill-over, a lack of social support as well as interference between roles within and outside of the workplace (de Bruin & Taylor, 2005). While most employees, both male and female, struggle with achieving a healthy balance between their work and personal lives, most research on the topic centres around women experiencing this stressor to a greater extent, as most working women are still expected to conform to traditional societal and cultural expectations of caring for the household and children (Rehman & Roomi, 2012; Yasin & Naqvi, 2016). While somewhat of a 'gender revolution' has occurred in recent years (Oláh et al., 2018), which has led to rapid changes in family patterns and gender roles, most researchers are of the opinion that women's greater economic contribution has not been met by a proportionate increase in men taking on more non-work responsibilities (Craig & Mullan, 2011).

The final source of work stress explored in this study is that of workload, which relates to the stress that individuals experience when they perceive that they are unable to be productive or manage their amount of allocated work (de Bruin & Taylor, 2005). Most studies indicate that women's total workload exceeds that of men, specifically when taking into account both work and non-work responsibilities, making women more prone to role and work overload as well as increased stress (Bittles & Parsons, 2016; Lundberg & Frankenhaeuser, 1999; Nelson & Burke, 2002).

Gender as a Moderator

Over the years, psychological theories have grown in sophistication and developed to the point whereby researchers are no longer merely interested in the main effects of variables, but have also started conducting research into their interactive, or moderating effects (Aguinis, 1995). With interactive/moderating effects playing an increasingly important role in research today (Aguinis, 2004), it is necessary to consider relations above

and beyond the first-order relationships occurring between stressors and strain.

These interactive effects occur via moderator variables, which affect the nature of the relationships between other variables, such that relationships between predictor and criterion variables vary as a function of moderators (Aguinis, 1995). One of the most common moderators included in psychological studies, is that of gender (Aguinis, 2004). While most research is inconclusive regarding the role that gender plays in the experience of work stressors and strain (Gyllensten & Palmer, 2005; Rivera-Torres et al., 2013), several studies indicate that gender differences may exist in both the types of stressors and the severity of stress experienced in the workplace (Baruch et al., 1987; Bielecky et al., 2017; de Bruin & Taylor, 2006b), providing justification for the inclusion of gender as a moderator in the study of work stress.

Moderators can take the form of either categorical or continuous variables (Aguinis, 1995). In the present study, where gender is the moderator, the moderator is treated as a categorical variable with two categories, namely men and women. While it is acknowledged that in today's society, several new and emerging gender classifications exist beyond simply men and women, this study only makes use of these two categories of gender, primarily as a result of the relatively large sample size needed.

The need for such a large sample for this study is owed to moderator testing requiring high statistical power to detect effects. Statistical power refers to the probability of rejecting the false null hypothesis that no moderating effect exists. Low statistical power, therefore, increases the occurrence of Type II errors in research, whereby researchers erroneously reject theoretical models that include moderating effects (Aguinis, 1995). One reason for a lack of consensus regarding the moderating role of gender in studies of work stress is thus, the potential lack of power in detecting a moderating effect (Aguinis, 1995).

According to Aguinis (1995), one of the most frequently used techniques for detecting moderating effects in research, is moderated multiple regression (MMR). Many investigations have been conducted in this regard, concluding that MMR is a suitable and effective technique for investigating the effects of moderator variables (Aguinis, 1995; Cohen, 1992; Stone-Romero et al., 1994). As a result, this technique is used as the primary method of analysis in the present study.

Study Aims and Objectives

The purpose of the present study is to determine whether gender plays a moderating role in the link between subjectively experienced work stress and different sources of work stress. The focus will, therefore, be on examining whether gender influences the relations between a series of environmental stressors and strain within the context of the work environment. This study aims to investigate the role of gender as a moderator in the relationships between general work stress and eight key sources of work stress, namely role ambiguity, relationships, tools and equipment, lack of career advancement, job insecurity, lack of autonomy, work-home interface and workload; as measured by the Sources of Work Stress Inventory (de Bruin & Taylor, 2006a).

The role of gender in work stress can be studied on different levels, translating to different research questions. The critical research questions of this study are therefore, (a) whether the subjective experience of work stress and the different sources of work stress carry the same meaning and manifest similarly among men and women; (b) whether differences exist in the levels of general work stress and the different sources of work stress for men and women; and (c) whether differences exist in the relations between general work stress and the different sources of work stress for men and women, with a focus on whether the different sources of work stress predict or explain strain equally well for men and

women, or whether gender moderates these relations. A separate question also relates to the possibility of the relations between the different sources of work stress differing across the two gender-based subgroups, with the focus falling on the relative importance of the different sources of work stress in predicting/explaining general work stress across gender. Operationally, this study is performed on archival data of South African adults, who completed the SWSI questionnaire in organisational settings; using measurement invariance and equivalence testing, descriptive statistics, moderated multiple regression and a relative importance assessment to investigate the critical research questions.

To reiterate, while it is acknowledged that the concept and meaning of gender has changed and evolved over time, with today's society now recognising numerous different classifications of gender, this study only makes use of two gender categories, namely men and women. Gender is a fairly complex variable of study, as it encapsulates a range of different characteristics pertaining to and differentiating between men and women, including hormones, biological features, mannerisms, social structures and identity (Carpenter, 1994). With this being said, the purpose of this study is to merely explore the differences, if any, in the relationships between general work stress and the different sources of work stress across the two gender groups, and the study will not, therefore, attempt to explain the causes or characteristics of men and women that result in any differences found between the two groups.

Value and Significance of the Study

As work stress is a common problem experienced by workers in almost all industries and occupations across the globe (Cooper & Quick, 2017), the value of this research lies in its potential to provide a better understanding of how working men and women might differ in terms of their experience of different stressors and work stress in general, to enable

organisations to develop strategies and interventions aimed at minimising specific sources of stress and reducing overall stress levels for both men and women.

This study is also particularly relevant in addressing the gender inequality that still exists in the modern workplace today (Elias, 2018). Arguably the most significant shift in the global economy in the last century, has been the substantial increase in female participation in the paid labour force (Long & Kahn, 1993). However, although women make up a significant and growing proportion of today's paid workforce, a definite gender gap still exists, not only in terms of pay and treatment in the workplace, but also in terms of the severe underrepresentation of women in positions of power and authority (Hunt et al., 2018), especially in male-dominated industries (Sunindijo & Kamardeen, 2017).

South Africa, in particular, still has a long way to go in terms of rectifying past imbalances and issues of discrimination. According to a report by Statistics South Africa (Stats SA, 2021), a greater proportion of men are involved in paid employment than women. The report further states that women only make up 32 percent of managers in South Africa and only dominate those occupations of domestic workers, clerks and technicians, with all other professions being dominated by men. This report highlights a clear need for greater female participation in both the primary sector, in mining and agricultural occupations, and in the secondary sector, in manufacturing and construction occupations, as well as in senior executive and managerial positions. Similarly, PricewaterhouseCoopers (PwC, 2018) state that women also remain underrepresented in the technology sector, which is one of the most lucrative and fastest-growing sectors worldwide. Within the 10 highest ranked global tech companies, women hold only 19 percent of tech-related jobs and only 28 percent of the leadership positions. In South Africa, the pool of female talent in the fields of science, technology, engineering and mathematics (STEM) is limited, with men significantly outweighing women in each of these fields (PwC, 2018).

Another male-dominated profession requiring greater female participation, is that of accounting (Ribeiro et al., 2016). This is of significance in South Africa, where most CEO's are Chartered Accountants (CAs). While global studies have indicated that more women than men have entered the accounting profession in recent years (Crosley, 2006; Meredith & French, 1996), only a small percentage of Partners and Executives in accounting public practice firms are women (Crosley, 2006; Kornberger et al., 2011), resulting in a need to increase retention rates of women CAs in order to increase the proportion of women in leadership positions (Ribeiro et al., 2016).

The benefits of promoting women in the workplace and ensuring a more gender-diverse workforce, include addressing skills shortages in certain industries, improved conflict resolution and performance (Sunindijo & Kamardeen, 2017) as well as increased creativity and innovation (PwC, 2018). Hunt et al. (2018) also state that companies with a greater proportion of women in leadership positions, have been found to be more profitable.

Since the mid-90's, South Africa has made major strides in trying to assist and advance previously disadvantaged groups and ensure a more representative and diverse labour force, particularly through the introduction of legislation such as the *Employment Equity Act* (Act 55 of 1998), which promotes equality and fair treatment in employment, as well as through affirmative action policies, which aim to address societal biases against underrepresented groups in the workplace. Recent years have also seen a significant spike in media coverage and awareness campaigns advocating for gender equality and women empowerment (Tokar et al., 2019).

Despite these efforts, employment equity laws and affirmative action policies have only had a marginal impact on gender equality in the workplace, with many organisations still functioning according to gendered lines and male models of work, making it necessary

to address other barriers to entry and advancement for women (Sunindijo & Kamardeen, 2017). One such barrier is that of stress for women in the workplace (Long & Kahn, 1993). Ribeiro et al. (2016) suggest that the low representation of women CAs in South Africa can be attributed to the combination of different work-related stressors, including work overload, job insecurity, work-family interference, advancement opportunities and team climate. In addition to reducing work stress for women, Sunindijo and Kamardeen (2017) also highlight the importance of reshaping perceptions regarding how women experience and handle work stress. This makes the present study particularly necessary, as further research is needed on women's experience of stressors and strain in order to formulate a more comprehensive definition of what work stress means for women. This will aid the development of specific strategies and interventions, aimed at minimising stress for women in particular, to ensure their retention, advancement and equitable representation in the workplace.

Thesis Overview

To outline the chapters to follow, firstly, Chapter 2 will provide an overview of the existing literature in terms of the relationship between gender and stress in the workplace; the role of gender in the experience of each of the eight identified sources of work stress; as well as the relative importance of the different sources of work stress in explaining general work stress. In Chapter 3, the research methodology will be presented in terms of the hypothesised models, research design and participants, measuring instrument and its psychometric properties, statistical power, treatment of missing data, statistical methods of data analysis and ethical considerations. The results of the preliminary analyses, the main MMR analysis as well as the relative importance assessment conducted in the study, will then be presented in Chapter 4. Finally, in Chapter 5, the results and findings as well as the limitations of the study will be discussed and recommendations will be proposed for future research. This thesis will then close with a summary of the general conclusions.

Chapter 2: Literature Review

A major drawback of past studies of work stress was that the majority of the research was conducted on samples consisting mainly of male participants, with the findings of which, then generalised to the entire population, thereby disregarding the influence that gender may have had on the relationships studied (Matud, 2004). However, with the increased feminisation of the labour market, the focus has shifted in more recent years, resulting in women becoming more of the focal point and making up a greater proportion of the samples used in studies of stress. For example, in a study conducted by Che et al. (2017) on stressors and employee health, of the 274 participants included in the sample, 97 percent were women. Similarly, several studies of work stress, such as those by Richardsen et al. (2016) and Sriharan et al. (2020), focus specifically on stress for women.

In terms of previous research and existing literature in this area, Väänänen et al. (2014) conducted a 50-year review of trends in work stress publications between 1960 and 2011, finding substantial growth in publications until the early 2000's and a stagnation and slight decline in the years thereafter. The primary reason for this was attributed to the shift in focus from a more medical model of employee health and well-being, focusing on stress and its negative consequences, to a more resource-based conceptualisation of occupational health, focusing on employee wellness and positive psychology. This being said, the recent COVID-19 pandemic has sparked yet another surge in research on stress, anxiety, depression and overall mental and physical health in the last year. Despite this, however, very few researchers have included gender as a variable of interest in their studies and even fewer of these studies have been conducted in a South African context.

This chapter reviews current literature on work stress and the different sources thereof. An overview of existing literature is provided in terms of, firstly, the interplay

between gender and work stress at different stages of the stress process as well as in terms of gender and stress levels; followed by literature on each of the eight sources of work stress measured by the SWSI and their theoretical and empirical associations with gender. This is followed by literature on the relations between these sources of work stress.

Gender and Work Stress

Miller (2016) conceptualises the idea of gender and work stress as the differences in stress processes and levels of stress of men and women in the work environment. Theory suggests that gender plays a role in every element of the stress process, including the sources of stress an individual is exposed to; whether an individual will appraise a situation as stressful; an individual's coping responses and social support systems; as well as the outcomes and health implications of an individual's stress reactions (Baruch et al., 1987; Chrisler & McCreary, 2010). While initially, gender differences in the experience of work stress were thought to merely be a function of biological factors typical of sexual differentiation, including anatomy, neurochemistry and hormones, more recent research has suggested that gender differences are far more complex and involve socio-cognitive, psychological and environmental factors, including gender role identification, socio-economic class, marital status, parental status and type of employment (Mayor, 2015; Miller, 2016; Verma et al., 2011).

The Stress Process

Regarding the different elements of the stress process, firstly, in terms of sources and triggers of stress, several researchers are of the opinion that men and women are triggered by different sources of stress and experience varying levels of exposure to the same sources of stress (Barling et al., 2005; Brooker & Eakin, 2001; Calvarese, 2015; Gyllensten & Palmer, 2005). While both genders are generally exposed to the most common types of

work stressors including role ambiguity, job insecurity and workload (Nelson & Burke, 2002), women are also believed to experience unique, gender-specific stressors, including gender-based violence, sexual harassment, tokenism and sexist discrimination (Matud, 2004). Although men also experience traumatic life and work events, inducing high levels of stress and anxiety, typically a far greater proportion of women fall victim to abuse and harassment in the workplace (Alsawalqa, 2021; Davidson & Cooper, 1992; McLaughlin et al., 2012).

Once an individual has been exposed to a stressor, whether or not the situation is perceived as stressful, depends on how the individual appraises the stressor (Mayor, 2015). Stangor and Walinga (2014) suggest that the appraisal process involves both a primary evaluation of how threating the stressor is as well as a secondary evaluation of one's resources to cope and deal with that threat. Matud (2004) found that women typically appraise stressors as more serious and show greater reactivity to stressors than men. Sarrasin et al. (2014) attributes this difference to women cognitively appraising stressors more as threats, while men appraise them more as challenges. Additionally, according to Miller (2016), women tend to experience increased psychological reactivity to interpersonal stressors, while men's psychological reactivity tends to increase in relation to achievement-related stressors.

Dhabhar (2018) suggests that after a situation has been perceived as stressful, an individual's response is linked, to a large extent, to the individual's gender. While biologically, research suggests that men and women experience similar hormonal responses to threats and are physiologically geared to meet the short-term demands of stress in a similar way, their adaptive responses to stressful situations have been found to differ (Taylor et al., 2000). In this regard, while men are typically thought to assume an egocentric

approach to stress, by adopting more of a 'fight-or-flight'[2] response, several researchers are of the belief that a woman's maternal instinct to protect and nurture, has resulted in women moving from a more biological response of fighting or fleeing, to that of a more 'tend-and-befriend' approach, characterised by attending to the needs of others and affiliating with social groups (Dhabhar, 2018; Taylor et al., 2000).

In terms of gender and coping, an abundance of literature exists in this area. Coping refers to the manner in which individuals cognitively and behaviourally deal with stress (Barling et al., 2005). As complex a concept as it is, coping can broadly be categorised as either problem-focused or emotion-focused (Matud, 2004; Mayor, 2015; Miller, 2016; Parkes & Hughes, 2020). While problem-focused coping centres around altering or eradicating stressors by taking control of the situation and confronting the stressors; emotion-focused coping, on the other hand, focuses less on individual stressors and more on one's strain reactions, through regulating one's emotional responses to stressful situations (Matud, 2004). Problem-focused coping is considered to be more adaptive and has been linked to positive outcomes such as feelings of a greater sense of control and mastery, while emotion-focused coping is often seen as less effective, as it involves avoidance and denial behaviours and has been linked to negative health outcomes, including depression and higher levels of perceived stress (Miller, 2016).

While several researchers are of the opinion that an individual's coping style is largely determined by individual differences in personality factors, such as locus of control, neuroticism and hardiness, as opposed to differences in gender (Barling et al., 2005; Parkes & Hughes, 2020), most of the literature on coping does note differences in the ways men

[2] The fight-or-flight response is a biobehavioural defence against stressful or threating situations, characterised by a physiological activation of the sympathetic nervous system in humans and animals to attack or flee from a threat or predator in order to ensure one's safety and survival (Taylor et al., 2000).

and women cope with stress (Brooker & Eakin, 2001; Carter, 2012; Matud, 2004). In this regard, men have been found to make more frequent use of problem-focused coping strategies to deal with work-related stress, which involve active problem solving and engagement, whereas women were found to make use of more passive, emotion-based coping strategies in the form of venting, avoidance and making use of social networks (Brooker & Eakin, 2001; Matud, 2004).

Moreover, a survey conducted by the American Psychological Association (APA, 2012) revealed that women typically make use of a multitude of strategies and techniques to cope with and manage their stress, including reading, praying, shopping, socialising or speaking to mental health professionals. Men, on the other hand, were typically found to rely more heavily on sports and exercise to manage their stress (Carter, 2012). Men and women not only differ in terms of how they manage stress in their lives, but also in terms of the level of importance they place on doing so. While women tend to be more aware of the presence of stress in their lives and spend more time trying to manage and prevent it, men, on the other hand, do not often readily acknowledge the impact of stress on their lives and tend to place less importance on managing it (Carter, 2012).

In a comprehensive review of gender research by Chrisler and McCreary (2010), it was concluded that one of the greatest gender differences in human behaviour, occurs within the extent to which men and women seek out social support in response to stressful situations. Social support is a well-known and widely studied resource in the process of coping with stress. The use of social support in coping has been found to significantly reduce the impact of stress, as it enables individuals to share their feelings, providing them with a sense of relief and helping them to better understand and respond to their stressors (Bellman et al., 2003; Chrisler & McCreary, 2010). In this regard, women tend to make more frequent use of social support as a resource in managing their stress (Chrisler &

McCreary, 2010; Kneavel, 2021; Turner, 1994). This is often attributed to women maintaining more frequent contact with their social networks and developing more intimate, empathetic and supportive relationships with others (Turner, 1994). According to Chrisler and McCreary (2010), due to their traditional role as caregiver and nurturer, women also provide more social support to others in times of need and therefore, both men and women tend to seek support from women in stressful circumstances. As such, women have been found to experience more of both the positive and negative effects of social relations in their experience of stress (Turner, 1994).

Certain differences have also been found in the overall outcomes of work-related stress for men and women (Pestonjee & Pandey, 2013). According to Miller (2016), men are more prone to externalised disorders as a result of work stress, including substance abuse and anti-social behaviour, while women are more prone to mood disorders and anxiety. In terms of health effects, men have been found to experience more chronic illnesses due to stress, including heart disease and hypertension, while women are more likely to experience physical and psychological symptoms, including headaches, insomnia, nausea, muscle tension and anxiety (Kuther, 2002).

Levels of Work Stress

The general opinion of the public across most parts of the world, appears to be that women are more stressed than men. Numerous blog posts, press releases as well as internet, magazine and newspaper articles, have addressed the stress gap between men and women and seem to have reached a general consensus that women suffer from higher levels of stress than men (APA, 2012; Wong, 2018). Studies on stress during the COVID-19 pandemic have also revealed higher stress levels amongst women in comparison to men (Kowal et al., 2020; Gamonal-Limcaoco et al., 2021; Wang et al., 2020).

The idea that women are more stressed than men, also extends to the domain of work stress, with the most cited causes of this gender gap being sexism and discrimination, unequal pay, a lack of workplace support for women as well as women having to juggle work and family responsibilities to a far greater extent than men (Batty, 2016). Empirically, while some researchers remain unconvinced that gender differences exist in levels of work stress (Martocchio & O'Leary, 1985), several studies and reviews thereof, have been conducted across various industries, occupations and countries, which support the notion that women report higher work-related stress levels than men (Bergdahl & Bergdahl, 2002; Jick & Mitz, 1985; Kneavel, 2020; Redondo-Flórez et al., 2020; Torkelson & Muhonen, 2008).

As mentioned, although this is not addressed in the present study, it is worth noting that different jobs and professions have been linked to differing levels of work stress (Yasin & Naqvi, 2016). While all jobs generally generate some degree of work stress, certain professions have proven to result in higher work-related stress levels than others (de Sousa, 2009). For example, particularly high levels of stress have been found amongst nurses, teachers and correctional officers. Moreover, farming has, in fact, been globally recognised as one of the most difficult and stressful jobs, primarily due to stressors such as changes in the international agricultural product market, the world economy as well as globalisation processes (Langan-Fox & Cooper, 2011).

According to Eisler and Hersen (2012), men and women often self-select into different professions and occupations, which could explain some of the differences in stress levels between the two genders. For instance, a greater number of women are typically found working in the public service sector, comprising of professions such as teaching and social work, which involve a high level of interaction with the general public and are thus, considered to be highly stressful (Chandola, 2012). In contrast, certain male-dominated

occupations such as those of police and prison officers and firefighters, where workers are confronted with death, accidents and crime on a regular basis, also often result in high levels of post-traumatic stress and burnout (Backteman-Erlanson et al., 2013; Langan-Fox & Cooper, 2011).

Sources of Work Stress

The work environment is home to numerous demands and pressures that trigger and cause stress in working individuals (Michie, 2002). The causes/sources of work stress are vast and vary by individual, occupation, industry and organisation (Al-Omar, 2003).

The sources of stress facing working individuals are usually divided into two main categories, namely personal stressors and work stressors (de Sousa, 2009). Examples of the most commonly experienced and widely studied work stressors include role stressors, technology, workplace politics, poor leadership and management, inadequate training, job insecurity, physical working conditions, discrimination and harassment, as well as labour disputes and strikes (Barling et al., 2005; Michie, 2002). Although this study focuses primarily on work stressors, it is worth mentioning that personal stressors, which usually come about as a result of life changes, or family or financial issues, can spill over into an individual's work life and influence the individual's job performance and productivity (Chandola, 2012; de Sousa, 2009).

In terms of different work stressors, according to Langan-Fox and Cooper (2011), jobs within the same industry have unique stressors specific to the particular job role. An example of this can be found in the field of medicine, where the most common sources of work stress for nurses include bullying and disruptive behaviours, while the most prevalent sources of work stress for surgeons, include new technology and operating on critically ill patients. In Pestonjee and Pandey's (2013) review of research findings on stress and work, it

was found that while stressors are usually a function of a person's occupation, men and women often experience different stressors, even within the same occupation, with men usually experiencing stressors related to finances, authority and responsibility, and women's stressors usually relating more to their interpersonal relationships.

The sections to follow explore the eight key sources of work stress included in the present study, and how each of the eight stressors interact with gender in explaining overall work stress. As mentioned, these eight sources of work stress include role ambiguity, relationships, tools and equipment, lack of career advancement, job insecurity, lack of autonomy, work-home interface and workload.

Role Ambiguity

Role ambiguity is generally classified as a role stressor, which is a categorisation of work stressors, relating to the various job and workplace roles assumed by an employee, typically encompassing role ambiguity, role conflict and role overload (Trayambak et al., 2012). While role conflict occurs as a result of opposing pressure and demands from multiple job and workplace (and sometimes, personal) roles assumed by an employee (Beehr, 1995); and role overload occurs when an employee is expected to fulfil too many roles and has too much work to do and not enough time to complete it (Beehr, 1995); role ambiguity, on the other hand, occurs when an employee does not understand the role that he/she is required to fulfil in the workplace or is unsure of his/her work responsibilities, performance expectations or level of authority (Barling et al., 2005).

Role ambiguity is often triggered by changes in jobs, supervisors, technology, workplaces or social structures (Barling et al., 2005; Ivancevich & Matteson, 1980). According to Leung et al. (2014), employees who experience role ambiguity often question what they should be doing (goal ambiguity), how they should be getting things done

(process ambiguity), what their priorities should be (priority ambiguity) and how they should act in various situations (behaviour ambiguity). Singh et al. (1996) cite these aspects as the four main dimensions of role ambiguity.

While the twenty-first century workplace is known for rapid change and high levels of uncertainty, some jobs are inherently less defined than others (Leung et al., 2014). For example, blue-collar jobs, characterised by a high degree of manual labour, tend to be more stable and structured, while work done by project teams, tends to be more ambiguous (Kim, 1999).

Role ambiguity has been found to be positively related to work stress and negatively related to job satisfaction (Chang & Hancock, 2003; Ram et al., 2011). Employees who experience role ambiguity also usually perform at lower levels than those with a clearer understanding of their job roles and performance expectations (Phillips & Gully, 2011; Zunker, 2008). Role ambiguity can be reduced through clearer job descriptions, redesigning jobs, performance management and rewards as well as effective leadership (Kahn & Byosiere, 1992).

In a review of several empirical articles, conducted by Barling et al. (2005), some psychologists were found to believe that one's experience of role ambiguity as a stressor is a result of individual differences in personal ability (or inability) to interpret expectations, locus of control, neuroticism, self-esteem and need for clarity. However, Barling et al. (2005) went on to conclude that role ambiguity should be seen as the result of a lack of information in the work environment due to organisational circumstances and constraints, communication issues and supervisor ineffectiveness, and that individual differences rather lie in a person's ability to cope with this source of stress.

In terms of gender differences, the majority of the research in this area indicates that

women experience more role ambiguity in the workplace than men, and that this is a far more prevalent source of stress for women than for men (Beena & Poduval, 1999; Phillips & Gully, 2011). According to Zunker (2008), role ambiguity negatively affects the job performance of women to a greater extent than it affects that of men, and leads to high levels of anxiety and stress in women as well as a strong desire to change jobs. The reason for these gender differences is largely attributed to the fact that men's work roles tend to be more specified, while women's jobs are usually vaguer and more unclear. This is usually a result of cultural expectations, along with the nurturing nature typically associated with women, which results in women taking on more tasks than what is expected of them, while men focus more on completing their assigned tasks at hand (Pandey & Pestonjee, 2013).

On the basis of the preceding, it appears that further research is needed on role ambiguity as a source of stress for working men. This poses several questions, including (a) whether this source of stress carries the same meaning amongst men and women, (b) whether the two genders differ in their levels of role ambiguity, and (c) whether role ambiguity predicts work stress equally well for men and women, or whether gender moderates this relationship.

Relationships

Interpersonal work relationships, relating to relations between supervisors and subordinates as well as between co-workers, are a commonly reported source of stress in organisations (Cooper et al., 2001). However, in addition to being a central source of stress, work relationships can also serve as a way of coping with other stressors, with many workers considering their work friendships to be among their most meaningful sources of social support (Bossé et al., 1990; Chrisler & McCreary, 2010).

Negative work relationships, along with a lack of social support in the workplace, have been found to cause high levels of stress and depression amongst working individuals (Landy & Conte, 2010). Two of the most significant contributing factors to relationship stress in the workplace include the quality of interpersonal relationships between members of an organisation, as well as the level of social support received from co-workers and supervisors (Cooper et al., 2001). Poor work relationships often occur as a result of a lack of group cohesion, a lack of interpersonal trust, too much prolonged contact with colleagues, an unfriendly or hostile work environment, as well as inconsiderate or non-supportive supervisor behaviour (Cooper et al., 2001).

Negative work relationships also often lead to interpersonal conflict, which, in extreme cases, can escalate into bullying and physical violence (Rayner et al., 2002). Interpersonal conflict can be a major source of stress, not only for the individuals involved in the conflict, but for all those present in the workplace (Landy & Conte, 2010). Conflict tends to be most prevalent when organisational resources are scarce or when employees perceive that they are being treated unfairly (Cooper et al., 2001).

Conflict with one's supervisor can be a major source of stress for an employee, as supervisors often have a large amount of control over their subordinates' rewards and work assignments (Barling et al., 2005). Poor interpersonal relations and conflict between supervisors and subordinates often occur as a result of personal or personality differences; a supervisor's lack of attention and/or empathy for a subordinate; a lack of confidentiality between the parties; as well as perceived unfairness and injustices (Barling et al., 2005). According to Mikula et al. (1990), these perceived injustices relate more to the manner in which people are treated interpersonally in the workplace, as opposed to procedural or distributive injustices. In this regard, Curtis et al. (2018) go on to suggest that these injustices often include sexism, sexual harassment, tokenism and abuse, commonly initiated

by supervisors and inflicted on subordinates, which can lead to extremely high levels of stress, anxiety and depression amongst employees who fall victim to these acts.

Supervisors are also responsible for providing their subordinates with the task-specific, emotional, informational and appraisal support they need in order to buffer stressful conditions (Barling et al., 2005). A review of theory and research on organisational stress by Cooper et al. (2001) revealed that employees differ in terms of their levels of tolerance for uncertainty in the workplace and that some employees require less guidance, while others require closer supervision as well as more frequent performance feedback. A lack of feedback from supervisors can cause stress and anxiety for employees who require more guidance and supervision (Leung et al., 2014).

In terms of the interplay between work relationships and gender, research conducted by Sheppard and Aquino (2013) on conflict at work, revealed that both men and women perceive female-to-female conflict to have more negative and lasting effects than male-to-male or male-to-female disputes. This finding was attributed to the societal view of female conflict being more unnatural due to women traditionally being expected to be gentler and more nurturing, while male conflict is viewed as a sign of healthy competition. Furthermore, Sheppard and Aquino (2013) posit that as a result of this perception, in hiring decisions, women are less likely to be selected for roles when there is another female already in the work group.

Overall, both theory and research indicate that interpersonal relationships and conflict are among the most troubling sources of stress for working women (Chrisler & McCreary, 2010; Miner-Rubino & Cortina, 2004; Morrison, 2007). According to Chrisler and McCreary (2010), women are more likely than men to experience interpersonal relationships as a workplace stressor due to women usually being more involved and

invested in social networks and relying more heavily on social support as a way of coping with stress. Morrison (2007) further suggests that because women's work relationships tend to be more communal in nature and typically involve more self-disclosure, supportiveness and complexity, while men's relationships are usually more instrumental and competitive in nature; women tend to experience stress as a result of situations that not only affect them personally but also affect those who are close to them.

Furthermore, as a result of the fact that women's work is typically characterised by lower pay, lower status and lower autonomy than that of men's, women are also more likely to experience abuse from their supervisors and colleagues (Abbott et al., 2006). It is also well-documented that women experience sexual harassment and tokenism in the workplace to a far greater extent than men, suggesting that this stressor is more prevalent in women than in men (Davidson & Cooper, 1992).

On the basis of the preceding, it appears that further research is needed on men's experience of interpersonal relationships as a source of work stress. This poses several questions, including (a) whether this source of stress carries the same meaning amongst men and women, (b) whether the two gender groups differ in terms of their levels of this stressor, and (c) whether work relationships predict/explain work stress equally well for men and women, or whether gender moderates this relationship.

Tools and Equipment

Tools and equipment as a source of work stress can relate to inadequate, broken, complex or non-user-friendly equipment, machinery or physical resources in the workplace, which inhibit an employee's ability to perform his/her job tasks effectively, efficiently and safely (Barling et al., 2005). Most employees want to perform their jobs well and these constraints can make it difficult for them to do so, resulting in high levels of anxiety and

stress (Leung et al., 2014). According to Agai-Demjaha et al. (2015), this stressor is experienced by almost all employees in all occupations, as all workers need the appropriate resources, materials and equipment to be able to fulfil their job and workplace roles. Furthermore, it is not only a lack of appropriate tools and equipment that causes stress for workers but also the effect of the actual tools and equipment themselves. Tools can cause strain and physical stress for employees if they are used for lengthy periods of time or are uncomfortable to use (Hawkins, 2016).

This stressor is particularly prevalent in individuals working in risky and dangerous occupations and industries such as construction, where workers are exposed to potential health and safety hazards and require suitable tools as well as appropriate safety and protective equipment and clothing to be able to perform their work efficiently and safely (Hawkins, 2016). An unsafe working environment, along with inadequate equipment, often complicates work processes and makes it difficult for employees to manage and control their work tasks and environment, while also increasing the risk of work-related accidents and injuries (Leung et al., 2014).

While limited empirical research has been conducted on gender differences in the experience of tools and equipment as a source of work stress, a study by Stafyla et al. (2013) indicated that men experience more stress due to a lack of appropriate equipment and supplies, as they tend to find it more difficult to work under these circumstances than women do. Moreover, while Hawkins (2016) acknowledges that women also experience tools and equipment as a stressor at work, primarily due to women typically holding non-unionised jobs, which puts them at greater risk of exposure to adverse working conditions; it is also noted that far more men tend to be employed in riskier and more dangerous jobs, involving the use of heavy and hazardous equipment and machinery, resulting in a higher rate of injuries and greater physical strain amongst men.

On the basis of the preceding, it appears that there are somewhat conflicting views of this stressor and that further research is needed on tools and equipment as a source of work stress. This poses several questions, including (a) whether this source of stress carries the same meaning amongst men and women, (b) whether the two gender groups differ in their levels of this stressor, and (c) whether tools and equipment predicts/explains work stress equally well for men and women, or whether gender moderates this relationship.

Lack of Career Advancement

Career advancement is a commonly cited work stressor in stress research (Coetzee & De Villiers, 2010; Cooper et al., 2001). Work stress can be caused by both under-promotion, where an employee is overlooked for promotional opportunities despite having the necessary skills and experience, and demonstrating hard work and capability; and over-promotion, where an employee is promoted beyond his/her capacity and/or abilities, without having received the appropriate training and preparation beforehand (Cooper et al., 2001). Another key source of work stress linked to career advancement is that of career plateauing, where an employee experiences a levelling off of his/her career and does not perceive any further opportunities for advancement in his/her current organisation (Cooper et al., 2001).

While a study conducted by Johnston and Lee (2013) linked promotions to poorer mental health as a result of the additional workload and stress associated with the additional status, other researchers such as Karasek and Theorell (1990), propose that being promoted to higher organisational levels entails less stress as a result of having more autonomy and control, which counters the higher work demands. On the flip side, a lack of career advancement and/or promotional opportunities (of focus in the present study) have consistently been found to negatively affect employee well-being and job satisfaction (Cooper et al., 2001). In this regard, Siegrist (1996) proposed a model based on effort-

reward imbalance, which suggests that stress results from disparity between work effort and work rewards.

Most of the literature on this source of stress focuses on the barriers that prevent women from advancing to more senior organisational levels (Napasri & Yukongdi, 2015; Risman et al., 2018; Warren, 2009). Napasri and Yukongdi (2015) attribute the underrepresentation of female professionals in positions of power and authority to barriers including tokenism, male-dominated business networks, as well as gender bias, stereotyping and discrimination in recruitment and promotional business practices. Warren (2009) further suggests that most people are more comfortable working with others who share similar beliefs and interests as themselves and as a result of most senior executives being men, more men tend to get promoted to higher-level, executive positions. Moreover, Bittles and Parsons (2016) suggest that one of the greatest obstacles facing women wanting to advance to higher levels in an organisation, is the perception that they have to compete with their male colleagues in order to receive the same recognition and promotional opportunities as them.

Landy and Conte (2010), on the other hand, attribute women's lack of career progression to women continuing to be employed in traditionally female-dominated industries and jobs, such as nursing and hairdressing, which are inherently characterised by low pay, low autonomy and limited career advancement opportunities. Similarly, Risman et al. (2018) suggest that women typically tend to self-select into jobs with shorter job ladders, less access to training opportunities and limited career development and advancement opportunities.

According to Schoon and Eccles (2014), women are less successful than men in their careers in terms of both objective evaluations, including pay and status, as well as subjective

evaluations, such as feelings of career satisfaction. Several researchers attribute this to women's career progress been stunted by discontinuous work patterns caused by childcare responsibilities (Greenhaus & Callanan, 2006; Kuther, 2002; Schoon & Eccles, 2014). Greenhaus and Callanan (2006) explain that women usually temporarily leave the workforce after childbirth and are more likely than men to take on family roles after school, resulting in many women only entering the workforce after having started a family. As such, many women start their careers at a later stage than men, resulting in women's careers not progressing as fast as men's careers. Furthermore, according to Kuther (2002), many women are often limited in terms of their career opportunities after having children, as they tend to be viewed as no longer committed to their careers, which influences their tenure, promotion and other advancement opportunities (Kuther, 2002).

On the basis of the preceding, it is clear that further research is needed on this source of work stress for men. This poses several questions, including (a) whether a lack of career advancement carries the same meaning amongst men and women, (b) whether the two gender groups differ in terms of their levels of this stressor, and (c) whether a lack of career advancement predicts/explains work stress equally well for men and women, or whether gender moderates this relationship.

Job Insecurity

Job insecurity relates to a lack of assurance regarding the stability of one's job, as well as feelings of concern regarding future work and career opportunities. In short, job insecurity occurs in response to the perceived threat of losing one's job (Heery & Salmon, 2002). Job loss can have a serious financial and emotional impact on individuals and their families (Buzzanell & Turner, 2003). The financial stress of having to provide for oneself and one's family, along with the uncertainty about one's future employment situation, can

lead to high levels of stress and depression (Lazarus & Folkman, 1984). According to De Witte (2005), feelings of job insecurity can, in fact, be more harmful and have more adverse effects than job loss itself.

Job insecurity has been negatively linked to job satisfaction and employee morale (László et al., 2010), and positively linked to poor physical and psychological health (Stansfeld & Candy, 2006), depression, anxiety and stress in employees (Kaniasty et al., 2014). As a result of a lack of job security, an employee may either decide to work harder in order to increase his/her chances of being retained by the organisation or he/she may alternatively, decide to work less hard as a result of the perception that the relationship with his/her current employer is almost over (Heery & Salmon, 2002).

Due to the rapidly changing and more flexible work environment that exists today, job insecurity has become an increasingly prominent source of stress for working individuals in recent years (Modrek & Cullen, 2013). As a result of economic recessions, globalisation, new technology and most recently, the COVID-19 pandemic; mergers, reorganisations and cutbacks are being implemented to a far greater extent than ever before (Pillay, 2006). The COVID-19 pandemic and its resultant effects, including nationwide lockdowns and restrictions on movement and trade, have had devastating effects on the global economy, resulting in major bouts of unemployment and huge financial losses for businesses worldwide (Abbas et al., 2021; Wilson et al., 2020). As a result of financial strain, many businesses resorted to retrenchments and reductions in pay as ways of cutting costs, which have left individuals stressed and anxious about their financial well-being and future employment prospects (Wilson et al., 2020). Several studies indicate that downsizing and layoffs lead to feelings of job insecurity as well as increased levels of work stress for the surviving workforce who remain employed (Gallie et al., 2017; Modrek & Cullen, 2013).

Pillay (2006) suggests that one's reaction to job insecurity is dependent on several labour market factors as well as individual differences in skills and employability, family size, age and gender. In terms of gender, men are thought to experience more physical distress in response to job insecurity, while women experience more psychological effects in response to a lack of job security (Burchell et al., 2005).

In general, most research indicates that job insecurity (as well as job loss and unemployment) is more stressful for men than it is for women (Burchell et al., 2005; Gaunt & Benjamin, 2007; Klandermans & Van Vuuren, 1999). This is generally attributed to the fact that men tend to attach greater importance to their work as a result of societal and cultural expectations of men to be the primary breadwinners of their families (Heery & Salmon, 2000; Klandermans & Van Vuuren, 1999). Traditionally, family roles such as that of a mother and/or spouse, were more significant to the identity of women, while work roles such as that of the primary breadwinner, were more commonly associated with the identity of men (Gaunt & Benjamin, 2007). Gaunt and Benjamin (2007), therefore, state that men, particularly those who are married, experience higher levels of stress due to job insecurity.

However, while most studies suggest that men experience higher levels of job insecurity than women, several studies still suggest that women are more negatively affected by job insecurity in terms of their work attitudes (Gaunt & Benjamin, 2007) and longer-term well-being (Mauno & Kinnunen, 2002).

In the context of South Africa, Buitendach and De Witte (2005) suggest that because men are among the least advantaged by employment equity and affirmative action policies and legislation, which provide more security and protection for women, men are more likely to experience higher levels of job insecurity. However, empirical research conducted by Pillay (2006) indicated that no significant gender differences exist in the experience of job

insecurity.

These conflicting views raise important questions as to whether (a) job insecurity carries similar meanings for men and women, (b) the two gender groups differ in their levels of job insecurity, and (c) job insecurity predicts/explains work stress equally well for men and women, or whether gender moderates this relationship. Näswall and De Witte (2003) state that it is particularly necessary for further research to be conducted on women's levels and experience of job insecurity in particular.

Lack of Autonomy

Kubicek et al. (2017) define autonomy as the amount of freedom and control an employee is given by his/her employing organisation to make work-related decisions independently and to determine his/her work methods and schedule. While job control and autonomy have been linked to improved mental health and job satisfaction, as well as reduced burnout and turnover intention (Zhou, 2020), a lack thereof can make for unenriched jobs, which lead to reduced enthusiasm, creativity and job performance, and increased job stress (Frone et al., 1995; Landy & Conte, 2010; Zhou, 2020). Adebayo and Ezeanya (2011) further suggest that a lack of autonomy can inhibit an employee's ability to meet his/her job demands, if he/she is not able to make important decisions necessary to accomplish his/her tasks.

According to Gonzalez-Mulé and Cockburn (2021), job control can buffer the effects of job demands on strain (see job demands-control model by Karasek, 1979) and can also be used as a resource in coping with other work stressors. However, when one's job demands exceed one's job control and abilities, job strain and poorer mental health, particularly in the form of depression, are likely to occur as a result (Gonzalez-Mulé & Cockburn, 2021).

The amount of autonomy an employee has, usually depends on his/her job type and

level. In this regard, lower-level jobs typically involve fixed work methods and schedules, and are thus, characterised by lower latitude and job control, whereas, higher-level jobs tend to be less defined and involve greater decision-making and innovation, allowing for a greater amount of autonomy and control (Landy & Conte, 2010). According to Aneshensel and Phelan (2006), low-paying, monotonous jobs that offer little autonomy can cause high levels of stress. However, with what Zhou (2020) has termed the 'internet age', where more work is being conducted online and work arrangements and schedules are becoming more flexible, different approaches are now being taken in terms of managing employees and as such, jobs are becoming more and more autonomous.

In terms of gender, the results of an empirical study conducted by de Bruin and Taylor (2006b) on the job demand-control model of job strain across gender, revealed a stronger relationship between job control and general work stress (operationalised using the Lack of Autonomy and General Work Stress scales of the SWSI, respectively) for men than for women. However, the moderating effect of gender in this relationship was found to be a very small, with gender only contributing to an additional one percent of the variance in general work stress above and beyond job control. These findings are in line with those of several other researchers (Bielecky et al., 2017; Griffin et al., 2002; Vermeulen & Mustard, 2004), who are of the opinion that the effects of a lack of autonomy and low job control are greater and more adverse for men than for women, primarily due to the identity of men traditionally being associated with work roles and men thus, placing greater value on the characteristics of their work roles.

Several other studies, on the other hand, oppose this view and suggest that a lack of autonomy is a far more prevalent stressor for working women than for working men. Most studies supporting this view attribute this to women typically occupying more monotonous jobs, involving limited problem-solving and learning, less opportunities for job modification

as well as far less decision autonomy and control over work processes (Goldman et al., 2013; Rivera-Torres et al., 2013). Abbott et al. (2006) found that in both male- and female-dominated industries, women's work was typically characterised by lower pay, lower status and lower autonomy than the work of men.

It can, therefore, be seen that the literature is relatively conflicting in terms of the role of gender in the link between a lack of autonomy and work stress. This poses several questions, including (a) whether this stressor carries the same meaning for men and women, (b) whether the two gender groups differ in their levels of this stressor, and (c) whether a lack of autonomy predicts/explains work stress equally well for men and women, or whether gender moderates this relationship.

Work-home Interface

Work-home interface (WHI) refers to the interaction and overlap between one's work and personal/home life (Greenhaus & Parasuraman, 1987; Holmes et al., 2020). Working individuals are believed to have two major life domains, namely the work domain and the non-work domain, in which they fulfil different roles and are faced with different demands and pressures. For instance, roles in the work domain include those of an employee, subordinate, supervisor and co-worker; while non-work roles, on the other hand, include those roles of a parent, spouse or friend (Barling et al., 2005). According to Ross and Vasantha (2014), the idea underlying work-home interface as a source of stress, is that workers who are able to balance their work and personal lives, experience lower levels of stress than those who lack this balance.

Work-home interface is a multifaceted concept, comprising of work-home additivity, spill-over and conflict (Greenhaus & Parasuraman, 1987). In terms of these components, firstly, work-home additivity assumes that the greater the stress and intensity of stressors

experienced in both the work and home/non-work domains, the higher one's overall stress levels will be (Greenhaus & Parasuraman, 1987). Secondly, work-home spill-over assumes that due to the bi-directional influence (positive and negative) of the work and home domains on each other, stressors in one's personal life, including family and financial problems, can affect one's performance and stress levels at work; and conversely, that one's work stressors can affect one's relationships and stress levels outside of work (Lin & Burgard, 2018). The third component of work-home interface, namely work-home conflict, assumes that stress is caused when the demands and roles that one is expected to fulfil at work, clash with those that must be fulfilled in one's personal life (Ross & Vasantha, 2014).

One of the main causes of stress within the sphere of work-home conflict, is that of work-family conflict, which occurs when an individual experiences opposing pressures from his/her work and family roles (Ahmad, 2008). Work-family conflict is generally classified as either time-based, when time spent on roles in one domain (either the work or the family domain) prevent time from being devoted to roles in the other domain; strain-based, when stress in one domain hampers performance in the other; and behaviour-based, when expected role behaviour in one domain is incompatible with behavioural expectations in roles in the other domain (Greenhaus & Beutell, 1985). As a result of the increased prevalence of dual-income families in more recent generations, work-family conflict has become an increasingly important predictor of work stress (Landy & Conte, 2010). While both work-to-family and family-to-work conflict have been linked to negative outcomes in the work domain, including job dissatisfaction, lower commitment and increased absenteeism (Frone et al., 1992); family-to-work conflict has been found to lead to higher levels of stress than work-to-family conflict (Barling et al., 2005).

While generally, most workers find it both challenging and stressful to simultaneously manage all of their work and personal responsibilities (Karkoulian et al.,

2016), the COVID-19 pandemic has only exacerbated the problem by further blurring the boundaries between the work and non-work/home domains. As a result of the enforcement of social distancing practices, many employees began working from home, which posed several challenges for these employees, including work-home interference and inter-role conflict (Schieman et al., 2021). However, a study conducted by Schieman et al. (2021) revealed that not all working individuals experienced these challenges to the same extent, and that in fact, work-home conflict decreased for certain individuals, particularly those without children. The same decrease was not, however, observed amongst parents, with the patterns of work-home conflict depending on the age of the individual's children. The researchers attributed these differences between parents and non-parents to institutional closures resulting in parents having to take over childcare and schooling responsibilities in addition to their daily work duties.

Work-home interface is believed to be influenced by several factors in the work and home domains, including role stressors and social support; as well as several personality factors, such as neuroticism and locus of control; and demographic characteristics, including marital and parental status, and gender (Michel et al., 2011). Barling et al. (2005) suggest that gender differences in stress are largely due to differences in men's and women's experiences of work-home interface as a source of stress.

Several studies conducted in and across multiple countries and occupations have found higher levels of stress due to work-home conflict and interference in women than in men (Fuss et al., 2008; Montgomery et al., 2006; Rehman & Roomi, 2012). These gender differences are often explained in terms of cultural and societal norms and expectations, where traditionally, women are expected to spend more time looking after their children and households and less time at work (Karkoulian et al., 2016), while men are expected to act as the financial providers for their families and therefore, spend more time at work in order to

earn money (Rivera-Torres et al., 2013).

Overall, most of the literature still views women as shouldering the majority of the burden when it comes to household work and family care (Rivera-Torres et al., 2013), with this only escalating during the COVID-19 pandemic (Schieman et al., 2021). However, while most studies of gender and work-life balance centre around whether men experience the same degree of difficulty in balancing work and family demands as women (Rehman & Roomi, 2012), others believe that the gender gap is slowly closing due to changing societal norms (Duxbury & Higgins, 1991). Along with the increase in women entering the paid workforce as well as the increase in dual-income families, recent years have also seen an increase in the involvement of men in childrearing and household duties (Sayer, 2005), resulting in a convergence of men's and women's roles and responsibilities, and a shift towards greater similarities in the life circumstances of men and women (Karkoulian et al., 2016). Barnett and Hyde (2001) state that most men and women now spend the majority of their days at work, followed by shared time at home with their partners and children.

However, several researchers are of the opinion that women's increased participation in paid labour has not been met by a proportionate increase in unpaid work on the part of men (Craig & Mullan, 2011). According to Coltrane (1996), fathers are less involved in childcare activities as a result of perceptions that they might no longer be able to provide financially for their families or that their employers might see them as less committed to their paid jobs. Eisler and Hersen (2012) further suggest that men and women differ, not only in terms of the quantity of household and childcare responsibilities that they take on, but also in terms of the types of duties they assume. Women often perform duties that require more frequent attention, such as cooking and buying groceries, while men's duties, such as car maintenance and repairs, allow for greater freedom and require less attention for shorter periods of time (Eisler & Hersen, 2012). Given the redistribution of paid work

amongst men and women, the fact that the same redistribution of unpaid work has not been observed between the genders, has led many to question whether the gender revolution has stalled or whether it is still ongoing, with further change to be seen in future years (Putnik et al., 2020).

As a final note on this stressor, many organisations have started implementing workplace flexibility as a way of assisting employees with achieving a better work-life balance, which can include flexi-time work, telecommuting, job-sharing, compressed work weeks and part-time work (Hill et al., 2008). Studies have shown that men and women also differ in terms of the way in which they deal with these flexible work arrangements, where women experience a decrease in work-life conflict and a resultant decrease in stress, while men experience an increase in work-life conflict and stress (Hill et al., 2008; Karkoulian et al., 2016).

It can therefore, be seen that current literature is relatively conflicting in terms of the role that gender plays in the link between work-home interface and work stress. These conflicting views raise important questions, including (a) whether work-home interface carries the same meaning amongst men and women, (b) whether the two genders differ in their levels of this stressor, and (c) whether work-home interface predicts/explains work stress equally well for men and women, or whether gender moderates this relationship.

Workload

Workload relates to the interaction between a worker's task demands, which include mental and physical effort and time constraints; and the worker's capacity and resources, including skills, knowledge and time availability (DiDominico & Nussbaum, 2008; Meister, 1971; Young et al., 2008;). Most definitions emphasise that workload is not merely a result of external, task-specific forces but is also person-specific in the sense that an individual's

skills, capabilities, mood and motivation can affect how the load of work is experienced (Krüger, 2005). The experience of workload as a stressor is therefore, dependent on the individual worker's ability and capacity to cope with job tasks and demands (De Waard, 1996).

As previously mentioned, working individuals have two major life domains, namely the work domain and the non-work domain. Barling et al. (2005) propose that an individual's duties and responsibilities within both of these domains, contribute to the individual's total workload. In a similar sense, Krantz et al. (2005) explain total workload as the combination of both paid (paid employment and overtime) and unpaid (voluntary work and work in unions) forms of productive activity. Unpaid work can also refer to work done outside of the workplace, such as household chores, which add to the duties and responsibilities of individuals over and above their work duties (Krantz et al., 2005).

Numerous studies have linked physical and mental workloads to job stress and strain (Leung et al., 2014; Lundberg & Frankenhaeuser, 1999; Schwartz et al., 2020), citing both work overload and work underload as sources of work stress (Desmond & Hancock, 2001; Eisler & Hersen, 2012). While work overload occurs as a result of over-stimulation and too much responsibility; work underload, on the other hand, occurs due to under-stimulation, resulting from monotonous and repetitive tasks that are not meaningful or do not lead to employee development (Eisler & Hersen, 2012).

When employees suffer from work overload, they are forced to spend more time on their work tasks and have less time to engage with their team members and colleagues, which can negatively affect interpersonal workplace relationships (Leung et al., 2014). Moreover, employees with excessive workloads often have to work long hours and overtime, resulting in them also having less time to spend with their friends and families

(Leung et al., 2014). Work overload has been linked to negative organisational effects, including increased accidents, absenteeism and staff turnover (Young et al., 2008), as well as to negative effects on employee health (physical and psychological), including fatigue, frustration and stress (Desmond & Hancock, 2001; Leung et al., 2014).

Excessive workloads can be an inherent characteristic of certain professions, involving urgent and complicated tasks with strict deadlines, or can result from organisational constraints such as insufficient staff for the amount of work needed to be performed (Stranks, 2005). Cazabat et al. (2008) further suggest that workloads have increased considerably in recent years as a result of the flexibility of the twenty-first century workplace. For example, the introduction of the four-day work-week in some organisations in certain parts of the world, has resulted in increased production rates and intensified time constraints, thereby increasing strain on employee health (Travis, 2009).

In contrast, employees can also experience work underload, which, although not the focus of the present study, results not only from being given too little work, but also from job tasks that are boring, repetitive and do not allow employees to fully utilise their abilities (Hancock & Desmond, 2001). Prolonged exposure to work underload can result in employees experiencing boredom, causing them to derive little sense of achievement from completing tasks and often causing psychological strain (Leung et al., 2014).

In terms of the interplay between workload and gender, Karkoulian et al. (2016) state that from one angle, it can be argued that because men, particularly those who are fathers, have to work longer hours in order to meet their financial obligations as well as in some cases, to compensate for a decrease in income as a result of their wives leaving their jobs for motherhood, it stands to reason that men are at greater risk of work overload and work stress. However, most of the available literature indicates that when taking into

consideration both work and non-work responsibilities, women report a higher total workload than men (Bittles & Parsons, 2016; Nelson & Burke, 2002). Several researchers attribute this to women taking on a greater amount of unpaid work in the workplace and having more home and family responsibilities than men (Bittles & Parsons, 2016; Lundberg & Frankenhaeuser, 1999). Mothers who work full-time have thus, been found to be extremely susceptible to work and role overload as well as increased stress. As a result, a large proportion of women have started working on a more part-time basis in order to better cope with and balance their work and non-work responsibilities (Eisler & Hersen, 2012).

On the basis of the preceding, it is clear that further research is needed on men's experience of workload as a source of stress. This poses several questions, including (a) whether workload carries the same meaning amongst men and women, (b) whether the two gender groups differ in terms of their levels of workload, and (c) whether workload predicts/explains work stress equally well for men and women, or whether gender moderates this relationship.

The Relative Importance of the Different Sources of Work Stress in Predicting General Work Stress

As most applications of contemporary regression now belong to exploratory models with predictors that could potentially be correlated (Lorenzo-Seva & Ferrando, 2011), the findings of a study conducted by Dewe and Trenberth (2012), published in the *Work and Stress* journal, prompted researchers to begin questioning whether the strength of certain sources of stress is dependent on the stressor's relationship with other sources of stress. In this regard, Hughes and Galinsky (1994) propose that for women in particular, different combinations of certain stressors result in higher levels of work stress than most individual stressors in isolation. This leads one to question the possible relations between the eight

different sources of work stress of this study and how these might differ for men and women, as well as what combination of these stressors results in higher work stress for men and for women. As such, a separate question in this study relates to the relative importance of the different sources of work stress in predicting/explaining general work stress across gender.

Having reviewed the existing literature on the relations between different sources of work stress, it would appear that perhaps the most significant relative relationships to explore in explaining general work stress, are those between interpersonal relationships and other sources of work stress. Several researchers suggest that poor workplace relationships, particularly passive and abusive supervisor relationships, give rise to and intensify, a number of other workplace stressors, including work overload and work-home conflict, which in turn, heighten levels of subjectively experienced work stress (Barling et al., 2005; Che et al., 2017).

As a result of the fact that an employee's resources, work environment, pace of work and workload are typically determined by his/her supervisor, poor supervisor-subordinate relationships can result in supervisors setting tighter deadlines for their subordinates, assigning them extra tasks and limiting their autonomy, all of which can consequently, result in higher levels of work stress for subordinates (Barling et al., 2005; Che et al., 2017). This points to noteworthy relative relationships to explore, firstly, between interpersonal work relationships and a lack of autonomy. According to Hampton (2019), when there is a lack of trust between an employee and his/her supervisor/manager, the relationship is often characterised by a considerable amount of micro-management, as well as limited autonomy and creative freedom for the employee. Additionally, employees with limited job control and autonomy also usually experience conflict with their supervisors and colleagues over their job requirements, which negatively affects interpersonal relationships in an

organisation and leads to psychological and emotional stress amongst employees (Leung et al., 2014).

Furthermore, as a result of hostile and abusive supervisor-subordinate relationships often resulting in supervisors setting unreasonable deadlines and assigning overly-heavy workloads to subordinates (Che et al., 2017), negative supervisor-subordinate relationships have also been found to predict role and work overload amongst subordinates (Barling et al., 2005), suggesting a noteworthy relationship to explore between interpersonal work relationships and workload. Moreover, Fox and Dwyer (1999) suggest that employees with increased workloads due to negative relationships with their supervisors, often have to spend more time at work in order to meet their strict deadlines and therefore, have less time to spend with their families and on non-work activities, which can lead to higher levels of work-home conflict. This suggests that stress due to the combination of, and interaction between, interpersonal relationships, workload and work-home interface, might result in increased levels of general work stress (Barling et al., 2005; Che et al., 2017)

In addition to supervisor relationships, co-worker relationships are also believed to both positively and negatively influence work-home interface. On the positive side, co-workers are often seen as a source of social support for working individuals, who can therefore, help to reduce family-to-work conflict. However, poor collegial relationships, on the other hand, can also increase work-to-family conflict (Barling et al., 2005; Fu & Shaffer, 2001).

In terms of other relative relationships, Beehr (1995) proposed that the interaction between low levels of autonomy and high levels of role ambiguity could result in higher levels of stress and depression than each of the two stressors in isolation. In more recent studies, however, a significant relationship was not observed between these two variables,

but rather between autonomy and workload, such that lower levels of autonomy and higher workloads resulted in greater stress (O'Driscoll & Beehr, 2000). A significant relationship was also later found between role ambiguity and interpersonal work relationships, where poor role congruence between members of a work team was found to cause conflict over the boundaries of work expected of each member, which in turn, was found to lead to emotional stress and strain (Leung et al., 2014).

Overall, while previous research (de Bruin & Taylor, 2005) has established that the different sources of work stress included in this study, do correlate to some extent as well as contribute to the prediction of work stress to varying extents, almost no research has been conducted on how these combinations of stressors differ for men and women in predicting/explaining general work stress. On this basis, it appears necessary to investigate the underlying relations between the eight sources of work stress included in this study, separately for men and women, in order to better understand their relative importance in explaining general work stress across gender.

Conclusion

Against the background of the preceding, it can be seen that the topic of gender and work stress has attracted much research interest over the years, with a large amount of literature focussing on the sources and manifestations of work stress amongst men and women. However, when it comes to the role that gender potentially plays in the relationships between work stressors and strain, the literature appears to be relatively conflicting and remains inadequate. This study therefore, focuses on answering the questions that remain after having reviewed the current literature, which include whether the aforementioned eight sources of work stress carry the same meaning and manifest similarly amongst men and women; whether the two gender groups differ in their levels of each

stressor; as well as whether the relations between subjectively experienced work stress and the different sources of work stress are similar for men and women, or whether they differ as a function of gender. Yet another question remains as to the relative importance of the different sources of work stress in explaining general work stress across gender. Chapter 3 to follow, addresses the research methodology followed in the empirical investigation of these research questions.

Chapter 3: Research Methodology

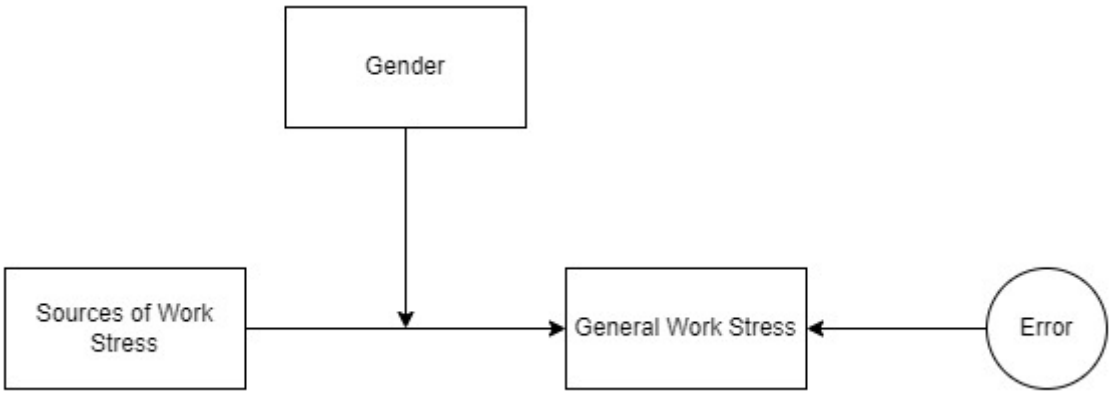
In the preceding chapters, a theoretical basis was formed for the present study, where, based on gaps in current literature, several questions were posed regarding the relationships between constructs of interest. The current chapter details the research approach and methods used in empirical investigating the answers to these research questions. Firstly, the latent variables and hypothesised models upon which the research is based, are presented. Thereafter, the research design and participants of the study are discussed. Following this, the operationalisation of the variables comprising the hypothesised models is discussed in terms of the measuring instrument and measures used, where comprehensive insight into the psychometric properties of the instrument is also provided in terms of validity, reliability, and measurement invariance and equivalence. Subsequently, consideration is given to the statistical power necessary for the study and the adverse effects of statistical artefacts in detecting moderating effects; as well as to techniques for handling missing data. The method of statistical data analysis is then presented in terms of a series of preparatory and preliminary analyses, the main moderation analysis and an assessment of relative importance. In the final section, the ethical considerations taken into account in the planning and execution of the research, are outlined.

Hypothesised Models

The main purpose of this study is to examine whether gender plays a moderating role in the link between subjectively experienced work stress and different sources of work stress. A conceptual model of the moderating role of Gender in this link between General Work Stress and the eight identified Sources of Work Stress, is depicted in Figure 3.1.

Figure 3.1

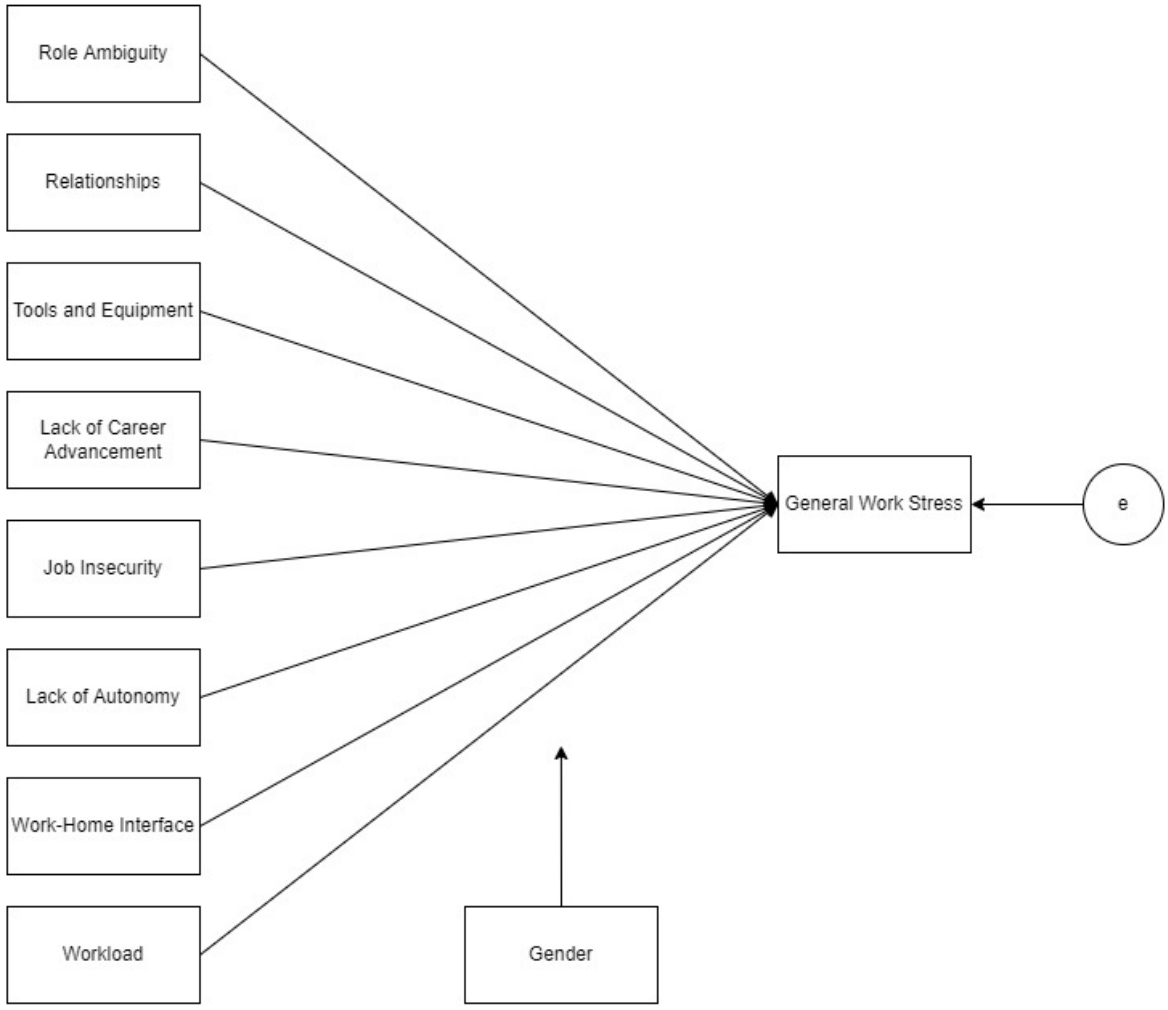
Conceptual Model of the Moderating Role of Gender in the Relationship between Sources of Work Stress and Subjectively Experienced General Work Stress



This conceptual model formed the basis of the hypothesised structural model, upon which the present research is based. This structural model consists of one dependent variable, namely General Work Stress; eight independent variables, namely Role Ambiguity, Relationships, Tools and Equipment, Lack of Career Advancement, Job Insecurity, Lack of Autonomy, Work-Home Interface and Workload; and one moderator variable, namely Gender. The hypothesised structural model of the relations between these variables of interest, is depicted in Figure 3.2.

Figure 3.2

Hypothesised Structural Model of the Relations between Eight Key Sources of Work Stress, Gender and General Work Stress

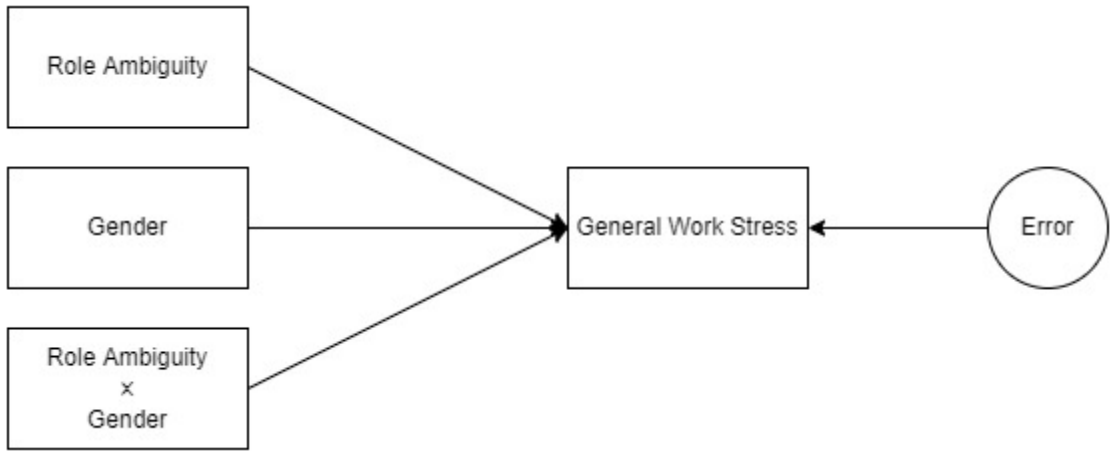


Note that it is also possible that the relations between the eight different Sources of Work Stress also differ across Gender, indicating potential differences in the relative importance of the different Sources of Work Stress in explaining General Work Stress across Gender. On the basis of previous research (de Bruin & Taylor, 2005), it is expected that the different Sources of Work Stress will correlate and will not therefore, contribute equally to the prediction of General Work Stress.

However, in isolation, each Source of Work Stress also potentially contributes towards the explanation of General Work Stress. Therefore, the moderating role of Gender will be examined for each of the eight Sources of Work Stress independently. Figure 3.3 provides a graphical depiction of the analytic model for the example of Role Ambiguity, where Role Ambiguity and Gender serve as independent variables and the product term of Role Ambiguity and Gender represents their interactive effect. In turn, the interactive effect represents the moderating role of Gender.

Figure 3.3

The Hypothesised Relations of General Work Stress with Gender and Role Ambiguity



There are also several other relevant variables in terms of both individual difference factors such as personality and coping style, as well as work situation factors such as job type and organisational culture, which unless controlled for during data analysis, could potentially influence the relationships between the variables in the hypothesised models of this study. However, according to Becker et al. (2016), the inclusion of such control variables can often complicate, rather than clarify, the relationships between variables of interest.

Becker et al. (2016) suggest that although it is common for researchers to include control variables in studies, following the belief that their inclusion will produce more accurate results by revealing more authentic relationships between variables; this belief is often unjustified, as the inclusion of control variables has also been proven to distort relationships between predictors and criteria, leading to incorrect conclusions about the relationships between variables of interest. In line with this view, Bernerth and Aguinis (2016) similarly suggest that models containing control variables no longer measure the relationships between the variables of interest, but rather between those variables and new, residuals variables, which results in invalid tests of initial hypotheses.

The inclusion of control variables can also cause potential problems by reducing the available degrees of freedom, statistical power as well as the amount of explainable variance (Bernerth & Aguinis, 2016). Furthermore, without a defensible theoretical backing, analyses including control variables can become problematic as a result of the numerous possible relations between the control variable and other variables in the model (Bernerth & Aguinis, 2016). For these reasons, such control variables are excluded from the analyses conducted in this study.

Research Design

This study makes use of a cross-sectional research design, using archival data collected and collated by an external source, namely JvR Psychometrics (Pty) Ltd. This study also takes the form of quantitative research, using questionnaire data with numerically-rated items. Valid and reliable measures from a standardised questionnaire, namely the Sources of Work Stress Inventory, were administered to a random sample of participants from the target population, and recorded (in an anonymised format) in an archival database, under the ownership of JvR Psychometrics - the test publishers and

distributors. This anonymised numerical data was then subjected to statistical data analysis techniques, most notably, moderated multiple regression, to test the hypothesised relations between the variables of interest. This research design was chosen to ensure the objectivity, generalisability and replicability of the results of the study (Murphy & Davidshofer, 2005).

Research Participants

The target population to whom the findings of this study will be generalised, is all working/employed South African individuals. Operationally, this study is performed using archival data of South African adults, who completed the SWSI questionnaire in organisational settings. Access to the data was obtained, firstly, via an application to JvR Psychometrics - the test publisher and owner of the SWSI archival database - for research assistance. Once permission had been granted to make use of the data, a research agreement was then entered into with JvR Psychometrics. This, along with the procedure for gaining ethical clearance for the study, is further detailed in the Ethical Considerations section to follow. Access to the data was then granted and provided in the form of an electronic, anonymised copy of the archival dataset.

The original archival dataset consisted of data from 2343 working adults. However, after the data had been cleaned and prepared for analysis, a final sample of 2058 working/employed South African individuals remained, of whom 1256 (61%) self-identified as men and 802 (39%) self-identified as women. The demographic composition of this sample is relatively diverse, comprising of South African working individuals residing across the nine provinces of South Africa; of different ethnicities (falling into the categories of African, Coloured, Indian, White, and Other), educational levels (ranging from lower than grade 10 to Doctorate degree level), job levels (falling into the categories of employee, supervisor, manager, business owner, and executive), as well as various age groups and job

categories. One can, therefore, be reasonably confident that the sample data accurately represents the target population in terms of the diverse characteristics of the individuals that make up the South African working population. These demographics are, however, not reported on due to the majority of the participants not having provided all of their biographical information.

Measuring Instrument

In order to empirically test whether Gender plays a moderating role in the relationships between General Work Stress and the eight different Sources of Work Stress, the latent variables that comprise the hypothesised structural model need to be operationalised. The measuring instrument used to operationalise the General Work Stress and Sources of Work Stress variables was that of the Sources of Work Stress Inventory. The following sections discuss this measuring instrument, paying specific attention to its assessment scales, validity and reliability as well as its measurement invariance and equivalence.

The Sources of Work Stress Inventory (SWSI)

The Sources of Work Stress Inventory is a South African-developed self-report questionnaire, first published in 2006. The SWSI provides an overall indication of general work-related stress levels, while also identifying possible triggers/stressors in the work environment that contribute towards these levels of work stress (de Bruin & Taylor, 2005). The questionnaire is available in both English and Afrikaans and can be administered online or in paper-and-pencil format to any individual aged 16 years and older, with a reading/educational level of at least grade eight (de Bruin & Taylor, 2006a).

The second (and latest) version of the SWSI consists of 59 items in total and comprises of two sections, namely the General Work Stress scale and the Sources of Work

Stress scales (de Bruin & Taylor, 2006a). The General Work Stress scale consists of nine items, intending to measure a general level of work-related stress (de Bruin & Taylor, 2006a). These items are responded to on a five-point Likert-type scale, based on how often an individual feels a particular way. Responses range from one to five in the following order: never, rarely, sometimes, often and always (de Bruin & Taylor, 2006b). The Sources of Work Stress section consists of eight scales, namely Role Ambiguity, Relationships, Tools and Equipment, Career Advancement, Job Security, Lack of Autonomy, Work/Home Interface and Workload. These scales measure the extent to which each of the eight identified sources of stress contributes to overall levels of work stress (de Bruin & Taylor, 2006a). As with the General Work Stress scale, these items are also answered on a five-point Likert-type scale, with the ordered responses from one to five being: none at all, very little, some, quite a lot and very much (de Bruin & Taylor, 2006b).

Measures

In terms of the demographic information collected, the SWSI questionnaire contains demographic questions relating to a respondent's age, gender and cultural/ethnic group. Note that the archival dataset contained additional demographic information from participating respondents, including country/province of origin and residence, qualification/educational level, job category and job level.

The General Work Stress variable of the study was measured using the General Work Stress scale of the SWSI. The nine items of this scale measure an individual's level of stress due to his/her work and work environment, with higher scores indicating higher levels of work-related stress (de Bruin & Taylor, 2006a).

The Role Ambiguity variable of the study was operationalised using the Role Ambiguity scale of the SWSI. This scale consists of seven items, measuring the stress

experienced by an individual as a result of vague job assignments and unclear guidelines and expectations within a particular job or workplace role. Higher scores on this scale indicate greater stress due to ill-defined job tasks and unclear expectations (de Bruin & Taylor, 2006a).

The Relationships variable was measured via the Relationships scale of the SWSI. The eight items of this scale measure stress due to poor interpersonal work relationships and abuse from colleagues and superiors. The higher an individual's score on this scale, the higher his/her level of stress due to workplace abuse, bulling and poor workplace relationships (de Bruin & Taylor, 2006a).

The Tools and Equipment variable was measured via the five-item Tools and Equipment scale of the SWSI. This scale measures the stress an individual experiences when working with unsuitable, broken or complicated machinery, or when there is a lack of the necessary resources to perform a job efficiently. The higher an individual scores on this scale, the more stressful he/she finds dealing with insufficient workplace equipment and resources (de Bruin & Taylor, 2006a).

The Lack of Career Advancement variable of the study was measured via the Career Advancement scale of the SWSI. The five items of this scale measure stress experienced in response to a perceived lack of opportunity for career progression within the current workplace. Higher scores on this scale indicate greater stress due to limited growth and advancement opportunities (de Bruin & Taylor, 2006a).

The Job Insecurity variable was operationalised using the Job Security scale of the SWSI. The four items of this scale measure an individual's level of stress due to a lack of confidence regarding future work and career opportunities in the current workplace. The higher an individual's score on this scale, the more stressed the individual is about the

stability of his/her job and future job status (de Bruin & Taylor, 2006a).

The Lack of Autonomy variable was measured via the Lack of Autonomy scale of the SWSI. The seven items of this scale measure stress caused by a lack of decision-making authority and a rigid work environment. The higher an individual's score on this scale, the more stressful the individual finds working with limited freedom and rigid rules (de Bruin & Taylor, 2006a).

The Work-Home Interface variable was operationalised using the Work/Home Interface scale of the SWSI. The eight items of this scale measure stress due to work/non-work additivity, spill-over and conflict as well as from a lack of social support. Higher scores on this scale indicate higher levels of stress as a result of having to balance work and home demands (de Bruin & Taylor, 2006a).

Finally, the Workload variable of the study was measured via the Workload scale of the SWSI. This scale consists of six items, measuring stress as a result of the perceived inability to be productive or manage an allocated amount of work. The higher the score on this scale, the greater the stress due to work overload (de Bruin & Taylor, 2006a).

Validity and Reliability

The extent to which a study produces accurate results, from which valid and credible conclusions can be drawn, is largely dependent on the validity and reliability of the measuring instrument(s) used in the study (Murphy & Davidshofer, 2005). To establish the psychometric integrity of the SWSI, research evidence of its psychometric properties was reviewed, where particular attention was paid to the instrument's technical manual (de Bruin & Taylor, 2006a) as well as to two studies conducted by de Bruin and Taylor (2005; 2006b) and a published dissertation by Davis (2015), in which the psychometric adequacy of the SWSI was empirically tested.

Validity

Three primary methods of analysis were used to evaluate the validity of the SWSI. These include factor analysis, multiple regression analysis as well as Rasch rating scale model-based item analysis (de Bruin & Taylor, 2005; 2006a; 2006b).

In terms of, firstly, the structural validity of the SWSI, in the initial development of the instrument (de Bruin & Taylor, 2005), the original 79 Sources of Work Stress items of the first version, were subjected to an unrestricted maximum likelihood factor analysis. A nine-factor solution was initially extracted, with these nine factors labelled as Role Ambiguity, Relationships, Working Environment, Bureaucracy, Autonomy, Tools and Equipment, Work/Home Interface, Career Advancement/Job Security and Workload. These nine factors explained 62.02% of the variance in the correlation matrix (de Bruin and Taylor, 2005). However, strong support was only provided for the factorial validity of five of the scales, namely Role Ambiguity, Relationships, Tools and Equipment, Work/Home Interface and Workload. The remaining scales were then reviewed and subsequently, the Bureaucracy and Autonomy factors were merged, the Job Security and Career Advancement factors were split and the Physical Environment factor was removed completely (de Bruin and Taylor, 2005).

The 71 items that remained after this revision, were then subjected to a maximum-likelihood factor analysis with a Promax rotation ($k = 4$), which revealed an eight-factor solution, explaining 62.36% of the variance in the correlation matrix (de Bruin and Taylor, 2005). These factors were labelled as Bureaucracy/Autonomy, Relationships, Tools and Equipment, Workload, Role Ambiguity, Work/Home Interface, Job Security and Career Advancement. However, due to several items cross-loading on more than one factor, several of the items were classified as possible candidates for revision (de Bruin & Taylor, 2005).

The instrument's technical manual (de Bruin & Taylor, 2006a), outlines the Promax-rotated (k = 4) maximum-likelihood factor analysis performed on the final 50 Sources of Work Stress items included in the second (and most recent) version of the SWSI, which revealed an eight-factor solution in line with the proposed structure of the SWSI. These factors were labelled as Role Ambiguity, Relationships, Tools and Equipment, Career Advancement, Job Security, Lack of Autonomy, Work/Home Interface and Workload. All 50 items displayed salient factor loadings (> .40) on their intended factors, with the exception of a single item, which loaded on both the Career Advancement and Lack of Autonomy factors, with loadings of .30 and .29, respectively (de Bruin & Taylor, 2006a).

An unrestricted maximum likelihood factor analysis was also performed on the items of the General Work Stress scale; however, this analysis was only performed on the 15 items of the first version of the instrument (de Bruin & Taylor, 2005), and the factor analysis reported on in the technical manual does not include the final nine items of the second version of the General Work Stress scale (de Bruin & Taylor, 2006a). In the factor analysis of the original 15 General Work Stress items, one general factor was extracted, which explained 42.75% of the variance in the correlation matrix. However, four of the items were found to be non-salient and were subsequently removed. The analysis was then repeated, with the first unrotated factor explaining 55.97% of the variance. The remaining 11 items had salient loadings, ranging from .58 to .85, on this general factor (de Bruin & Taylor, 2005). Overall, the results of these factor analyses indicate good structural validity of the SWSI.

In terms of the construct validity of the SWSI, this was evaluated via a multiple regression analysis of the relationships between General Work Stress and the eight Sources of Work Stress (de Bruin & Taylor, 2005; 2006a). As published in the technical manual, the zero-order correlations between the General Work Stress scale and the Sources of Stress

scales of the second version of the instrument were as follows: Role Ambiguity, r =.50; Relationships, r = .36; Tools and Equipment, r = .27; Career Advancement, r = .40; Job Security, r = .37; Lack of Autonomy, r = .47; Work/Home Interface, r = .48; and Workload, r = .54. These moderately strong correlations indicate that each Source of Work Stress contributed to the prediction of General Work Stress (de Bruin & Taylor, 2006a). However, Workload and Role Ambiguity were found to be the strongest predictors, being the only two Sources of Work Stress to have had meaningful partial correlations with General Work Stress ($r_{partial}$ = .30 and $r_{partial}$ = .29, respectively). Moreover, a strong multiple correlation of R = .67, R^2 = .45, $F(8, 444)$, $p < .0001$ was identified between the Sources of Work Stress and General Work Stress, providing further support for the construct validity of the SWSI (de Bruin & Taylor, 2006a).

Additional support for the construct validity of the SWSI was obtained through satisfactory results of a Rasch rating scale analysis[3], conducted in the development of the SWSI (de Bruin & Taylor, 2005). This analysis was conducted on the items remaining after the factor analysis. The highest and lowest values for the INFIT mean squares[4], item difficulty parameters and item-score correlations were reported on (de Bruin & Taylor, 2005). While a few items with INFIT > 1.40 were discarded, generally, all nine SWSI scales were regarded as unidimensional. In addition, the item-score correlations were high for all nine scales, indicating that all items were strong indicators of their respective constructs (de Bruin & Taylor, 2005).

[3] Rasch rating scale analysis involves the computation of fit indices (INFIT and OUTFIT mean squares being the most commonly used indices) to determine how well the data fits the Rasch model, which requires that all item discrimination parameters be equal (Wright & Masters, 1982). These fit indices compare expected item responses (based on estimated parameters) to observed item responses, and use this as the basis for evaluating the fit of the items and responses to the to the Rasch rating scale model (Bond & Fox, 2001).

[4] The INFIT mean square has an expected value of 1, but values ranging between .60 (indicating slight overfit) and 1.40 (indicating greater response variation) are generally regarded as indicative of satisfactory fit (Linacre & Wright, 1994).

The SWSI technical manual also provides scale-score and factor corelations for the eight Sources of Work Stress scales. The correlations between the scale scores ranged from .28 (between Job Security and Workload) to .67 (between Career Advancement and Lack of Autonomy) and were all statistically significant ($p < .01$), alluding to the presence of a higher-order stress factor (de Bruin & Taylor, 2006a). The factor correlations ranged from .07 (between Relationships and Workload) to .55 (between Career Advancement and Job Security). Overall, the correlations between the factors and scale scores were all greater than or equal to .95, contributing to even greater support for the construct validity of the scales (de Bruin & Taylor, 2006a).

It is noteworthy to mention that the results of a factor analysis conducted in de Bruin and Taylor's (2006b) study of the job demand-control model also provided evidence of the convergent and discriminant validity of three of the SWSI scales, namely General Work Stress, Lack of Autonomy and Workload. These three scales were found to measure separate but correlated constructs. Similarly, Davis (2015) also set out to evaluate the discriminant validity of the SWSI by (a) subjecting the nine SWSI scales to 'average variance extracted' versus 'shared variance' tests, and (b) computing 95% confidence interval estimates for the correlations between the latent constructs measured by the SWSI, separately for both genders. The former compares the average variance extracted proportions[5] of two constructs, with the squared correlation of the two constructs, to determine whether scales explain their items better than they explain other scales (Hair et al., 2006); while the 95% confidence interval estimates test the null hypotheses of perfect correlations against alternative hypotheses of non-perfect correlations (Mels, 2010).

[5] The average variance extracted proportion refers to the amount of variance in items that can be explained by their intended construct, as opposed to measurement error (Hair et al., 2006).

In the male sample, the General Work Stress, Role Ambiguity, Career Advancement, Lack of Autonomy and Work/Home Interface scales were seen as problematic, as a greater proportion of the variance in the items of these scales was explained by measurement error as opposed to the constructs that they were intended to reflect. Furthermore, the following scales were also found to share variance: Lack of Autonomy and Role Ambiguity; Lack of Autonomy and Relationships; Lack of Autonomy and Job Security; and Work/Home Interface and Workload (Davis, 2015). However, despite these findings, none of the confidence interval estimates were excessively high (< .90) or included unity, enabling all 36 null hypotheses of perfect correlations to be rejected. This indicated that none of the latent variables correlated perfectly, meaning that each scale could be regarded as qualitatively distinct (Davis, 2015).

In the female sample, the Role Ambiguity, Lack of Autonomy and Work/Home Interface scales were regarded as problematic, as more variance in the items of these scales was explained by measurement error as opposed to their intended constructs. Furthermore, the Lack of Autonomy and Relationships scales; the Lack of Autonomy and Career Advancement scales; and the Lack of Autonomy and Job Security scales, were all found to share variance (Davis, 2015). However, as with the male sample, none of the confidence interval estimates were excessively high (< .90) or included unity, enabling all 36 null hypotheses of perfect correlations to be rejected. This indicated that none of the latent variables correlated perfectly, meaning that each scale could be regarded as qualitatively distinct (Davis, 2015).

On the basis of these results, Davis (2015) concluded that each scale measured unique aspects, not measured by other scales. Despite minor shortcomings, this provided sufficient evidence of the discriminant validity of the SWSI scales in both the male and female samples.

Reliability

In the development of the SWSI, the reliability of the first version of the instrument was evaluated, firstly, by means of the aforementioned Rasch rating scale analysis as well as via internal consistency reliability coefficients (de Bruin and Taylor, 2005). In terms of the Rasch rating scale analysis, both item-separation as well as person-separation reliabilities were reported on. The item-separation reliabilities were generally regarded as satisfactory, ranging from .89 (Career Advancement) to .99 (Work/Home Interface). This implied that the item difficulty parameters were separated acceptably and that the item difficulty hierarchy would replicate across administrations with a different sample of participants (de Bruin & Taylor, 2005). The person-separation reliabilities (comparable to Cronbach's coefficient alpha) were also generally deemed as satisfactory, ranging from .76 (Career Advancement) to .91 (Bureaucracy/Autonomy). This implied that the items of the scales were able to distinguish between individuals with different scores/standings on the latent constructs, and that the order of low to high scorers on the construct would remain the same if the individuals were administered a different sample of the items (Bond & Fox, 2001; de Bruin & Taylor, 2005). Overall, these results supported the reliability of the SWSI scales (de Bruin & Taylor, 2005).

The SWSI technical manual also provides internal consistency (Cronbach alpha) coefficients for the General Work Stress scale as well as for each of the eight Sources of Work Stress scales (de Bruin & Taylor, 2006a). The Cronbach alpha coefficients ranged from .86 (Work/Home Interface) to .95 (Bureaucracy/Autonomy) for the scales of the first version of the instrument. For the second version, the Cronbach alpha coefficients were as follows: General Work Stress, α = .91; Role Ambiguity, α = .87; Relationships, α = .94; Tools and Equipment, α = .90; Career Advancement, α = .89; Job Security, α = .92; Lack of Autonomy, α = .90; Work/Home Interface, α = .86; and Workload, α = .88. These

coefficients were seen as uniformly high and were thus, deemed as satisfactory (de Bruin & Taylor, 2006a).

Overall, in addition to satisfactory evidence of the validity of the SWSI, evidence in support of its reliability was also obtained. The SWSI can, therefore, be seen as both psychologically meaningful and psychometrically satisfactory (de Bruin & Taylor, 2005).

Measurement Invariance and Equivalence

According to de Bruin and Taylor (2006b), when research studies include different demographic groups, such as men and women, it is imperative to evaluate the invariance and equivalence of the measures used, in order to ensure that the items and/or scales measured, are perceived in the same way by both groups. Only once this has been established, can meaningful comparisons of the groups be made.

Essentially, measurement invariance and equivalence address the same issues as construct and item bias (Vandenberg & Lance, 2000). Conceptually, this means assessing whether different groups interpret measures in a similar way. In a more operational sense, this entails assessing whether the relationships between the items and/or scales, and the underlying constructs of an instrument, are the same across groups (Bialosiewicz et al., 2013). While in many studies of gender differences, it is merely assumed that measures are equally valid for both men and women, present day researchers have called for greater invariance and equivalence testing in such studies (Steyn & de Bruin, 2020). Therefore, in order to place greater confidence in the validity of the test scores obtained on the SWSI as well as in the comparability of scores across gender groups, these were necessary considerations in the present study.

The concept of measurement invariance implies that, regardless of group membership, individuals with the same standing on a factor, will have the same scores on

measures of that factor. Measurement invariance can be tested on five increasingly restrictive levels, each imposing a set of more stringent equality constraints (Dunbar et al., 2011). These five levels, as initially set out by Meredith (1993), include (1) configural invariance, which suggests that the same factor model and configuration holds across groups, and is evaluated by constraining the structure of the model to equality across groups; (2) weak invariance, which suggests that the same measurement scale holds across groups, and is evaluated by constraining the item factor loadings, in addition to the structure of the model, to be equivalent across groups; (3) strong invariance, which suggests that any differences in mean scores across groups, are the result of true differences in the underlying latent factors, and is evaluated by constraining the model structure, item factor loadings as well as the regression intercepts of the items to equality across groups; (4) strict invariance, which suggests that residual error is equivalent across groups, and is tested by constraining the model structure, factor loadings, intercepts as well as the error variances of items to equality across groups; and (5) complete invariance, which suggests that groups respond to items using the same ranges of the construct continuum, and is tested by constraining the variance-covariance matrix to equality across groups. Most psychometricians regard the display of strong invariance as sufficient to justify comparisons of scores across groups, and suggest that models more restrictive than this, are too highly constrained and difficult to achieve in practice (Bialosiewicz et al., 2013; Vandenberg & Lance, 2000).

Complimentary to the concept of measurement invariance, is that of measurement equivalence, which involves the comparison of more restrictive and less restrictive multi-group measurement models across groups (Dunbar et al., 2011). Dunbar et al. (2011) propose four hierarchical levels of measurement equivalence, including (1) metric equivalence, which is achieved then the weak invariance model fits better than the less restrictive, configural invariance model (in which all model parameters are freely

estimated); (2) scalar equivalence, which is achieved when the strong invariance model fits better than the configural invariance model; (3) conditional probability equivalence, which is achieved when the strict invariant model fits better than the configural invariance model; and (4) full equivalence, which is achieved when the complete invariance model fits better than the configural invariance model.

It should be noted that, as a result of the fact that each level of invariance and equivalence testing is done on the basis of the preceding level, if a lack of invariance and/or equivalence is found at any particular level of testing, testing of further levels is terminated (Dunbar et al., 2011). This, however, has left gaps in finding the sources of the invariance and inequality, which along the fact that full measurement invariance and equivalence is seldom achieved in practice, led to the proposal of partial measurement invariance and equivalence as a compromise between full and non-invariance and equivalence. Under these partial models, non-invariant items are retained and their factor loadings, intercepts, error variances and/or scale variances and covariances are allowed to vary (Cheung & Rensvold, 1999).

In the context of the present study, the measurement invariance and equivalence of the 59-item SWSI instrument across gender groups was reviewed with reference to a particular study conducted by Davis at Stellenbosch University (2015) on the measurement invariance and equivalence of the SWSI across gender groups (men and women) in South Africa. In this study, a series of measurement invariance and equivalence tests were conducted (within a CFA framework) on a similar archival dataset of the SWSI (n = 920; with 460 men and 460 women) as that used in the present study. These tests and analyses conducted by Davis (2015) are described in the following paragraphs.

Firstly, following the establishment of satisfactory model fit of the SWSI, separately for both gender groups, configural invariance was tested. Support was obtained for this level of invariance, indicating that the same underlying constructs were measured across gender groups. This finding allowed for the testing of weak invariance, which was also supported, indicating that the items of the SWSI were perceived and interpreted in the same manner and reflected the same intended constructs across both gender groups. This finding enabled the testing of metric equivalence. However, in comparison to the configural invariance model, the weak invariance model fitted significantly poorer, meaning that the factor loadings of certain items differed across gender groups and, therefore, that metric equivalence was not supported. The possibility of partial metric equivalence was then evaluated by locating the sources of the non-invariance, where it was found that three of the factor loadings (of one Role Ambiguity item, one Career Advancement item, and one Lack of Autonomy item) were non-invariant. Therefore, with 56 of the 59 factor loadings found to be invariant, adequate support was established for partial metric equivalence.

On the basis of the preceding, strong invariance was then tested, while allowing for the three non-invariant factor loadings to vary across groups. Adequate support was obtained for strong invariance, implying that any differences observed in the underlying constructs could be attributed to true differences resulting from larger forces influencing item response across groups. However, when compared to the configural invariance model, the strong invariance model fitted significantly poorer, meaning that scalar equivalence was not supported. The possibility of partial scalar equivalence was then tested by exploring the sources of the non-invariance, leading to the identification of 31 non-invariant intercepts. The items with non-invariant intercepts included six General Work Stress items, four Role Ambiguity items, three Relationships items, two Tools and Equipment items, three Career Advancement items, two Lack of Autonomy items, seven Work/Home Interface items and

four Workload items. With 28 of the 59 intercepts found to be invariant, adequate support was obtained for partial scalar equivalence, which is generally regarded as necessary and sufficient for cross-group comparisons of observed and latent means (Cheung & Rensvold, 1999).

This finding allowed for the testing of strict invariance, under the condition that the three non-invariant factor loadings and the 31 non-invariant intercepts were allowed to vary across groups. This level of invariance was supported, implying that no significant variance existed in the error terms of the items across the gender groups. However, in comparison to the configural invariance model, the strict invariance model fitted significantly poorer, resulting in inadequate support for conditional probability equivalence. Partial conditional probability equivalence was then explored, leading to the identification of four non-invariant error variances (of one Relationships item, one Job Security item, one Lack of Autonomy item and one Work/Home Interface item). With 55 of the 59 error variances being invariant, adequate support was obtained for partial conditional probability equivalence.

On the basis of the preceding, complete invariance was then tested, allowing for the three non-invariant factor loadings, 31 non-invariant intercepts and four non-invariant error variances to vary across groups. Adequate support was obtained for this level of invariance, implying that both groups used the same ranges of the construct continuum to respond to the SWSI items. Finally, the finding of complete invariance allowed for the testing of full equivalence. However, when comparing the complete invariance model to the configural invariance model, inadequate support was found for full equivalence.

This resulted in additional tests to locate the sources of the non-invariance, where the variances of all nine scales and the covariances of 15 scale pairs were found to be non-invariant. These covariances included General Work Stress with Role Ambiguity (GWS-

RA); Role Ambiguity with Relationships (RA-REL), Tools and Equipment (RA-TE), Career Advancement (RA-CA), Job Security (RA-JS) and Lack of Autonomy (RA-LA); Relationships with Career Advancement (REL-CA) and Workload (REL-WL); Tools and Equipment with Career Advancement (TE-CA) and Workload (TE-WL); Career Advancement with Lack of Autonomy (CA-LA) and Job Security (CA-JS); Job Security with Lack of Autonomy (JS-LA); and Lack of Autonomy with Work/Home Interface (LA-WH) and Workload (LA-WL). Therefore, with 21 invariant covariances, adequate support was provided for partial full equivalence. Overall, taking into account the three non-invariant factor loadings, 31 non-invariant intercepts, four non-invariant error variances, nine non-invariant variances and 15 non-invariant covariances, the measurement model of the SWSI fitted successfully under the conditions of complete invariance and partial full equivalence.

Although in the analyses conducted by Davis (2015), as well as in those conducted by de Bruin and Taylor (2006b), a number of items of certain of the SWSI scales were found to function differently across men and women, showing statically significant differential item functioning (DIF), which could not be ascribed to sampling error, the DIF of these items was trivially small, making the measurement implications thereof, also relatively trivial. Furthermore, while the differential test functioning (DTF) of the scales were also not identical for men and women, they were very similar, meaning that bias due to measurement artefacts on the scale level was minimal.

Despite minor shortcomings, the SWSI ultimately displayed partial measurement invariance and equivalence across gender groups in South Africa, thus validating cross-group comparisons of men and women, given that the aforementioned parameters are taken into account (Davis, 2015). These findings not only provided additional support for the psychometric integrity of the SWSI, but also, in fact, answered one of the key research

questions of this study. In terms of whether the latent constructs of the present study carry the same meaning and manifest similarly amongst men and women, these findings of Davis (2015) indicate that General Work Stress and the eight Sources of Work Stress, as operationalised by the SWSI scales, are perceived in the same manner and carry the same meaning for both men and women.

Statistical Power and the Effects of Statistical Artefacts

As mentioned, moderated multiple regression - the primary method of analysis in the present study (to be described in the Data Analysis section to follow) - is one of the most effective and frequently used techniques for detecting moderating effects in research (Aguinis, 2004). However, its increased popularity over the years has sparked concerns amongst researchers regarding the difficulties and limitations associated with its use, the most notable of which, includes the need for high statistical power to detect moderating effects (Aguinis, 1995). In MMR, statistical power relates to the probability of accurately detecting a true effect[6], or a real difference between moderator-based subgroups. Low power[7], therefore, means that the likelihood of detecting a moderating effect is small, and that results are likely to be distorted by error, which increases the risk of Type II error, whereby theoretical models that include moderating effects are erroneously rejected (Aguinis, 1995).

As such, it has become necessary for researchers to conduct power analyses prior to the study of moderating effects, to ensure that statistically significant effects will be able to be detected (Aguinis, 2004). Power analyses are conducted on the basis of four components,

[6] Effects typically refer to variance in a particular variable across different groups, or to the strength of covariance between different variables in the same group. True effects, therefore, reflect real relationships between variables or differences between groups (Schäfer & Schwarz, 2019).

[7] Statistical power ranges from zero to one, with values closer to one indicating greater power to detect a false null hypothesis (Aguinis et al., 2005).

namely statistical power, sample size, significance level and targeted effect size; such that three of the four components are needed to calculate the fourth. In this manner, one can test the power yielded by the given parameters of a study; or prior to beginning a study, one can determine the minimum sample size needed to achieve a desired power level, given a particular significance level (usually set to .05) and targeted effect size (typically based on similar or pilot studies; Aguinis et al., 2005).

Essentially, effect size indicates the strength of a moderating effect in terms of whether statistically significant differences are large enough to be considered practically meaningful (Schäfer & Schwarz, 2019). A standardised metric for the measurement of effect size, used in most psychological studies using multiple regression, is f^2, which is calculated as the ratio of systematic variance explained by the moderator, relative to the variance left unexplained in the criterion (see Aiken & West, 1991, p. 157 for the calculation of f^2).

Cohen (1988) suggested that effects be classified into small, medium and large size categories, labelling effect sizes of around $f^2 = .02$, as small; $f^2 = .15$, as medium; and $f^2 = .35$, as large. While Cohen (1988) noted that even small effect sizes hold practical and theoretical significance, a 30-year review (from 1969 to 1998) by Aguinis et al. (2005) of effect size and power in moderated multiple regression, revealed that observed moderating effects were notably smaller than what Cohen (1988) initially defined as a small effect, with the effect size of tests including the moderating effect of gender, being uniformly narrow and around .002. Aguinis et al. (2005) therefore, concluded that researchers need to conduct *a priori* power analyses and design research on the basis of smaller, more realistic effect sizes, if such small effects are to have any meaningful impact in practice. It should also be noted here, that the results of this review indicated that across most studies, statistical power of .80 was generally found to be sufficient in detecting small moderating effects.

In light of the preceding, there are a number of methodological/design, measurement and other statistical artefacts[8], which can cause a downward bias in observed effect size and thereby, put researchers at risk of incorrectly concluding the absence of a moderating effect in the population (Aguinis et al., 2005). Aguinis (1995) classified these artefacts under four main factors influencing the power of MMR, namely sample size, variable distributions, criterion and predictor operationalisations, and predictor intercorrelation; each of which is discussed in the paragraphs to follow.

Perhaps one of the single most significant and well-documented of these factors influencing effect size and power of MMR analyses, is sample size, which includes both total sample size as well as sample size across moderator-based subgroups (Aguinis, 1995; Cohen, 1992; Stone-Romero & Anderson, 1994). Total sample size and power are positively related, such that larger sample sizes yield higher statistical power. However, this is only true to a certain point, at which the sample is large enough, that additional data will only marginally increase power and not be of much benefit (Aguinis, 1995). Furthermore, while it is relatively common for studies including categorical moderator variables such as gender, to have unequal sample sizes across the moderator-based subgroups, research evidence has proven this to reduce power (Aguinis, 1995; Stone-Romero et al., 1994). This reduction in power is primarily due to the power of a test being limited to the size of the smallest subgroup sample, which places a ceiling on the strength of the correlation between the criterion and the product term[9] variables. The maximum value of this correlation occurs when subgroup proportions are equal, therefore, as this ceiling declines, so does the power to detect moderating effects (Aguinis, 1995).

---

[8] In research, statistical artefacts refer to findings that occur as a result of the research design employed, measurement error or bias in data collection and manipulation, as opposed to reflecting findings of the real world (Wiernik & Dahlke, 2020).

[9] The product term carries information regarding the interaction between predictor and moderator variables. See Figure 3.3 for an example.

Yet another influential factor affecting observed effect size and contributing to low statistical power, relates to variable distributions, in terms of predictor variable range restriction as well as error variance heterogeneity (Aguinis, 1995). Range restriction occurs when data in the population is limited to a particular subset or by some criterion, resulting in the variance in the sample underrepresenting the variance in the target population (Wiernik & Dahlke, 2019). In MMR, restricting the range of predictors, even slightly, lowers the variance of product term scores, which in turn, leads to substantial decreases in power and thus, threatens the validity of MMR-based conclusions (Aguinis, 1995; Stone-Romero & Liakhovitski, 2002).

Moreover, one of the necessary conditions/assumptions for testing the moderating effects of categorical variables via MMR, which is often systematically violated, is the homogeneity of within-moderator-based subgroup error variances (Aguinis et al., 1999). When, in addition to the violation of error variance homogeneity, subgroup sample sizes are unequal, and the largest subgroup in terms of sample size, also displays the largest residual variance, power is drastically reduced (Aguinis, 1995).

Other issues affecting MMR power relate to the operationalisations of predictor and criterion variables. One such issue is that of measurement error, which relates to the reality of constructs being measured with less than perfect reliability (Aguinis, 1995). This pertains to both predictor and criterion scores. Unreliable predictor scores reduce the estimated effect sizes of product terms, resulting in sample-based regression coefficients that underestimate population coefficients (Dunlap & Kemery, 1988; Stone-Romero et al., 1994). Unreliable criterion scores also negatively affect power by weakening the relationship between the criterion and the product term (Aguinis, 1995). Although the predictor and criterion measures of the present study have already been shown to demonstrate satisfactory reliability, a discouraging conclusion was made by Aguinis et al. (1994) that even reliability

deemed to be acceptable, can result in significantly lesser power than error-free criterion and predictor measurements.

Additionally, inappropriate metrics used in the operationalisation of predictor and criterion variables can also negatively affect the power of MMR analyses (Aguinis, 1995). In terms of the measurement of predictor variables, certain studies (Southwood, 1978) initially argued that in order to conduct MMR analyses, predictor variables needed to be measured on ratio scales. However, further testing (Evans, 1985; Jaccard et al., 1990) revealed that interaction effects could be tested using interval-level data without jeopardising the power of the test (Aguinis, 1995).

The issue of concern in terms of criterion measurement, relates to scale coarseness. This pertains to an insufficient number of scale points included in the operationalisation of a criterion variable (Aguinis, 1995). As a result of the fact that the product term has a range of scores equivalent to the product of the number of scale points of the predictor and moderator variables, while the criterion is typically measured on a scale with far fewer points than this, information regarding the relationship between the criterion and the product term is lost. This information loss results in an underestimation of the moderating effect, thereby reducing power to detect such an effect (Aguinis, 1995).

The final known artefact influencing the power of MMR analyses, as documented by Aguinis (1995), is the intercorrelation between predictor and moderator variables. As a result of both predictor and moderator scores being used to calculate the product term in MMR, it stands to reason that the predictor and the product term, as well as the moderator and the product term, tend to be highly correlated. This is referred to as multicollinearity (Aguinis, 1995). According to Aguinis (1995), initially, some researchers were concerned that multicollinearity resulted in ill-conditioned solutions due to unstable regression

coefficients, large error terms and reduced statistical power. However, further developments by researchers including Aiken and West (1991) and Cronbach (1987), suggested that while multicollinearity does have certain effects on MMR analysis, including increased rounding and regression coefficient sampling errors, and difficulty in interpreting regression coefficients; in practice, the impact of multicollinearity on MMR power is not detrimental.

Overall, Aguinis (1995) proposed that power problems can be mitigated or solved by paying careful consideration to research design and conducting *a priori* power analyses prior to data collection (Aguinis, 1995). Aguinis et al. (2005) further suggested that research needs to be designed, and *a priori* power analyses need to be conducted, on the basis of more realistic targeted effect sizes. Additionally, a noteworthy finding of Aguinis and Stone-Romero's (1997) study was that these aforementioned artefacts had interactive effects above and beyond their main effects on MMR, emphasising the importance of fully considering all methodological and measurement issues when planning and designing research (as opposed to using a single strategy), in order to increase observed effect size and avoid power problems.

In the context of the present study, these statistical artefacts and potential power problems were taken into account in the design of the study, by (a) ensuring that the sample size was large enough to achieve statistical power of .80 or greater, hence the use of archival data; (b) basing the study on a realistic targeted effect size of .02; (c) using appropriate and reliable predictor and criterion measures; and (d) conducting a power analysis prior to data analysis, keeping in mind variable distributions, multicollinearity and the fact that the unequal sample sizes of the gender-based subgroups may have needed to be equalised in the event of power problems.

Treatment of Missing Data

In addition to statistical power, another preliminary issue requiring attention before subjecting data to statistical analysis, is that of missing data, which in relation to the present study (which uses questionnaire data), takes the form of item non-response (Kang, 2013). Missing data can complicate and distort data analysis by reducing statistical power, creating bias in the estimation of parameters, and reducing the representativeness of a sample. This can lead to inaccurate conclusions and thus, threaten the validity of research (Kang, 2013).

According to Kang (2013), missing data can be classified into three categories, with the recommended technique for handling the missing data, dependent upon the type of missingness occurring in the dataset (Sijtsma & van der Ark, 2003). These three categories include (1) data missing completely at random (MCAR), which implies that the missingness is not dependent on any observed or missing values and that missing values are a random sample of all values in the dataset (Van Ginkel et al., 2007); (2) data missing at random (MAR), which occurs when non-response depends on another observed variable in the dataset, such as gender, where for example, men may have found it more difficult than women to answer a certain question (Sijtsma & van der Ark, 2003); and (3) data not missing at random (NMAR), which implies that the missingness is dependent on the missing variable itself or on variables that are not included in the study; an example being if stressed respondents had a higher probability of not responding to a question about general work stress than those who were not stressed.

There still remains an unsettled debate regarding the amount of missing data a particular dataset can handle before the results of statistical analyses become biased (Riedel, 2005). Some researchers, such as Bennett (2001), suggest that results are only seriously biased when the percentage of missing data in a dataset exceeds around 10 percent of the

total data. Others hold missing data to a stricter standard, suggesting that missingness should not exceed five percent of the total data in a dataset (Riedel, 2005). According to Hair et al. (2006), the general rule of thumb is that missingness of less than 10 percent is acceptable for any individual case, unless the missingness occurs in a non-random manner. It is also generally accepted that larger datasets absorb missing data better than datasets with smaller sample sizes (Riedel, 2005).

One of the most common methods of dealing with missing data is listwise deletion, which entails simply removing cases containing any missing values from the dataset and excluding them from further analyses. There are however, certain disadvantages associated with this method, as removing cases reduces both sample size and statistical power, and can lead to a biased sample if data is not classified as MCAR (Kang, 2013). While there are numerous other techniques for handling missing data (see Kang, 2013), the most suitable and applicable of these in the context of the present study, involves the imputation of values.

Two main types of imputation exist, namely single and multiple imputation, within which different methods of imputation fall. In contrast to single imputation, which substitutes a single value for each missing value, and treats these imputed values as true values, thereby ignoring the fact that imputed values are not exact; multiple imputation is often preferred, as this approach produces valid statistical inferences by restoring the natural variability of the missing data while also incorporating the uncertainty of imputed values (Kang, 2013).

Multiple imputation seeks to replace missing values with a set of plausible, predicted values, based on the existing data from other variables. This is achieved by applying a specific method of imputation to the same incomplete dataset multiple times, thereby producing different versions of a complete dataset, each of which is then analysed using

standard procedures for the statistical analysis of complete data, and the results thereof, are combined to produce a single overall estimate (Kang, 2013). The natural variability of the missing data is thus, restored by predicting values using variables that are correlated with the missing values. Moreover, this approach also takes into account the uncertainty of imputed values by producing multiple imputed datasets and examining the variability between the different versions (Kang, 2013). According to Mels (2007), multiple imputation can be used on the condition that observed variables are measured on a scale comprising of five or more values; observed variables are not excessively skewed; and missing data equals less than 30 percent of the total data.

Practically, Sijtsma and van der Ark (2003) suggest that several of the imputation methods used in research are too advanced for researchers who are not trained statisticians or psychometricians. It is, therefore, proposed that one of the simpler methods be used, such as person mean (PM) or two-way (TW) imputation. In Van Ginkel et al.'s (2007) study of the performance of these simpler methods of multiple imputation, the TW method was found to be the preferred method when dealing with missing questionnaire data, as it produced little discrepancy in reliability and thus, reduced the risk of obtaining distorted results. Another advantage of using two-way imputation, is that it corrects for both person and item effects, using the mean of the observed item scores of the specific respondent (whose response is missing); the mean of the observed item scores of all respondents for the specific item (for which the response is missing); as well as the overall mean of all the observed item scores of all respondents (Van Ginkel et al., 2007).

Data Analysis

In the present study, all statistical analyses of the archival data were performed using *R* statistical programming software (R Core Team, 2021). As previously stated, the main

method of analysis used to test the effects of Gender as a moderator in the relationships between General Work Stress and the eight identified Sources of Work Stress (as operationalised by the SWSI), was moderated multiple regression (Aguinis, 1995; Aiken & West, 1991). MMR was found to be the most effective and widely-used statistical technique for estimating the presence of a moderating effect in a population, based on sample data collected (Aguinis, 2004) and was, therefore, chosen as the most suitable method to investigate the relationships between the variables in the hypothesised models underlying this study.

Prior to the main analysis, a series of preparatory and preliminary analyses were conducted in order to, not only ready the data for analysis, but also to confirm the appropriateness, psychometric adequacy and power yielded by the data to detect moderating effects. Firstly, in preparation for the subsequent analyses, the original archival dataset was cleaned and formatted for use in *R.* This also included addressing the issue of missing values, using the *mokken* package in *R* (*R* Core Team, 2021). The techniques used for handling the missing data included listwise deletion for cases for which no gender was stated, or where missingness equalled or exceeded 10 percent for the individual case; and two-way imputation to replace the remaining missing values for cases with missingness of less than 10 percent (Hair et al., 2006).

Following this, a series of preliminary analyses were conducted. Firstly, the descriptive statistics of the new, complete dataset were analysed for the total sample and for men and women separately, in order to determine the appropriateness of the data for analysis, as well as to ensure that all data had been captured and recorded correctly. Thereafter, the reliabilities of the nine SWSI scales were analysed via Cronbach's alpha and McDonald's omega coefficients, for the total sample, as well as separately for men and women. As a preliminary step to these reliability tests, the data was also subjected to a

confirmatory factor analysis (CFA) to support the construct validity of the SWSI. Factor correlations as well as observed scale score correlations were then computed and analysed for the total sample, as well as separately for men and women. In order to answer one of the key research questions, as to whether gender differences existed in levels of General Work Stress and the different Sources of Work Stress, the distributions of the men's and the women's total scores on each of the nine SWSI scales were then also graphically depicted and analysed.

As a final preliminary step before the main moderation analysis, a statistical power analysis was conducted using the *pwr* package in *R* (*R* Core Team, 2021), with the typical effect size reported in the literature, the sample size and the significance level used as parameters, also bearing in mind the generally accepted level of statistical power of .80 necessary to detect moderating effects (Aguinis et al., 2005). This power analysis was conducted to assess the ability of the study to detect moderating effects in the population, based on the sample data; and in the event of low power, indicate the need for certain measurement or design issues to be addressed.

In terms of the main moderation analysis, conceptually, detecting the effects of categorical moderator variables on the relations between continuous variables via MMR, involves testing for differences in the slope coefficients of the moderator-based subgroups' regression lines of the criterion variable on each predictor variable. Essentially, this means testing (for each predictor) the null hypotheses of equal slopes (to determine the presence of a moderating effect) and equal intercepts (to determine whether joint versus separate regression equations should be used for the different moderator-based subgroups), resulting in one of three possible outcomes (Aguinis, 1995).

The first possible outcome involves homogenous regression lines, which in the context of the present study, would involve the men's and women's regression lines of

General Work Stress on the respective Source of Work Stress, being equal in terms of both slopes and intercepts. This would indicate that the Source of Work Stress predicted General Work Stress equally well for men and women, and that a joint regression equation could be used for both groups (Aguinis, 1995).

The second outcome involves differences in intercepts, which in the context of the present study, would involve the slopes of the men's and women's regression lines of General Work Stress on the Source of Work Stress being equivalent, but the intercepts of the regression lines of the two groups differing. From a test bias perspective, a joint regression equation in this case, would consistently overpredict the effect of the Source of Work Stress on General Work Stress for one gender group and underpredict for the other, indicating that separate regression equations should be used for men and women (Aguinis, 1995).

The third possible outcome involves a difference in slopes, which in the context of the present study, would involve the slopes of the regression lines of General Work Stress on the Source of Work Stress differing for men and women. This would indicate that Gender moderated the relationship between the Source of Work Stress and General Work Stress, and that separate regression equations should be used for men and women (Aguinis, 1995).

Operationally, the foregoing was tested via a three-step moderated hierarchical multiple regression analysis, as recommended by Pedhazur (1997). This analysis was conducted on a scale-by-scale basis for each of the eight Sources of Work Stress, with each Source of Work Stress acting as the independent variable in its respective regression models.

The first step of the three-step analysis involved fitting a linear regression model with the independent variable (X) as the only predictor of the criterion (Y). In the present study, this involved entering the Source of Work Stress as the only predictor of General Work Stress in the linear regression model, as expressed by the following regression equation:

$$Y = \beta_0 + \beta_1 X + \varepsilon$$

The second step then involved fitting another regression model with both the independent variable (X) and the moderator variable (Z) as predictors of the criterion (Y). This meant entering Gender as another predictor of General Work Stress in the linear regression model, as expressed by the following regression equation:

$$Y = \beta_0 + \beta_1 X + \beta_2 Z + \varepsilon$$

The third step involved fitting another regression model with the independent variable (X), the moderator variable (Z) and the product term of the independent variable and moderator variable (X × Z) as predictors of the criterion (Y). This involved entering the product term of Gender and the Source of Work Stress (e.g., Workload × Gender) as a third predictor of General Work Stress in the linear regression model, as expressed by the following regression equation:

$$Y = \beta_0 + \beta_1 X + \beta_2 Z + \beta_3 XZ + \varepsilon$$

After fitting these models, the output of each model was then analysed for each of the eight Sources of Work Stress, beginning with, and working backwards from, the model fitted in the third step (which included the product term). In analysing the output of this model, specific attention was paid to the regression coefficient of the interaction/product term and the significance level thereof (Aguinis & Gottfredson, 2010). In the event that the

regression coefficient of the product term was non-significant ($p > .05$), the output of the model fitted in the second step, which excluded the product term, was analysed. In this instance, a moderating effect was ruled out, as the non-significance of the product term indicated that no significant difference was found in the slopes of the men's and women's regression lines and therefore, that the null hypothesis of equal slopes could not be rejected (Aguinis & Gottfredson, 2010). This did not, however, rule out potential differences in the intercepts of the regression lines of the two groups (and thus, the possibility that separate regression lines should be used for men and women).

In analysing the output of the model fitted in the second step, attention was paid to the significance level of the regression coefficient of the Gender variable (Aguinis & Gottfredson, 2010). A non-significant regression coefficient in this case, was regarded as evidence that the intercepts of the men's and women's regression lines did not differ, indicating that the null hypothesis of equal intercepts could not be rejected (Aguinis & Gottfredson, 2010), thus shifting the focus to the model fitted in the first step. If in the output of this model, the regression coefficient of the Source of Work Stress was found to be significant, this was regarded as evidence of homogenous regression lines, meaning that the Source of Work Stress predicted General Work Stress equally well for men and women, which allowed for the conclusion that a joint regression equation could be used for both gender groups (Aguinis & Gottfredson, 2010).

In analysing each model for each Source of Work Stress, attention was also paid to the multiple correlation coefficient of determination (R^2) in the output of each model. Of particular importance with regard to this parameter, was the magnitude and significance of the change in R^2 from one model to the next, determined via an ANOVA test (Aguinis & Gottfredson, 2010). The change in R^2 from the model fitted at the third step to the model

fitted at the second step, represented the proportion of variance due to the interaction (or moderating effect) of Gender and the Source of Work Stress. This change in R^2 was tested for significance, where in the event that the change was non-significant, the focus shifted to the change in R^2 from the model fitted at the second step, to the model fitted at the first step. This represented the proportion of variance explained by differences in the intercepts of the regression equations for men and women (Aguinis & Gottfredson, 2010). A statistically significant difference between these two R^2 values indicated that separate regression equations should be used for men and women, whereas a non-significant difference indicated that the same equation could be used for men and women (Aguinis & Gottfredson, 2010). These results, therefore, mirror those of the significance tests of the interaction effect and Gender, respectively, as described in the preceding paragraph.

Finally, as a separate analysis, the relative importance of the different Sources of Work Stress in explaining General Work Stress across Gender was also explored. This analysis was conducted to determine each Source of Work Stress' proportionate contribution to the multiple regression model, in which all eight Sources of Work Stress were entered as predictors of General Work Stress, for each Gender group independently (Grömping, 2006).

Operationally, this involved the use of the *relaimpo* package in *R* (*R* Core Team, 2021), which implements different metrics of dispersion importance (Grömping, 2006). A combination of metrics, including four simple metrics and one computer-intensive metric, was used to determine the relative importance of the different Sources of Work Stress. The four simple metrics used included (1) the "first" statistic, which compared the univariate R^2 values of the different Sources of Work Stress, indicating the variance in General Work Stress that each Source of Work Stress alone was able to explain, without giving consideration to the other Sources of Work Stress; (2) the "last" statistic, which focused on the increase in R^2 when each respective Source of Work Stress was included as the last

predictor in the model, indicating the variance in General Work Stress explained by each Source of Work Stress in addition to the other Sources of Work Stress; (3) the "betasq" statistic, which used the squared standardised regression coefficients of the Sources of Work Stress as indicators of their individual contributions to variance in General Work Stress; and (4) the "pratt" statistic, which used the product of each respective Source of Work Stress' standardised regression coefficient and its marginal[10] correlation with General Work Stress as a metric for relative importance, based on the assumption that the sum of these products across all regressors, was equivalent to the R^2 of the overall model (Grömping, 2006).

Although these simple metrics provide insight into the contributions of the individual regressors to the multiple regression model, in cases of correlated regressors, such as the Sources of Work Stress in the present study (de Bruin & Taylor, 2005; 2006a), these metrics do not decompose R^2 into contributions that naturally sum to the total R^2 value of the overall model, as univariate R^2 values do when regressors are uncorrelated. While the "pratt" metric is argued to be a natural decomposition of R^2, many criticise this view, as the metric can allocate negative contributions (Grömping, 2006). According to Grömping (2006), the more computer-intensive "lmg" metric is thus, advantageous over the simpler metrics in this regard, as it decomposes R^2 into non-negative contributions that automatically add up to the total R^2 of the overall model (Grömping, 2006). The "lmg" metric is also recommended by Johnson and Lebreton (2004) for its use of both direct regressor effects and effects when combined with other regressors in the model. This metric was, therefore, the final metric implemented in assessing the relative importance of the different Sources of Work Stress, with most of the focus falling upon this metric in particular.

The approach taken by the "lmg" metric is based on the premise that the test of

[10] Without regard for the other Sources of Work Stress.

relative importance is influenced by the order in which regressors are entered into the model, and is only effective and appropriate when there is no prior evidence to suggest a natural order among variables, in which they should be entered into the model (Grömping, 2006). This metric, therefore, made use of sequential R^2 contributions[11], whereby the Sources of Work Stress were entered into the model in accordance with the order that they were listed in the input of the model. As mentioned, separate analyses were conducted for men and women, with the results plotted and compared between the two groups.

Ethical Considerations

In order to protect the rights, dignity, safety and well-being of all research participants and stakeholders involved in the present study, as well as to adhere to Stellenbosch University's *Policy for Responsible Research Conduct*, certain ethical risks were taken into account in the planning and execution of the present research (Siegle, 2017). The following paragraphs outline the ethical risks taken into consideration, including informed consent, anonymity and confidentiality, data security, feedback and data use.

Informed Consent

As a result of the study being performed on archival data of individuals who had previously completed the SWSI, informed consent for this particular study was not explicitly obtained from the participants whose data was used in the study. However, informed consent was obtained from the participants at the time of their respective assessments, for their de-personalised and aggregated data to be stored by JvR Psychometrics and used for research purposes such as this (see Informed Consent Form in Appendix A).

[11] Sequential R^2 contributions are calculated as the sequential sum of squares of the respective regressors (which sum to the sum of squares of the model) divided by the sum of squares of the model.

In this regard, prior to completing the SWSI, participants were informed of the voluntary nature of their participation in completing the questionnaire as well as of their freedom to withdraw at any point. The consent form also outlined that the data would be provided to JvR Psychometrics for the purposes of scoring, analysing and interpreting the results, and that personal information gathered during the assessment would not be used for marketing purposes or be made available to any third party without written consent. Furthermore, as these participants completed the electronic version of the SWSI, they were also informed of the privacy and security risks associated with the use of the internet as the medium of administration. Finally, participants were also informed of their responsibilities, including providing accurate information, using the website in a lawful, non-damaging manner, and respecting the copyright laws governing the SWSI.

Moreover, ethical clearance for the present study was obtained via an application to the Research Ethics Committee: Social, Behavioural and Education Research (REC: SBER) of Stellenbosch University. This application was reviewed by the Industrial Psychology Departmental Ethics Screening Committee (DESC; a registered sub-committee of the REC), where the study was deemed as 'low risk research' and was subsequently, approved by both the DESC and the REC: SBER (project number 19320; see Ethical Clearance Letter in Appendix B).

Permission to make use of and receive access to the SWSI archival database for this study, was obtained via an application to JvR Psychometrics for research assistance. This application included details of the researchers, the objectives and purpose of the study, the necessity and value of the research, the research design, as well as what the research would entail; and was accompanied by a copy of the research proposal. Once permission had been granted to make use of the data and the research had also been ethically cleared by the DESC and the REC: SBER, a research agreement (see Appendices C and D for Research

Agreement and Commitment as Supervisor Form) was then entered into with JvR Psychometrics, and access to the data was provided in the form of an electronic copy of the archival dataset.

Anonymity and Confidentiality

In terms of anonymity, the archival dataset was received in a de-personalised format, such that participants' responses to the SWSI questionnaire had been recorded in an anonymised manner, whereby all person identifiers had been removed and item responses were not linked to any identifying information. Therefore, the identities of the participants were unknown to the researcher. Moreover, it should be noted that only aggregate findings, as opposed to individual-level data, were reported on.

All information collected by means of the SWSI questionnaire and included in the archival dataset was also treated with strict confidentiality, so as to ensure the safety and protection of the participants' information. In this regard, the dataset was held securely and was not made available to any third party, as further described in the Data Security section to follow.

Data Security

As mentioned, access to the archival data was provided in the form of an electronic copy of the dataset. To protect the data against security risks, such as unauthorised access to the data or theft of storage devices, the dataset was stored securely in a password-protected file, saved on a computer device with firewall and antivirus/spyware software activated on the device. A copy of the dataset was also backed up on a password-encrypted hard drive. Neither the data nor the passwords to access the data were made available to any third party. The original data is stored under the ownership of JvR Psychometrics.

Feedback

As feedback was provided to participants on the results of their SWSI assessments by JvR Psychometrics and the researchers who originally collected the data, feedback on assessment results was not a relevant consideration in the present study. Furthermore, bearing in mind that the focus of this study was not to describe the level of the participants on the different variables, but rather, to demonstrate the hypothesised relations between the different variables; and also because of the identity of the participants being unknown to the researcher, feedback on the results of the study was not provided to the research participants themselves. However, the research results will be made available to JvR Psychometrics, in the form of a copy of the final manuscript of the study.

Data Use

So as to respect all copyright and legal rights held by JvR Psychometrics with regard to the security and ownership of the SWSI test material, none of the items of the SWSI were reported on or exposed in such a way that the security of the questionnaire would be compromised. Furthermore, all information included in the SWSI archival database, including participants' responses to the questionnaire, as well as their demographic information, was used for the purpose of research in the present, agreed upon study only, and for no other research studies. In addition, all copies of the data in the researcher's possession were deleted from all computer and electronic storage devices after the research had been conducted and the findings had been reported on.

Conclusion

This chapter described the research strategy and methods used to empirically investigate the hypothesised relations between the constructs of interest in the present study. Firstly, the hypothesised models underlying the research were presented, where the variables

of interest and their hypothesised relations were introduced. The research design and participants were then discussed, followed by a focus on the operationalisation of the variables comprising the hypothesised models. Through a review of previous empirical research, comprehensive insight into the psychometric properties of the SWSI was provided, where, in analysing the findings of a study by Davis (2015), answers to one of the key research questions of this study were obtained. In this regard, the question as to whether the latent constructs of the study carry the same meaning and manifest similarly among men and women, the findings of Davis (2015) indicated that General Work Stress and the eight Sources of Work Stress were, in fact, perceived in the same manner and carried the same meaning for both gender groups. This was a critical and noteworthy finding of this chapter.

The methods of statistical data analysis used in the study were then outlined in terms of the preliminary analyses, the main moderation analysis and the relative importance assessment; the results of which, are presented in Chapter 4. The ethical risks taken into consideration in the execution of the research were then discussed in closing the chapter.

Chapter 4: Results

This chapter presents the results of the statistical analyses conducted on the archival dataset in *R* (*R* Core Team, 2021), as outlined in the Data Analysis section of the preceding chapter. The analysis proceeded firstly, with the cleaning of the data, which also included addressing the issue of missing values. Thereafter, the descriptive statistics were analysed for appropriateness and accuracy of recording. Following this, to support the psychometric adequacy of the SWSI, the factor correlations, scale score correlations and reliabilities of the SWSI scales were analysed, where as a preliminary step, the data was also subjected to a confirmatory factor analysis. In order to investigate whether Gender differences existed in levels of General Work Stress and Sources of Work Stress - a critical research question of this study - the distributions of the men's and the women's total scores on the SWSI scales were then analysed.

Prior to the main moderation analysis, a power analysis was conducted to ensure that the power yielded by the archival dataset was sufficient enough to detect a small moderating effect. Thereafter, a scale-by-scale moderated hierarchical multiple regression analysis was performed as the main analysis of the study, to determine whether or not Gender played a moderating role in the relationships between General Work Stress and the eight Sources of Work Stress. Finally, in closing this chapter, the relative importance of the different Sources of Work Stress in explaining General Work Stress across the Gender groups, was explored.

Missing Data

Upon initial inspection of the dataset, several instances of missing values were found. There did not appear to be any pattern of item non-response and the missingness appeared to occur at random, suggesting that the missing data could be classified as MCAR.

Of the 2343 cases included in the dataset, only 2066 of the participants were found to have disclosed their gender. Given the classification of the data as MCAR, these 277 cases for whom no gender was stated, were removed via listwise deletion. Further analysis of the remaining cases revealed additional missing data in the form of item non-response. Table 4.1 contains the frequency of missing responses across all participants and all items. Following the recommendations of Hair et al. (2006), those participants with six or more missing values (i.e., missingness ≥ 10%) were also set aside via listwise deletion, resulting in the exclusion of an additional eight participants. This yielded a dataset with n = 2058, of which 1256 (61%) were men and 802 (39%) were women.

Table 4.1

Frequency of Missing Responses across all Participants and all Items

	Number of missing responses across all the items									
	0	1	2	3	4	5	6	8	9	14
Participants	1741	225	57	22	9	4	4	2	1	1
Cumulative participants	1741	1966	2023	2045	2054	2058	2062	2064	2065	2066

Note. Eight participants with six or more missing responses across all the items were excluded from further analysis. 317 participants who had from one to five missing responses across all the items remained in the data set, leaving n = 2058.

Given that the data met the assumptions listed by Mels (2007) for the use of multiple imputation, for the remaining 317 cases containing strings of missing data, two-way imputation (see Bernaards & Sijtsma, 2000; Sijtsma & van der Ark, 2003; Van Ginkel et al., 2007) was employed to replace the missing item responses (totalling 0.38% of all responses) with plausible values. These analyses were conducted on a scale-by-scale basis, using the *mokken* package (van der Ark, 2007; van der Ark, 2010) in *R* (*R* Core Team, 2021).

Descriptive Statistics

As a check of the appropriateness of the data and the accuracy of its recording, the minimum and maximum values, mean, standard deviation, skewness and kurtosis of each item of each of the nine SWSI scales was inspected for the total sample (see Table 4.2) as well as for the male and female samples separately (see Tables 4.3 and 4.4). All minimum and maximum values, and means and standard deviations, appeared plausible. All items also displayed acceptable skewness and kurtosis, with the exception of item wh7 (Total: skew = 2.06, kurtosis = 4.40; Men: skew = 2.05, kurtosis = 4.52; Women: skew = 2.05, kurtosis = 4.11), which produced values that were slightly large and outside of the acceptable range. However, upon inspection of the content of item wh7, it appeared likely that only respondents experiencing extreme stress would have indicated high values on the five-point scale, which very few respondents did. Overall, apart from this potentially problematic item, where caution was taken in further analyses, the data appeared satisfactory from a descriptive perspective.

Table 4.2

Descriptive Statistics of the SWSI Items for the Total Sample

Item	M	SD	Skew	Kurt.
General Work Stress				
gws1	2.55	1.05	.21	-.53
gws2	2.11	1.06	.67	-.36
gws3	2.14	1.07	.71	-.19
gws4	2.33	1.13	.48	-.60
gws5	2.16	.95	.56	-.19
gws6	2.13	.94	.57	-.09
gws7	2.60	1.10	.29	-.63
gws8	1.92	1.00	.90	.16
gws9	2.13	1.02	.63	-.27
Total	20.08	7.26	.66	.08
Role Ambiguity				
ra1	2.03	1.06	.90	.17
ra2	2.07	1.11	.88	-.03
ra3	2.50	1.22	.45	-.73
ra4	2.18	1.08	.75	-.11
ra5	2.00	1.01	.89	.25
ra6	2.27	1.20	.70	-.46
ra7	2.10	1.12	.87	.00
Total	15.15	5.75	.72	.25
Relationships				
rel1	2.18	1.29	.82	-.47
rel2	1.91	1.20	1.22	.47
rel3	2.25	1.26	.75	-.51
rel4	1.84	1.14	1.35	.93
rel5	1.75	1.14	1.47	1.12
rel6	1.77	.99	1.35	1.38
rel7	2.01	1.14	1.00	.11
rel8	1.72	1.07	1.45	1.20
Total	15.43	7.59	1.16	.60
Tools and Equipment				
te1	2.06	1.18	.90	-.16
te2	2.14	1.21	.81	-.34
te3	2.35	1.24	.56	-.71
te4	2.23	1.21	.72	-.45
te5	2.29	1.26	.66	-.62
Total	11.08	5.18	.74	-.22
Career Advancement				
ca1	2.63	1.35	.33	-1.08
ca2	2.65	1.42	.31	-1.22
ca3	2.46	1.34	.51	-.92
ca4	2.18	1.24	.83	-.36
ca5	2.59	1.32	.35	-1.02
Total	12.51	5.34	.39	-.75

Item	M	SD	Skew	Kurt.
Job Security				
js1	2.53	1.33	.44	-.98
js2	2.75	1.33	.23	-1.09
js3	2.64	1.23	.33	-.86
js4	2.36	1.25	.61	-.65
Total	10.27	4.53	.41	-.76
Lack of Autonomy				
la1	2.42	1.14	.51	-.50
la2	2.29	1.17	.66	-.44
la3	2.22	1.21	.73	-.46
la4	2.19	1.20	.78	-.35
la5	2.49	1.24	.44	-.82
la6	2.62	1.29	.34	-1.00
la7	2.38	1.23	.62	-.59
Total	16.60	6.42	.50	-.34
Work/Home Interface				
wh1	2.66	1.27	.32	-.91
wh2	1.98	1.22	1.08	.07
wh3	2.45	1.23	.48	-.74
wh4	2.08	1.17	.89	-.12
wh5	1.76	1.04	1.40	1.33
wh6	1.84	1.04	1.28	1.13
wh7	1.47	.82	2.06	4.40
Total	14.24	5.69	.82	.41
Workload				
wl1	2.37	1.30	.56	-.86
wl2	2.60	1.23	.34	-.84
wl3	2.29	1.27	.64	-.70
wl4	2.49	1.29	.48	-.82
wl5	2.23	1.21	.78	-.34
wl6	2.57	1.27	.39	-.90
wl7	2.36	1.17	.59	-.49
Total	16.91	6.87	.54	-.41

Table 4.3

Descriptive Statistics of the SWSI Items for the Male Sample

Item	M	SD	Skew	Kurt.
General Work Stress				
gws1	2.50	1.05	.21	-.59
gws2	2.03	1.04	.75	-.22
gws3	2.06	1.04	.81	.03
gws4	2.28	1.12	.54	-.52
gws5	2.15	.95	.56	-.15
gws6	2.11	.95	.65	.07
gws7	2.58	1.11	.28	-.65
gws8	1.88	.98	.98	.36
gws9	2.08	1.01	.70	-.14
Total	19.68	7.20	.74	.27
Role Ambiguity				
ra1	1.98	1.04	.95	.33
ra2	2.03	1.10	.94	.13
ra3	2.52	1.22	.43	-.76
ra4	2.20	1.08	.74	-.13
ra5	1.98	.99	.94	.48
ra6	2.33	1.21	.65	-.51
ra7	2.11	1.10	.87	.06
Total	15.15	5.71	.74	.35
Relationships				
rel1	2.22	1.29	.77	-.56
rel2	1.91	1.18	1.19	.45
rel3	2.28	1.24	.71	-.51
rel4	1.89	1.14	1.24	.64
rel5	1.75	1.13	1.47	1.17
rel6	1.74	.95	1.35	1.45
rel7	2.04	1.12	.95	.10
rel8	1.69	1.00	1.48	1.53
Total	15.52	7.40	1.10	.51
Tools and Equipment				
te1	2.10	1.18	.85	-.22
te2	2.22	1.19	.70	-.44
te3	2.41	1.22	.47	-.78
te4	2.26	1.19	.69	-.43
te5	2.23	1.23	.72	-.50
Total	11.23	5.03	.65	-.31
Career Advancement				
ca1	2.74	1.34	.24	-1.09
ca2	2.69	1.43	.29	-1.24
ca3	2.52	1.32	.48	-.88
ca4	2.22	1.24	.79	-.41
ca5	2.62	1.28	.33	-.95
Total	12.79	5.23	.33	-.74

Item	M	SD	Skew	Kurt.
Job Security				
js1	2.58	1.32	.40	-1.00
js2	2.80	1.32	.18	-1.09
js3	2.66	1.22	.30	-.87
js4	2.38	1.26	.59	-.71
Total	10.41	4.51	.39	-.77
Lack of Autonomy				
la1	2.46	1.12	.45	-.53
la2	2.31	1.16	.63	-.44
la3	2.30	1.22	.64	-.59
la4	2.21	1.19	.72	-.43
la5	2.49	1.22	.42	-.81
la6	2.64	1.27	.33	-.98
la7	2.33	1.20	.63	-.52
Total	16.75	6.29	.45	-.39
Work/Home Interface				
wh1	2.64	1.25	.34	-.86
wh2	1.95	1.21	1.09	.07
wh3	2.40	1.20	.51	-.63
wh4	1.98	1.13	1.04	.28
wh5	1.72	1.01	1.48	1.67
wh6	1.79	1.01	1.32	1.24
wh7	1.46	.79	2.05	4.52
Total	13.94	5.49	.84	.52
Workload				
wl1	2.31	1.27	.61	-.74
wl2	2.55	1.22	.40	-.78
wl3	2.37	1.26	.56	-.75
wl4	2.60	1.25	.37	-.83
wl5	2.33	1.21	.68	-.45
wl6	2.56	1.24	.39	-.86
wl7	2.36	1.15	.62	-.39
Total	17.08	6.85	.52	-.40

Table 4.4

Descriptive Statistics of the SWSI Items for the Female Sample

Item	M	SD	Skew	Kurt.
General Work Stress				
gws1	2.63	1.04	.20	-.46
gws2	2.23	1.09	.55	-.53
gws3	2.27	1.10	.57	-.43
gws4	2.41	1.15	.40	-.71
gws5	2.18	.96	.55	-.27
gws6	2.17	.93	.44	-.33
gws7	2.61	1.09	.30	-.60
gws8	2.00	1.02	.78	-.09
gws9	2.21	1.04	.52	-.44
Total	20.71	7.32	.54	-.16
Role Ambiguity				
ra1	2.10	1.10	.83	-.06
ra2	2.13	1.13	.78	-.26
ra3	2.48	1.21	.48	-.69
ra4	2.16	1.09	.77	-.09
ra5	2.02	1.03	.81	-.07
ra6	2.18	1.19	.77	-.37
ra7	2.10	1.15	.87	-.11
Total	15.16	5.80	.70	.09
Relationships				
rel1	2.11	1.29	.92	-.32
rel2	1.92	1.24	1.25	.47
rel3	2.21	1.30	.81	-.50
rel4	1.76	1.15	1.55	1.46
rel5	1.75	1.17	1.46	1.01
rel6	1.82	1.05	1.32	1.15
rel7	1.97	1.17	1.07	.14
rel8	1.76	1.16	1.37	.68
Total	15.29	7.88	1.24	.69
Tools and Equipment				
te1	2.00	1.17	1.00	-.04
te2	2.02	1.22	1.00	-.07
te3	2.26	1.25	.72	-.54
te4	2.18	1.24	.78	-.46
te5	2.38	1.31	.58	-.79
Total	10.84	5.39	.87	-.10
Career Advancement				
ca1	2.46	1.36	.49	-1.01
ca2	2.59	1.41	.33	-1.20
ca3	2.36	1.35	.58	-.95
ca4	2.11	1.25	.90	-.28
ca5	2.56	1.38	.39	-1.11
Total	12.08	5.50	.50	-.72

Item	M	SD	Skew	Kurt.
Job Security				
js1	2.45	1.35	.52	-.94
js2	2.68	1.36	.33	-1.08
js3	2.61	1.25	.37	-.85
js4	2.32	1.23	.65	-.55
Total	10.05	4.57	.45	-.75
Lack of Autonomy				
la1	2.34	1.16	.60	-.43
la2	2.26	1.19	.71	-.43
la3	2.09	1.20	.90	-.17
la4	2.15	1.23	.86	-.24
la5	2.48	1.27	.47	-.84
la6	2.59	1.33	.35	-1.04
la7	2.45	1.28	.59	-.71
Total	16.36	6.61	.58	-.28
Work/Home Interface				
wh1	2.70	1.31	.27	-.98
wh2	2.02	1.25	1.06	.05
wh3	2.53	1.29	.41	-.90
wh4	2.23	1.21	.68	-.56
wh5	1.83	1.08	1.27	.87
wh6	1.91	1.07	1.22	.94
wh7	1.48	.86	2.05	4.11
Total	14.71	5.97	.76	.20
Workload				
wl1	2.47	1.35	.46	-1.03
wl2	2.69	1.25	.26	-.92
wl3	2.17	1.27	.77	-.56
wl4	2.32	1.32	.67	-.68
wl5	2.07	1.20	.96	-.06
wl6	2.58	1.31	.39	-.97
wl7	2.37	1.20	.54	-.63
Total	16.66	6.90	.56	-.43

Scale Reliabilities

The next step in the analysis involved examining the reliabilities of the nine SWSI scales, using Cronbach's alpha and McDonald's omega coefficients. As a preliminary step, the data was also subjected to a confirmatory factor analysis[12]. Nine factors were specified and each factor was defined by the items that constituted the corresponding scale: General Work Stress (GWS; items gws1 to gws9), Role Ambiguity (RA; items ra1 to ra7), Relationships (REL; items rel1 to rel8), Tools and Equipment (TE; items te1 to te5), Career Advancement (CA; items ca1 to ca5), Job Security (JS; items js1 to js4), Lack of Autonomy (LA; items la1 to la7), Work/Home Interface (WH; items wh1 to wh7), and Workload (WL; items wl1 to wl7). All factors were allowed to freely correlate. The items were treated as ordinal variables and the factor parameters were estimated with mean and variance corrected weighted least squares (WLSMV; Li, 2016).

As a whole, the nine-factor model fitted the data satisfactorily (CFI = .91; TLI = .90; RMSEA = .06; SRMR = .06). The standardised factor loadings are reported in Table 4.5. Each item was a satisfactory indicator of its corresponding factor and each factor was well defined. Across the nine scales, the standardised factor loadings ranged from a low of .60 (item wh2 on factor WH) to a high of .91 (item js2 on factor JS). The average factor loadings across the nine scales were as follows: GWS, .80; RA, .77; REL, .85; TE, .86; CA, .80, JS, .88; LA, .76; WH, .77; and WL, .81. Note that while caution was taken with item wh7 in this analysis, as the descriptive statistics indicated it to be potentially problematic, the item still produced a satisfactory and relatively strong factor loading.

[12] A confirmatory factor analysis is reported to support the construct validity of the SWSI scales. As Davis (2015) at Stellenbosch University previously examined the measurement invariance and equivalence of the SWSI across gender groups in South Africa, this invariance testing is not repeated in the present study. Refer to the Measurement Invariance and Equivalence section of Chapter 3 where this study is described.

Table 4.5

Standardised Factor Loadings of the SWSI Items

	GWS	RA	REL	TE	CA	JS	LA	WH	WL
gws1	.84								
gws2	.86								
gws3	.77								
gws4	.76								
gws5	.80								
gws6	.83								
gws7	.76								
gws8	.85								
gws9	.73								
ra1		.76							
ra2		.82							
ra3		.69							
ra4		.73							
ra5		.78							
ra6		.78							
ra7		.85							
rel1			.88						
rel2			.88						
rel3			.88						
rel4			.88						
rel5			.87						
rel6			.72						
rel7			.84						
rel8			.85						
te1				.89					
te2				.86					
te3				.87					
te4				.88					
te5				.78					
ca1					.85				
ca2					.75				
ca3					.83				
ca4					.81				
ca5					.76				

	GWS	RA	REL	TE	CA	JS	LA	WH	WL
js1						.83			
js2						.91			
js3						.88			
js4						.88			
la1							.69		
la2							.72		
la3							.79		
la4							.78		
la5							.81		
la6							.82		
la7							.72		
wh1								.80	
wh2								.60	
wh3								.78	
wh4								.87	
wh5								.84	
wh6								.71	
wh7								.77	
wl1									.77
wl2									.80
wl3									.75
wl4									.78
wl5									.86
wl6									.83
wl7									.87

Note. All values are rounded to two decimal places. Factor loadings were estimated with mean and variance corrected weighted least squares (WLSMV), where the items were treated as ordinal variables.

GWS = General Work Stress; RA = Role Ambiguity; REL = Relationships; TE = Tools and Equipment; CA = Career Advancement; JS = Job Security; LA = Lack of Autonomy; WH = Work/Home Interface; WL = Workload.

Table 4.6 contains the factor correlations (below the diagonal) as well as the correlations between the observed scale scores (above the diagonal). All of the factors/scales were positively correlated and all correlations were statistically significant ($p < .01$). All eight Sources of Work Stress correlated moderately with General Work Stress as well as

with each other. The three strongest correlations among the Sources of Work Stress factors occurred between LA and REL (r = .75); LA and CA (r = .73); and LA and JS (r = .72); with LA correlating, on average, the strongest with the other Sources of Work Stress. The three weakest factor correlations among the Sources of Work Stress occurred between WL and REL (r = .31); WL and CA (r = .35); and WH and TE (r = .37), with WL correlating, on average, the weakest with the other Sources of Work Stress. The three Sources of Work Stress factors that correlated most strongly with the GWS factor were: RA (r = .61), WL (r = .60) and WH (r = .59). The three Sources of Work Stress that, relatively speaking, correlated the weakest with the GWS factor were: TE (r = .29), CA (r = .34) and REL (r = .36).

Table 4.6

Factor Correlations and Scale Score Correlations of the SWSI Scales

	Scale Scores								
Factors	GWS	RA	REL	TE	CA	JS	LA	WH	WL
GWS	1.00	.57	.30	.26	.29	.42	.45	.52	.55
RA	.61	1.00	.54	.45	.45	.49	.60	.44	.47
REL	.36	.63	1.00	.53	.55	.43	.65	.34	.26
TE	.29	.51	.60	1.00	.46	.39	.58	.31	.33
CA	.34	.52	.64	.54	1.00	.62	.63	.36	.30
JS	.46	.54	.50	.45	.71	1.00	.63	.40	.35
LA	.51	.68	.75	.66	.73	.72	1.00	.46	.42
WH	.59	.49	.41	.37	.42	.46	.53	1.00	.58
WL	.60	.51	.31	.38	.35	.40	.50	.66	1.00

Note. All values are rounded to two decimal places and are significant at the .01 level. Factor correlations are below the diagonal. Observed scale score correlations are above the diagonal. GWS = General Work Stress; RA = Role Ambiguity; REL = Relationships; TE = Tools and Equipment; CA = Career Advancement; JS = Job Security; LA = Lack of Autonomy; WH = Work/Home Interface; WL = Workload.

Table 4.7 simultaneously shows the correlations between the observed scale scores of both the men (above the diagonal) and the women (below the diagonal). For both gender groups, all of the scales were positively correlated and all correlations were statistically significant ($p < .01$). Moreover, all eight Sources of Work Stress correlated fairly moderately with General Work Stress as well as with each other. For the women, the three strongest correlations among the eight Sources of Work Stress occurred between JS and CA ($r = .65$); LA and REL ($r = .65$); and LA and CA ($r = .65$). The three weakest correlations among the Sources of Work Stress occurred between WL and REL ($r = .28$); WL and CA ($r = .31$); and WH and TE ($r = .31$). For the men, the strongest correlations among the Sources of Work Stress occurred between LA and REL ($r = .65$); LA and JS ($r = .62$); LA and RA ($r = .61$); and LA and CA ($r = .61$). The weakest correlations among the Sources of Work Stress for the men occurred between WL and REL ($r = .24$); WL and CA ($r = .29$); and WL and TE ($r = .30$).

For both the men and the women, the three Sources of Work Stress scales that correlated most strongly with the GWS scale were: RA (men, $r = .58$; women, $r = .57$), WL (men, $r = .55$; women, $r = .56$) and WH (men, $r = .52$; women, $r = .51$). The scales that, relatively speaking, correlated the weakest with the GWS scale were: TE (men, $r = .27$; women, $r = .25$), CA (men, $r = .31$; women, $r = .29$), and REL (men, $r = .30$; women, $r = .32$). While the correlations were very similar for the two gender groups, the largest differences in their scale score correlations occurred between TE and WL (difference = .08); TE and CA (difference = .07); TE and JS (difference = .06); CA and JS (difference = .06), where the correlations between these scales were slightly stronger for the women than for the men; as well as between RA and WH (difference = .06), where the correlation was slightly stronger for the men.

Table 4.7

Observed Scale Score Correlations of the SWSI Scales for Men and Women

Women's Scores	Men's Scores								
	GWS	RA	REL	TE	CA	JS	LA	WH	WL
GWS	1.00	.58	.30	.27	.31	.44	.45	.52	.55
RA	.57	1.00	.54	.45	.46	.51	.61	.47	.48
REL	.32	.52	1.00	.51	.54	.41	.65	.35	.24
TE	.25	.46	.56	1.00	.43	.37	.57	.31	.30
CA	.29	.45	.56	.50	1.00	.59	.61	.36	.29
JS	.39	.46	.46	.43	.65	1.00	.62	.41	.36
LA	.47	.60	.65	.60	.65	.64	1.00	.47	.42
WH	.51	.41	.33	.31	.37	.39	.46	1.00	.59
WL	.56	.46	.28	.38	.31	.34	.44	.57	1.00

Note. All values are rounded to two decimal places and are significant at the .01 level. Observed scale score correlations for the women are below the diagonal. Observed scale score correlations for the men are above the diagonal. GWS = General Work Stress; RA = Role Ambiguity; REL = Relationships; TE = Tools and Equipment; CA = Career Advancement; JS = Job Security; LA = Lack of Autonomy; WH = Work/Home Interface; WL = Workload.

Table 4.8 contains Cronbach's alpha and McDonald's omega coefficients for the nine SWSI scales, reported for the total sample as well as for men and women separately. The reliability coefficients were satisfactory (> .80) for the total sample as well as across the two gender groups. The reliability coefficients for the total sample ranged from a low of .85 (WH) to a high of .93 (REL). Across the men and the women, the reliability coefficients ranged from a low of .84 (WH) to a high of .93 (REL) for the men; and a low of .86 (RA and WH) to a high of .94 (REL) for the women.

Table 4.8

Reliability Coefficients of the SWSI Scales

	GWS	RA	REL	TE	CA	JS	LA	WH	WL
Alpha (α)	.92	.86	.93	.90	.86	.90	.87	.85	.90
Omega (ω)	.92	.86	.93	.90	.86	.90	.88	.85	.90
$Alpha_M$	.92	.86	.93	.89	.85	.90	.87	.84	.90
$Omega_M$	.92	.86	.93	.89	.85	.90	.87	.84	.91
$Alpha_W$	.92	.86	.93	.92	.87	.90	.88	.86	.89
$Omega_W$	.92	.86	.94	.92	.88	.91	.88	.86	.89

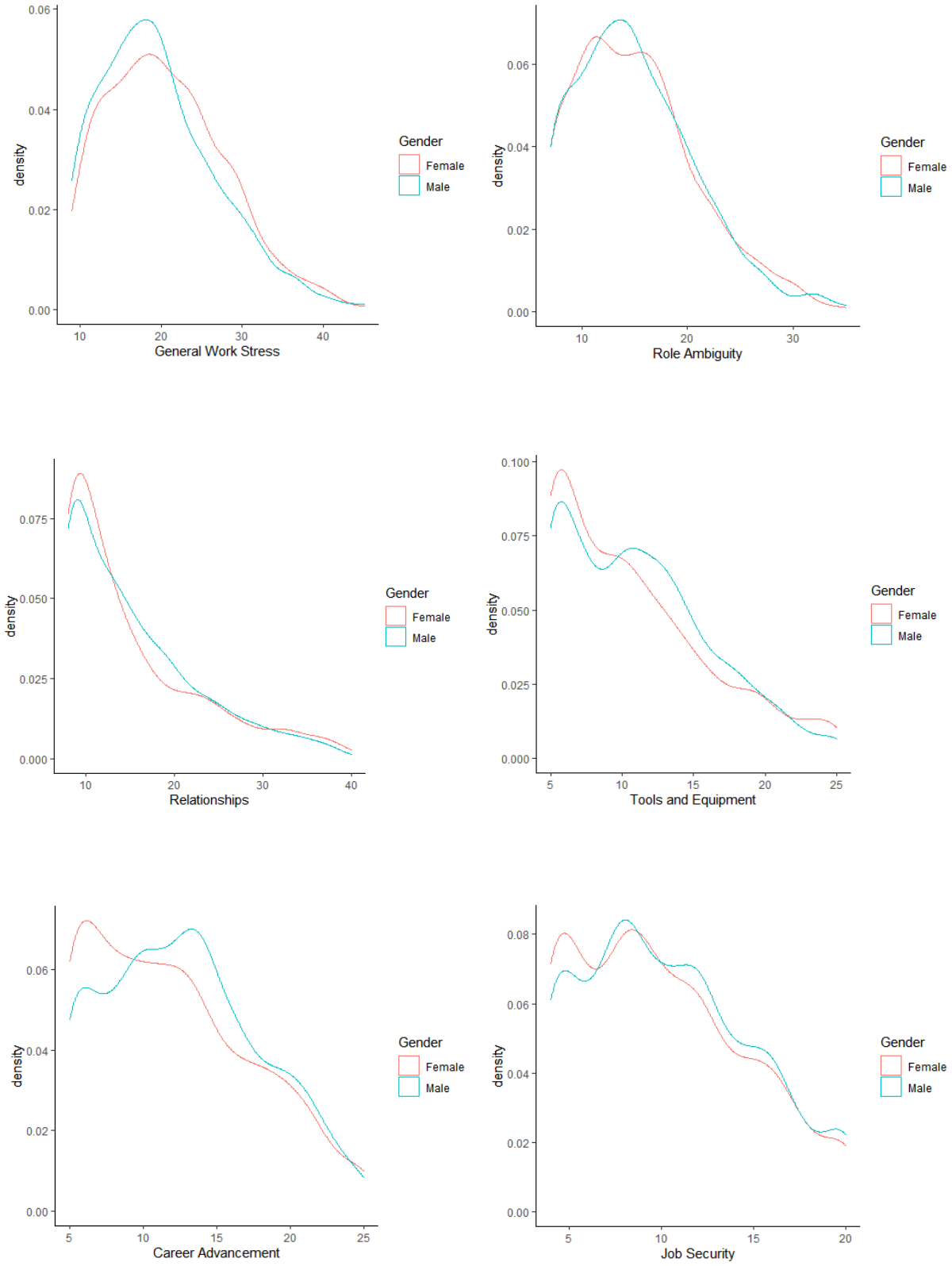
Note. All values are rounded to two decimal places. Reliability coefficients are reported for the total sample as well as separately for men (M) and women (W). GWS = General Work Stress; RA = Role Ambiguity; REL = Relationships; TE = Tools and Equipment; CA = Career Advancement; JS = Job Security; LA = Lack of Autonomy; WH = Work/Home Interface; WL = Workload.

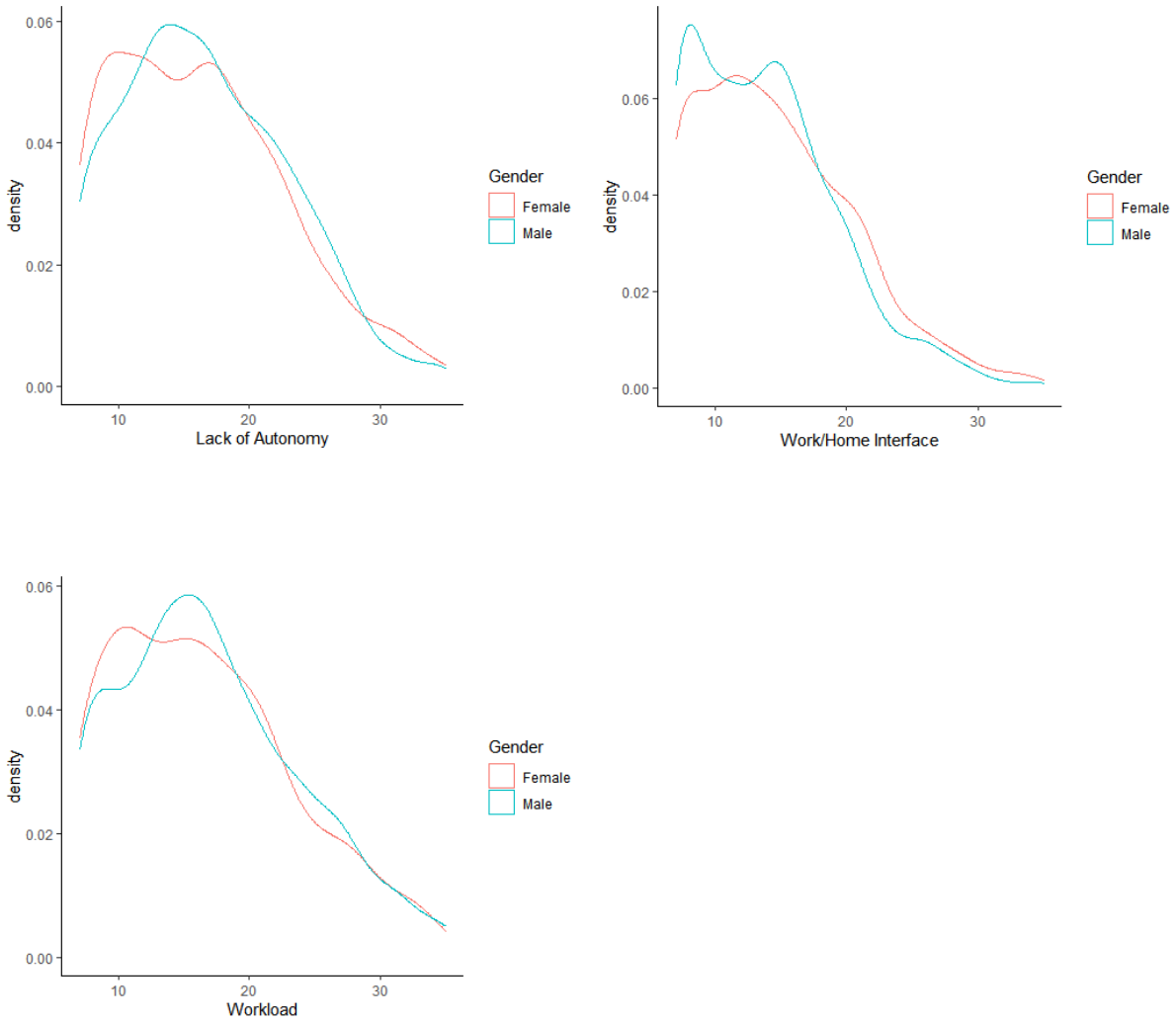
Scale Distributions

The distributions of the men's and women's total scores on each of the nine SWSI scales are depicted in the density plots in Figure 4.1. The shape of the men's and women's distributions were relatively similar to each other across the nine scales. For all nine scales, both distributions were generally skewed more to the right, peaking at the lower end to the middle of the range of total scores and declining relatively steeply thereafter, indicating that most items were responded to with lower values on the five-point scale. In general, the women appeared to have responded slightly more negatively than the men on most of the scales, with the exception of the General Work Stress and Work/Home Interface scales, where men responded with slightly lower values.

Figure 4.1

Density Plots Depicting the Distributions of Men and Women on the SWSI Scales





Statistical Power Analysis

As previously outlined, failure to detect moderating effects in research can often be attributed to low statistical power (Aguinis, 1995). Moreover, the effect sizes of moderating effects found in research, are typically relatively small. For instance, in the aforementioned 30-year review of moderating effects by Aguinis et al. (2005), published in the *Journal of Applied Psychology*, the average effect size for tests including the moderating effect of gender was found to be around 0.002, with statistical power of .80 generally seen as sufficient to detect small effects. Refer to the section on Statistical Power and the Effects of Statistical Artefacts in Chapter 3, where this study is described.

Following the recommendations of Cohen (1988), the statistical power yielded by the study's sample size of 2058 to detect a small moderating effect (f^2 = 0.02, where $f^2 = \frac{R^2_{AB} - R^2_A}{1 - R^2_{AB}}$) was investigated. The *pwr* package in *R* was employed to calculate the power to detect a moderating effect with the following parameters: *df*1 = 1, *df*2 = 2054, f^2 = .02, significance level = .05. This yielded a power of 1.00, indicating that with the given sample size, the power to detect a small effect was sufficient.

Moderation Analysis

In addition to readying the data for analysis, the main purpose of the preceding analyses was to support the psychometric integrity of the SWSI scales and their corresponding items in order to gain a better understanding of the functioning of the indicator variables representing the latent variables of interest in the study, as well as to provide a sound basis upon which to conduct the main MMR analysis. As outlined in the Data Analysis section of Chapter 3, the main investigation of the moderating effect of Gender in the relationships between General Work Stress and the eight identified Sources of Work Stress, was performed via a three-step moderated hierarchical multiple regression analysis for each Source of Work Stress, as recommended by Pedhazur (1997).

The analysis was performed on a scale-by-scale basis, fitting three separate linear models for each Source of Work Stress, with the first of which (labelled Model 1 in the results) using the Source of Work Stress as the only predictor of General Work Stress; the second (labelled Model 2 in the results) using both the Source of Work Stress as well as Gender as predictors of General Work Stress; and the third (labelled Model 3 in the results) using the Source of Work Stress, Gender, and the product term of the Source of Work Stress and Gender, as predictors of General Work Stress. Note that in the analyses, women served as the reference group, such that females were coded as zeros (0's) and males as ones (1's).

The analysis of each Source of Work Stress proceeded firstly, in terms of the results of an ANOVA test, which indicated the change in R^2 (and significance thereof) from one model to the next, testing the null hypothesis of equal intercepts from Model 1 to Model 2, and the null hypothesis of equal slopes from Model 2 to Model 3. The R^2 value at each model was also taken into consideration, indicating the proportion of variance in General Work Stress due to the interaction effect (in Model 3) and due to Gender (in Model 2). Mirroring these results, were those of the significance tests of the interaction effect and Gender in Model 3 and Model 2, respectively, enabling the formulation of either joint or separate regression equations for men and women.

Role Ambiguity

Table 4.9 contains the results of the comparisons of Models 1, 2 and 3 for the analysis of Role Ambiguity. The change in R^2 from Model 2 to Model 3 was non-significant ($\Delta R^2 = .000$, $F = .107$, $p = .744$), indicating that the null hypothesis of equal slopes could not be rejected. This also, therefore, indicated the absence of a moderating effect. However, the change in R^2 from Model 1 to Model 2 was statistically significant ($\Delta R^2 = .005$, $F = 14.646$, $p < .001$), indicating that the null hypothesis of equal intercepts had to be rejected. Note that Role Ambiguity and Gender jointly accounted for about 33.3% of the variance in General Work Stress. On its own, Role Ambiguity accounted for about 32.8% of the variance in General Work Stress, with Gender only accounting for an additional .5% of the variance above and beyond Role Ambiguity, which although statistically significant, appeared to be a small effect.

Table 4.9

Tests of Equal Slopes and Equal Intercepts of Role Ambiguity across Gender

	R^2	ΔR^2	F	p
Model 1	.328			
Model 2	.333	.005	14.696	< .001
Model 3	.333	.000	.107	.744

Note. Model 1 had Role Ambiguity as the predictor. Model 2 had Role Ambiguity and Gender as predictors. Model 3 had Role Ambiguity, Gender, and their product as predictors. All values are rounded to three decimals.

Table 4.10 contains the regression coefficients of Role Ambiguity and Gender across the three models. As the product term in Model 3 was non-significant (mirroring the foregoing ANOVA results) and thus, the null hypothesis of equal slopes could not be rejected, the focus fell on the interpretation of Model 2. The significant coefficient for Gender in Model 2 (b = -1.028, t = -3.834, p < .001) indicated that separate regression equations were required for men and women. The regression coefficient for Gender indicated that while holding Role Ambiguity constant, the mean General Work Stress score of the men was 1.028 points lower than that of the women. The separate regression equations obtained for men and women were as follows:

$$\hat{Y}_{Men} = 8.624 + .730(\text{Role Ambiguity})$$

$$\hat{Y}_{Women} = 9.882 + .715(\text{Role Ambiguity})$$

Figure 4.2 contains a scatterplot of Role Ambiguity and General Work Stress, with separate regression lines for men and women. Herein, the similarities of the slopes and differences in the intercepts are depicted.

Table 4.10

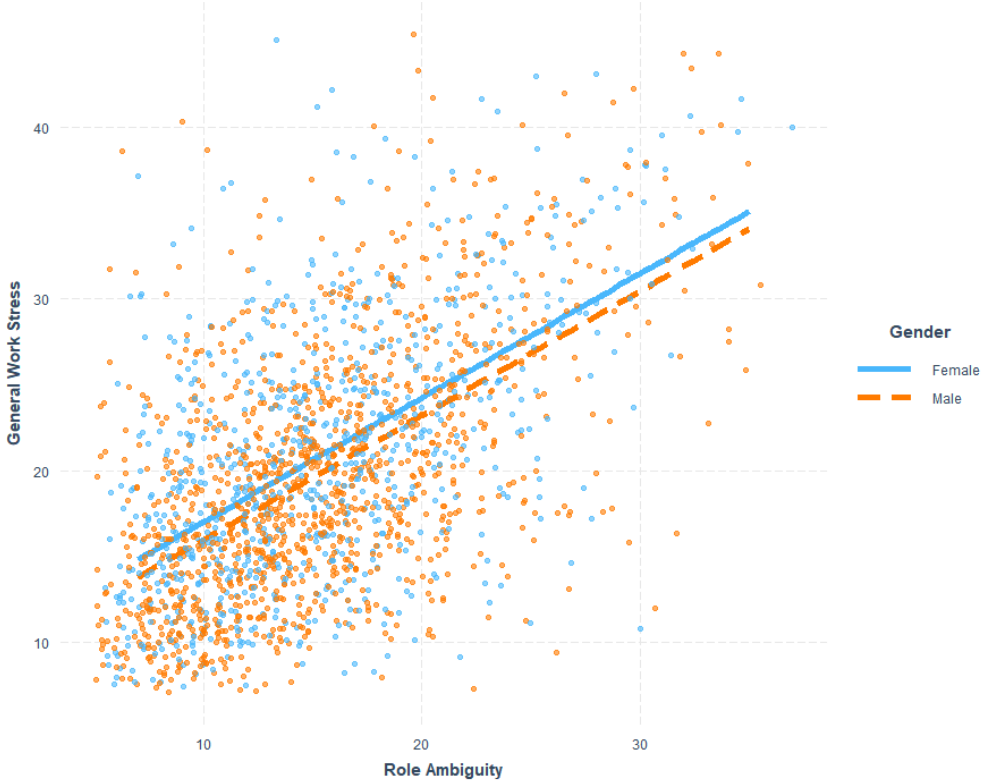
Regression Coefficients of Models 1, 2, and 3 for Role Ambiguity

	b	*se*	std. *b*	*t*	*p*
Model 1					
Intercept	9.115				
RA	.724	.023	.573	31.680	< .001
Model 2					
Intercept	9.744				
RA	.724	.023	.573	31.785	< .001
Gender	-1.028	.268	-.142	-3.834	< .001
Model 3					
Intercept	9.882				
RA	.715	.036	.565	19.777	< .001
Gender	-1.259	.755	-.142	-1.668	.096
RA × Gender	.015	.047	.012	.326	.744

Note. std.*b* = standardized regression coefficient. RA = Role Ambiguity. All values are rounded to three decimals.

Figure 4.2

Scatterplot and Regression Lines of Role Ambiguity and General Work Stress



Relationships

Table 4.11 contains the results of the comparisons of Models 1, 2 and 3 for the analysis of Relationships. The change in R^2 from Model 2 to Model 3 was non-significant (ΔR^2 = .000, F = .028, p = .867), indicating that the null hypothesis of equal slopes could not be rejected. This also, therefore, indicated the absence of a moderating effect. However, the change in R^2 from Model 1 to Model 2 was statistically significant (ΔR^2 = .005, F = 12.466, p < .001), indicating that the null hypothesis of equal intercepts had to be rejected. Note that Relationships and Gender jointly accounted for about 9.8% of the variance in General Work Stress. On its own, Relationships accounted for about 9.3% of the variance in General Work Stress, with Gender only accounting for an additional .5% of the variance above and beyond Relationships, which although statistically significant, appeared to be a small effect.

Table 4.11

Tests of Equal Slopes and Equal Intercepts of Relationships across Gender

	R^2	ΔR^2	F	p
Model 1	.093			
Model 2	.098	.005	12.466	< .001
Model 3	.098	.000	.028	.867

Note. Model 1 had Relationships as the predictor. Model 2 had Relationships and Gender as predictors. Model 3 had Relationships, Gender, and their product as predictors. All values are rounded to three decimals.

Table 4.12 contains the regression coefficients of Relationships and Gender across the three models. As the product term in Model 3 was non-significant (mirroring the foregoing ANOVA results) and thus, the null hypothesis of equal slopes could not be rejected, the focus fell on the interpretation of Model 2. The significant coefficient for Gender in Model 2 (b = -1.101, t = -3.532, p < .001) indicated that separate regression equations were required for men and women. The results indicated that while holding Relationships constant, the men's mean General Work Stress score was 1.101 points lower

than the women's mean score. The separate regression equations obtained for men and women were as follows:

$$\hat{Y}_{Men} = 15.178 + .290(\text{Relationships})$$

$$\hat{Y}_{Women} = 16.174 + .297(\text{Relationships})$$

Figure 4.3 contains a scatterplot of Relationships and General Work Stress, with separate regression lines for men and women. Herein, the similarities of the slopes and differences in the intercepts are depicted.

Table 4.12

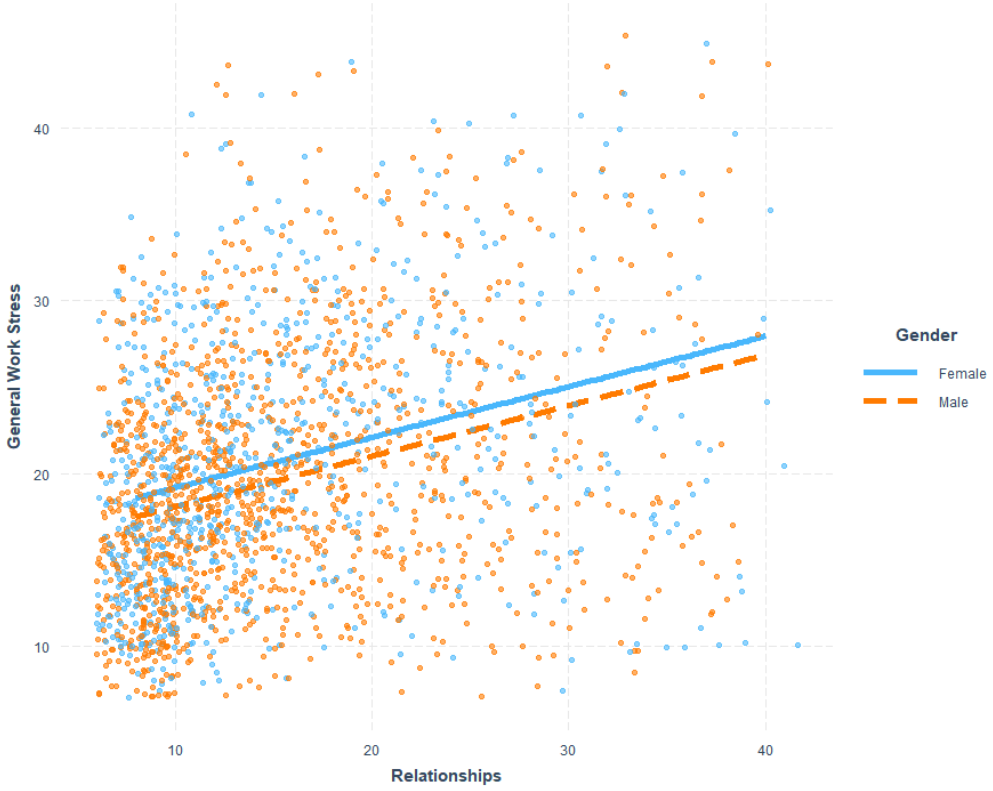
Regression Coefficients of Models 1, 2, and 3 for Relationships

	b	*se*	std. *b*	*t*	*p*
Model 1					
Intercept	15.579				
REL	.292	.020	.305	14.520	< .001
Model 2					
Intercept	16.235				
REL	.293	.020	.306	14.609	< .001
Gender	-1.101	.312	-.152	-3.532	< .001
Model 3					
Intercept	16.174				
REL	.297	.031	.311	9.591	< .001
Gender	-.997	.699	-.152	-1.426	.154
REL × Gender	-.007	.041	-.009	-.167	.867

Note. std.*b* = standardized regression coefficient. REL = Relationships. All values are rounded to three decimals.

Figure 4.3

Scatterplot and Regression Lines of Relationships and General Work Stress



Tools and Equipment

Table 4.13 contains the results of the comparisons of Models 1, 2 and 3 for the analysis of Tools and Equipment. The change in R^2 from Model 2 to Model 3 was non-significant ($\Delta R^2 = .001$, $F = .790$, $p = .374$), indicating that the null hypothesis of equal slopes could not be rejected. This also, therefore, indicated the absence of a moderating effect. However, the change in R^2 from Model 1 to Model 2 was statistically significant ($\Delta R^2 = .006$, $F = 13.822$, $p < .001$), indicating that the null hypothesis of equal intercepts had to be rejected. Note that Tools and Equipment and Gender jointly accounted for about 7.4% of the variance in General Work Stress. On its own, Tools and Equipment accounted for about 6.8% of the variance in General Work Stress, with Gender only accounting for an additional .6% of the variance above and beyond Tools and Equipment, which although statistically significant, appeared to be a small effect.

Table 4.13

Tests of Equal Slopes and Equal Intercepts of Tools and Equipment across Gender

	R^2	ΔR^2	F	p
Model 1	.068			
Model 2	.074	.006	13.822	< .001
Model 3	.075	.001	.790	.374

Note. Model 1 had Tools and Equipment as the predictor. Model 2 had Tools and Equipment and Gender as predictors. Model 3 had Tools and Equipment, Gender, and their product as predictors. All values are rounded to three decimals.

Table 4.14 contains the regression coefficients of Tools and Equipment and Gender across the three models. As the product term in Model 3 was non-significant (mirroring the foregoing ANOVA results) and thus, the null hypothesis of equal slopes could not be rejected, the focus fell on the interpretation of Model 2. The significant coefficient for Gender in Model 2 (b = -1.175, t = -3.718, p < .001) indicated that separate regression equations were required for men and women. The results indicated that while holding Tools and Equipment constant, the mean General Work Stress score of the men was 1.175 points lower than that of the women. The separate regression equations obtained for men and women were as follows:

$$\hat{Y}_{Men} = 15.268 + .393(Tools\ and\ Equipment)$$

$$\hat{Y}_{Women} = 17.033 + .339(Tools\ and\ Equipment)$$

Figure 4.4 contains a scatterplot of Tools and Equipment and General Work Stress, with separate regression lines for men and women. Herein, the similarities of the slopes and differences in the intercepts are depicted.

Table 4.14

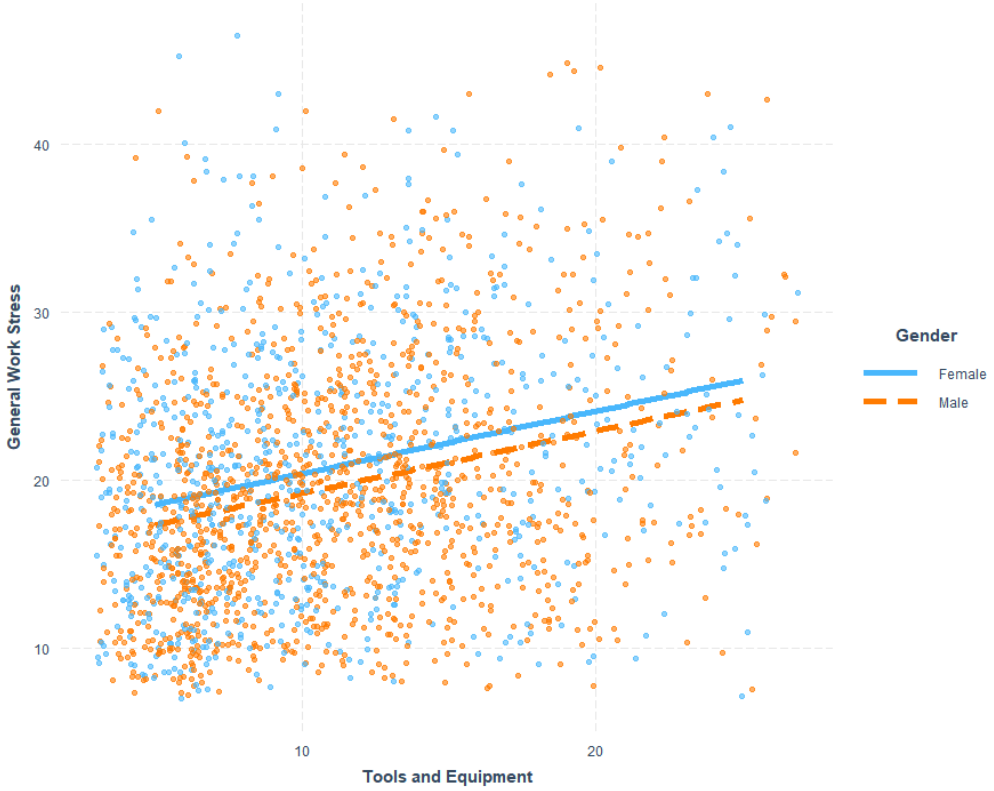
Regression Coefficients of Models 1, 2, and 3 for Tools and Equipment

	b	*se*	std. *b*	*t*	*p*
Model 1					
Intercept	16.026				
TE	.366	.030	.261	12.260	< .001
Model 2					
Intercept	16.698				
TE	.370	.030	.264	12.428	< .001
Gender	-1.175	.316	-.162	-3.718	< .001
Model 3					
Intercept	17.033				
TE	.339	.046	.242	7.409	< .001
Gender	-1.765	.735	-.161	-2.401	.016
TE × Gender	.054	.060	.038	.889	.374

Note. std.*b* = standardized regression coefficient. TE = Tools and Equipment. All values are rounded to three decimals.

Figure 4.4

Scatterplot and Regression Lines of Tools and Equipment and General Work Stress



Lack of Career Advancement

Table 4.15 contains the results of the comparisons of Models 1, 2 and 3 for the analysis of Lack of Career Advancement. The change in R^2 from Model 2 to Model 3 was non-significant ($\Delta R^2 = .000$, $F = .328$, $p = .567$), indicating that the null hypothesis of equal slopes could not be rejected. This also, therefore, indicated the absence of a moderating effect. However, the change in R^2 from Model 1 to Model 2 was statistically significant ($\Delta R^2 = .008$, $F = 17.719$, $p < .001$), indicating that the null hypothesis of equal intercepts had to be rejected. Note that Lack of Career Advancement and Gender jointly accounted for about 9.5% of the variance in General Work Stress. On its own, Lack of Career Advancement accounted for about 8.7% of the variance in General Work Stress, with Gender only accounting for an additional .8% of the variance above and beyond Lack of Career Advancement, which although statistically significant, appeared to be a small effect.

Table 4.15

Tests of Equal Slopes and Equal Intercepts of Lack of Career Advancement across Gender

	R^2	ΔR^2	F	p
Model 1	.087			
Model 2	.095	.008	17.719	< .001
Model 3	.095	.000	.328	.567

Note. Model 1 had Lack of Career Advancement as the predictor. Model 2 had Lack of Career Advancement and Gender as predictors. Model 3 had Lack of Career Advancement, Gender, and their product as predictors. All values are rounded to three decimals.

Table 4.16 contains the regression coefficients of Lack of Career Advancement and Gender across the three models. As the product term in Model 3 was non-significant (mirroring the foregoing ANOVA results) and thus, the null hypothesis of equal slopes could not be rejected, the focus fell on the interpretation of Model 2. The significant coefficient for Gender in Model 2 ($b = -1.318$, $t = -4.210$, $p < .001$) indicated that separate

regression equations were required for men and women. The results indicated that while holding Lack of Career Advancement constant, the men's mean General Work Stress score was 1.318 points lower than the women's mean score. The separate regression equations obtained for men and women were as follows:

$$\hat{Y}_{Men} = 14.287 + .422(Lack\ of\ Career\ Advancement)$$

$$\hat{Y}_{Women} = 16.017 + .389(Lack\ of\ Career\ Advancement)$$

Figure 4.5 contains a scatterplot of Lack of Career Advancement and General Work Stress, with separate regression lines for men and women. Herein, the similarities of the slopes and differences in the intercepts are depicted.

Table 4.16

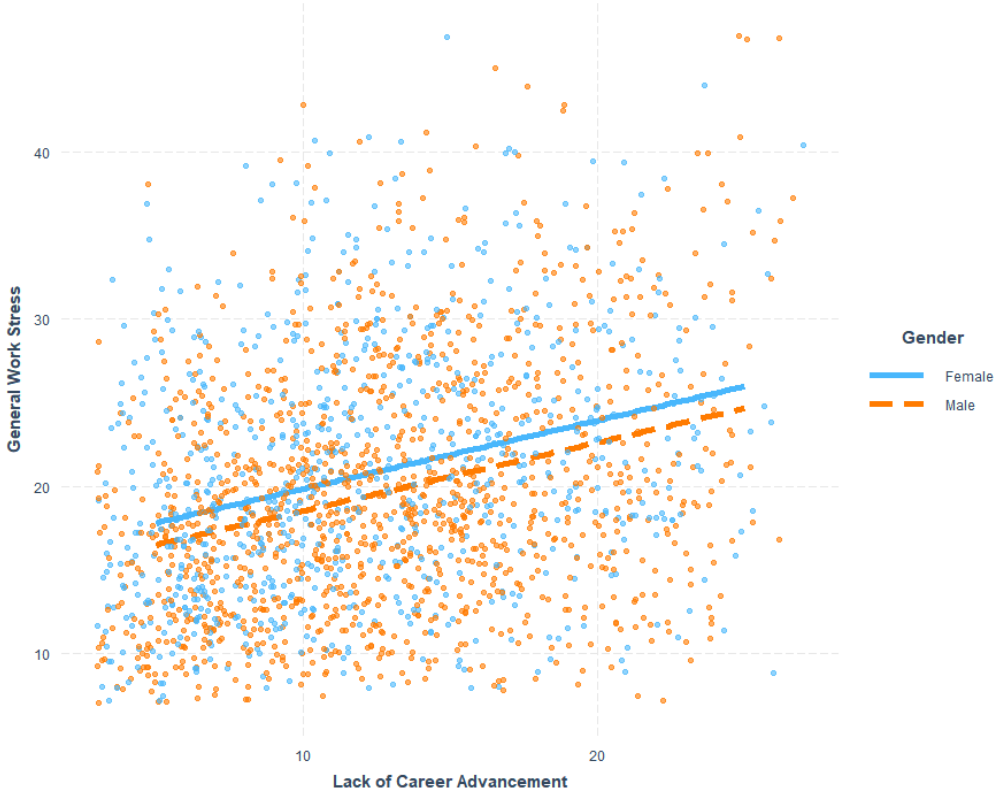
Regression Coefficients of Models 1, 2, and 3 for Lack of Career Advancement

	b	*se*	std. *b*	*t*	*p*
Model 1					
Intercept	15.073				
CA	.400	.029	.295	13.980	< .001
Model 2					
Intercept	15.781				
CA	.408	.029	.300	14.280	< .001
Gender	-1.318	.313	-.182	-4.210	< .001
Model 3					
Intercept	16.017				
CA	.389	.044	.286	8.742	< .001
Gender	-1.730	.784	-.181	-2.207	.027
CA × Gender	.033	.058	.024	.573	.567

Note. std.*b* = standardized regression coefficient. CA = Lack of Career Advancement. All values are rounded to three decimals.

Figure 4.5

Scatterplot and Regression Lines of Lack of Career Advancement and General Work Stress



Job Insecurity

Table 4.17 contains the results of the comparisons of Models 1, 2 and 3 for the analysis of Job Insecurity. The change in R^2 from Model 2 to Model 3 was non-significant ($\Delta R^2 = .001$, $F = 1.729$, $p = .189$), indicating that the null hypothesis of equal slopes could not be rejected. This also, therefore, indicated the absence of a moderating effect. However, the change in R^2 from Model 1 to Model 2 was statistically significant ($\Delta R^2 = .007$, $F = 18.349$, $p < .001$), indicating that the null hypothesis of equal intercepts had to be rejected. Note that Job Insecurity and Gender jointly accounted for about 18.1% of the variance in General Work Stress. On its own, Job Insecurity accounted for about 17.4% of the variance in General Work Stress, with Gender only accounting for an additional .7% of the variance above and beyond Job Insecurity, which although statistically significant, appeared to be a small effect.

Table 4.17

Tests of Equal Slopes and Equal Intercepts of Job Insecurity across Gender

	R^2	ΔR^2	F	p
Model 1	.174			
Model 2	.181	.007	18.349	< .001
Model 3	.182	.001	1.729	.189

Note. Model 1 had Job Insecurity as the predictor. Model 2 had Job Insecurity and Gender as predictors. Model 3 had Job Insecurity, Gender, and their product as predictors. All values are rounded to three decimals.

Table 4.18 contains the regression coefficients of Job Insecurity and Gender across the three models. As the product term in Model 3 was non-significant (mirroring the foregoing ANOVA results) and thus, the null hypothesis of equal slopes could not be rejected, the focus fell on the interpretation of Model 2. The significant coefficient for Gender in Model 2 (b = -1.274, t = -4.283, p < .001) indicated that separate regression equations were required for men and women. The results indicated that while holding Job Insecurity constant, the mean General Work Stress score of the men was 1.274 points lower than that of the women. The separate regression equations obtained for men and women were as follows:

$$\hat{Y}_{Men} = 12.318 + .707(Job\ Insecurity)$$

$$\hat{Y}_{Women} = 14.469 + .621(Job\ Insecurity)$$

Figure 4.6 contains a scatterplot of Job Insecurity and General Work Stress, with separate regression lines for men and women. Herein, the similarities of the slopes and differences in the intercepts are depicted.

Table 4.18

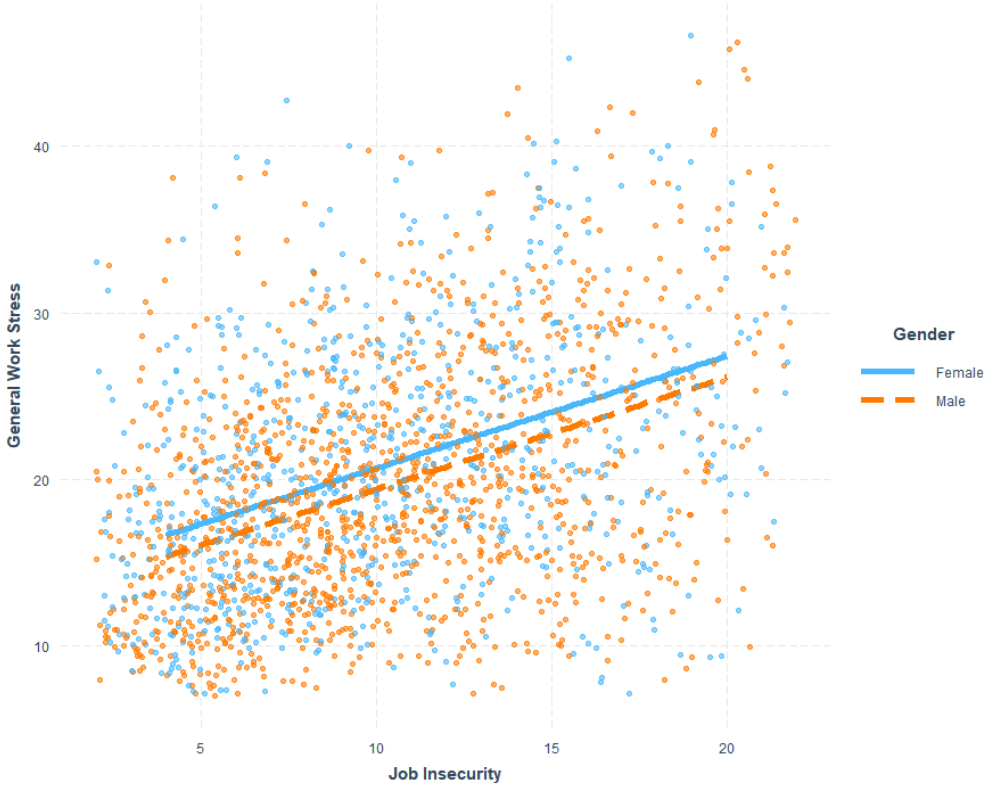
Regression Coefficients of Models 1, 2, and 3 for Job Insecurity

	b	*se*	std. *b*	*t*	*p*
Model 1					
Intercept	13.224				
JS	.668	.032	.417	20.780	< .001
Model 2					
Intercept	13.946				
JS	.673	.032	.420	21.022	< .001
Gender	-1.274	.297	-.175	-4.283	< .001
Model 3					
Intercept	14.469				
JS	.621	.051	.388	12.209	< .001
Gender	-2.151	.731	-.175	-2.944	< .010
JS × Gender	.086	.065	.054	1.315	.189

Note. std.*b* = standardized regression coefficient. JS = Job Insecurity. All values are rounded to three decimals.

Figure 4.6

Scatterplot and Regression Lines of Job Insecurity and General Work Stress



Lack of Autonomy

Table 4.19 contains the results of the comparisons of Models 1, 2 and 3 for the analysis of Lack of Autonomy. The change in R^2 from Model 2 to Model 3 was non-significant ($\Delta R^2 = .000$, $F = .016$, $p = .900$), indicating that the null hypothesis of equal slopes could not be rejected. This also, therefore, indicated the absence of a moderating effect. However, the change in R^2 from Model 1 to Model 2 was statistically significant ($\Delta R^2 = .007$, $F = 17.753$, $p < .001$), indicating that the null hypothesis of equal intercepts had to be rejected. Note that Lack of Autonomy and Gender jointly accounted for about 21.1% of the variance in General Work Stress. On its own, Lack of Autonomy accounted for about 20.4% of the variance in General Work Stress, with Gender accounting for an additional .7% of the variance above and beyond Lack of Autonomy, which although statistically significant, appeared to be a small effect.

Table 4.19

Tests of Equal Slopes and Equal Intercepts of Lack of Autonomy across Gender

	R^2	ΔR^2	F	p
Model 1	.204			
Model 2	.211	.007	17.753	< .001
Model 3	.211	.000	.016	.900

Note. Model 1 had Lack of Autonomy as the predictor. Model 2 had Lack of Autonomy and Gender as predictors. Model 3 had Lack of Autonomy, Gender, and their product as predictors. All values are rounded to three decimals.

Table 4.20 contains the regression coefficients of Lack of Autonomy and Gender across the three models. As the product term in Model 3 was non-significant (mirroring the foregoing ANOVA results) and thus, the null hypothesis of equal slopes could not be rejected, the focus fell on the interpretation of Model 2. The significant coefficient for

Gender in Model 2 (b = -1.230, t = -4.214, p < .001) indicated that separate regression equations were required for men and women. The results indicated that while holding Lack of Autonomy constant, the men's mean General Work Stress score was 1.230 points lower than the women's mean score. The separate regression equations obtained for men and women were as follows:

$$\hat{Y}_{Men} = 11.108 + .512(Lack\ of\ Autonomy)$$

$$\hat{Y}_{Women} = 12.245 + .518(Lack\ of\ Autonomy)$$

Figure 4.7 contains a scatterplot of Lack of Autonomy and General Work Stress with separate regression lines for men and women. Herein, the similarities of the slopes and differences in the intercepts are depicted.

Table 4.20

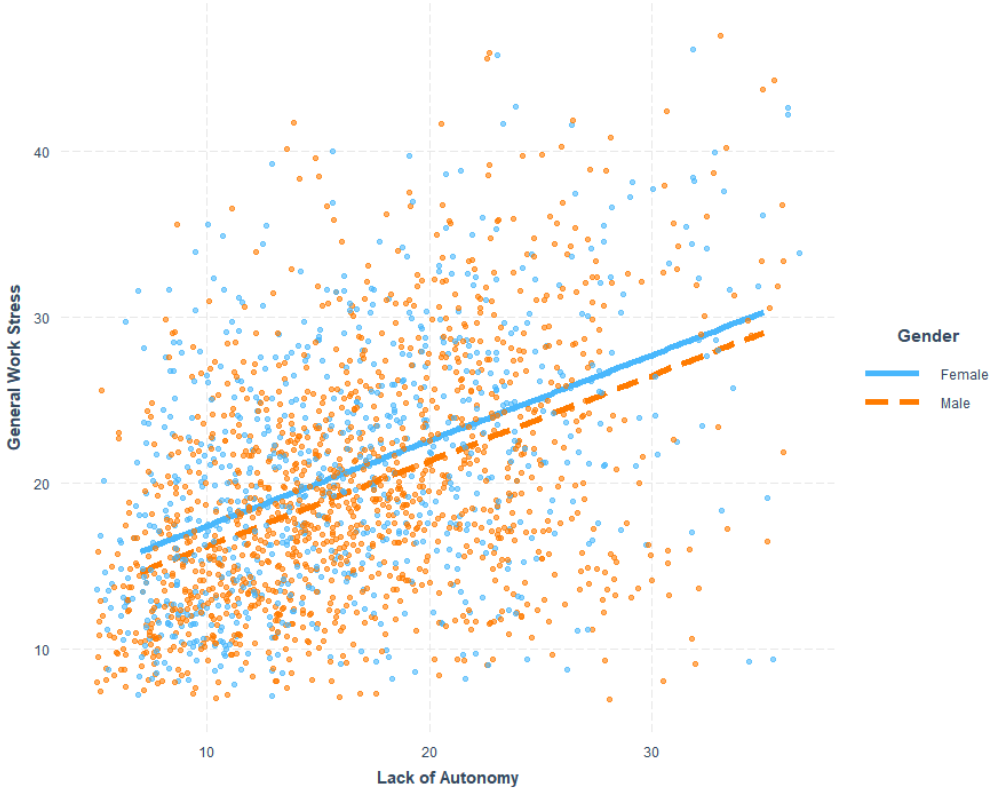
Regression Coefficients of Models 1, 2, and 3 for Lack of Autonomy

	b	*se*	std. *b*	*t*	*p*
Model 1					
Intercept	11.594				
LA	.511	.022	.452	22.980	< .001
Model 2					
Intercept	12.299				
LA	.514	.022	.454	23.185	< .001
Gender	-1.230	.292	-.169	-4.214	< .001
Model 3					
Intercept	12.245				
LA	.518	.035	.457	14.992	< .001
Gender	-1.136	.800	-.169	-1.421	.155
LA × Gender	-.006	.045	.005	-.125	.900

Note. std.*b* = standardized regression coefficient. LA = Lack of Autonomy. All values are rounded to three decimals.

Figure 4.7

Scatterplot and Regression Lines of Lack of Autonomy and General Work Stress



Work-home Interface

Table 4.21 contains the results of the comparisons of Models 1, 2 and 3 for the analysis of Work-Home Interface. The change in R^2 from Model 2 to Model 3 was non-significant (ΔR^2 = .000, F = 1.775, p = .183), indicating that the null hypothesis of equal slopes could not be rejected. This also, therefore, indicated the absence of a moderating effect. In addition, the change in R^2 from Model 1 to Model 2 was also non-significant (ΔR^2 = .002, F = 3.476, p = .062), indicating that the null hypothesis of equal intercepts could also not be rejected. Note that on its own, Work-Home Interface accounted for about 27% of the variance in General Work Stress, with Gender accounting for no significant additional variance.

Table 4.21

Tests of Equal Slopes and Equal Intercepts of Work-Home Interface across Gender

	R^2	ΔR^2	F	p
Model 1	.270			
Model 2	.272	.002	3.476	.062
Model 3	.272	.000	1.775	.183

Note. Model 1 had Work-Home Interface as the predictor. Model 2 had Work-Home Interface and Gender as predictors. Model 3 had Work-Home Interface, Gender, and their product as predictors. All values are rounded to three decimals.

Table 4.22 contains the regression coefficients of Work-Home Interface and Gender across the three models. As the product term in Model 3 as well as the Gender variable in Model 2 were both non-significant (mirroring the foregoing ANOVA results) and thus, the null hypotheses of equal slopes and equal intercepts could not be rejected, the focus fell on the interpretation of Model 1. The non-significant coefficient for Gender in Model 2 (b = -.524, t = -1.864, p = .062) indicated that a joint regression equation could be used for men and women. This further indicated that the men's and women's mean scores on General Work Stress were the same. Figure 4.8 contains a scatterplot of Work-Home Interface and General Work Stress, with separate regression lines for men and women, based on the following equations:

$$\hat{Y}_{Men} = 10.082 + .689(Work - Home\ Interface)$$

$$\hat{Y}_{Women} = 11.537 + .624(Work - Home\ Interface)$$

Herein, the similarities of the slopes and intercepts are depicted, suggesting a common/joint regression equation can be used without overpredicting or underpredicting the effects of Work-Home Interface on General Work Stress for either gender group. The joint equation obtained for men and women was as follows:

$$\hat{Y} = 10.632 + .664\ (Work - Home\ Interface)$$

Table 4.22

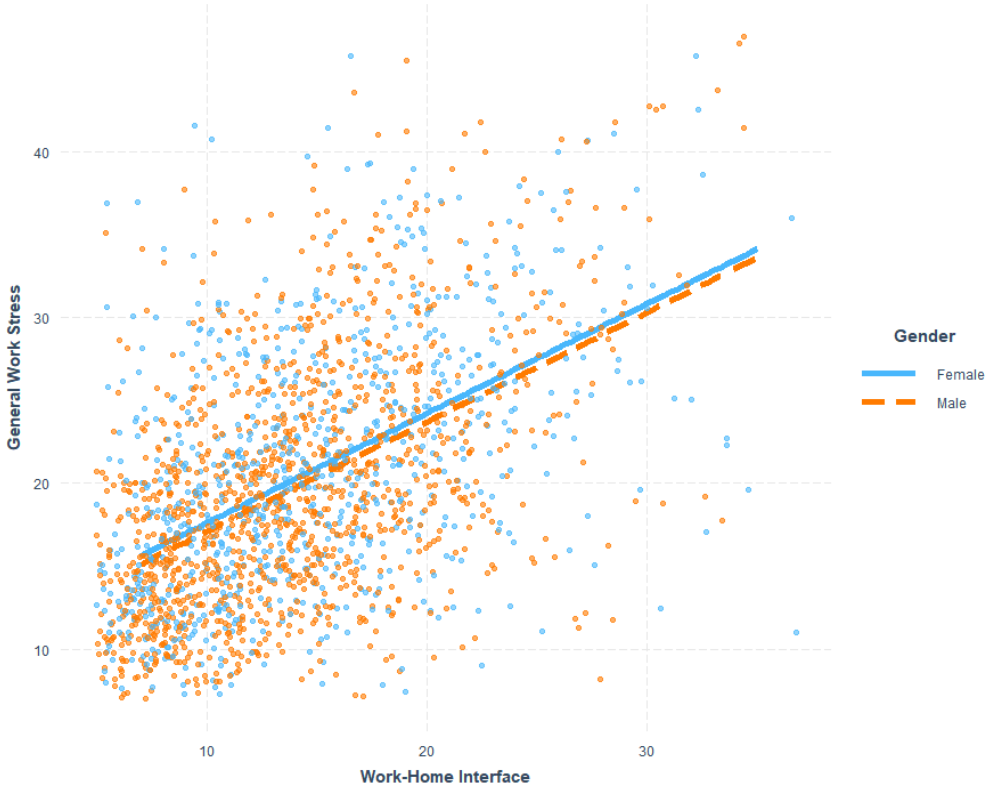
Regression Coefficients of Models 1, 2, and 3 for Work-Home Interface

	b	*se*	std. *b*	*t*	*p*
Model 1					
Intercept	10.632				
WH	.664	.024	.520	27.610	< .001
Model 2					
Intercept	10.993				
WH	.661	.024	.518	27.440	< .001
Gender	-.524	.281	-.072	-1.864	.062
Model 3					
Intercept	11.537				
WH	.624	.037	.489	16.991	< .001
Gender	-1.455	.753	-.073	-1.931	.054
WH × Gender	.065	.049	.051	1.332	.183

Note. std.*b* = standardized regression coefficient. WH = Work-Home Interface. All values are rounded to three decimals.

Figure 4.8

Scatterplot and Regression Lines of Work-Home Interface and General Work Stress



Workload

Table 4.23 contains the results of the comparisons of Models 1, 2 and 3 for the analysis of Workload. The change in R^2 from Model 2 to Model 3 was non-significant ($\Delta R^2 = .000$, $F = .110$, $p = .741$), indicating that the null hypothesis of equal slopes could not be rejected. This also, therefore, indicated the absence of a moderating effect. However, the change in R^2 from Model 1 to Model 2 was statistically significant ($\Delta R^2 = .007$, $F = 21.805$, $p < .001$), indicating that the null hypothesis of equal intercepts had to be rejected. Note that Workload and Gender jointly accounted for about 31.1% of the variance in General Work Stress. On its own, Workload accounted for about 30.4% of the variance in General Work Stress, with Gender accounting for an additional .7% of the variance above and beyond Workload, which although statistically significant, appeared to be a small effect.

Table 4.23

Tests of Equal Slopes and Equal Intercepts of Workload across Gender

	R^2	ΔR^2	F	p
Model 1	.304			
Model 2	.311	.007	21.805	< .001
Model 3	.311	.000	.110	.741

Note. Model 1 had Workload as the predictor. Model 2 had Workload and Gender as predictors. Model 3 had Workload, Gender, and their product as predictors. All values are rounded to three decimals.

Table 4.24 contains the regression coefficients of Workload and Gender across the three models. As the product term in Model 3 was non-significant (mirroring the foregoing ANOVA results) and thus, the null hypothesis of equal slopes could not be rejected, the focus fell on the interpretation of Model 2. The significant coefficient for Gender in Model 2 ($b = -1.273$, $t = -4.671$, $p < .001$) indicated that separate regression equations were required for men and women. The results indicated that while holding Workload constant, the mean General Work Stress score of the men was 1.273 points lower than that of the women.

The separate regression equations obtained for men and women were as follows:

$$\hat{Y}_{Men} = 9.776 + .580(Workload)$$

$$\hat{Y}_{Women} = 10.828 + .593(Workload)$$

Figure 4.9 contains a scatterplot of Workload and General Work Stress, with separate regression lines for men and women. Herein, the similarities of the slopes and differences in the intercepts are depicted.

Table 4.24

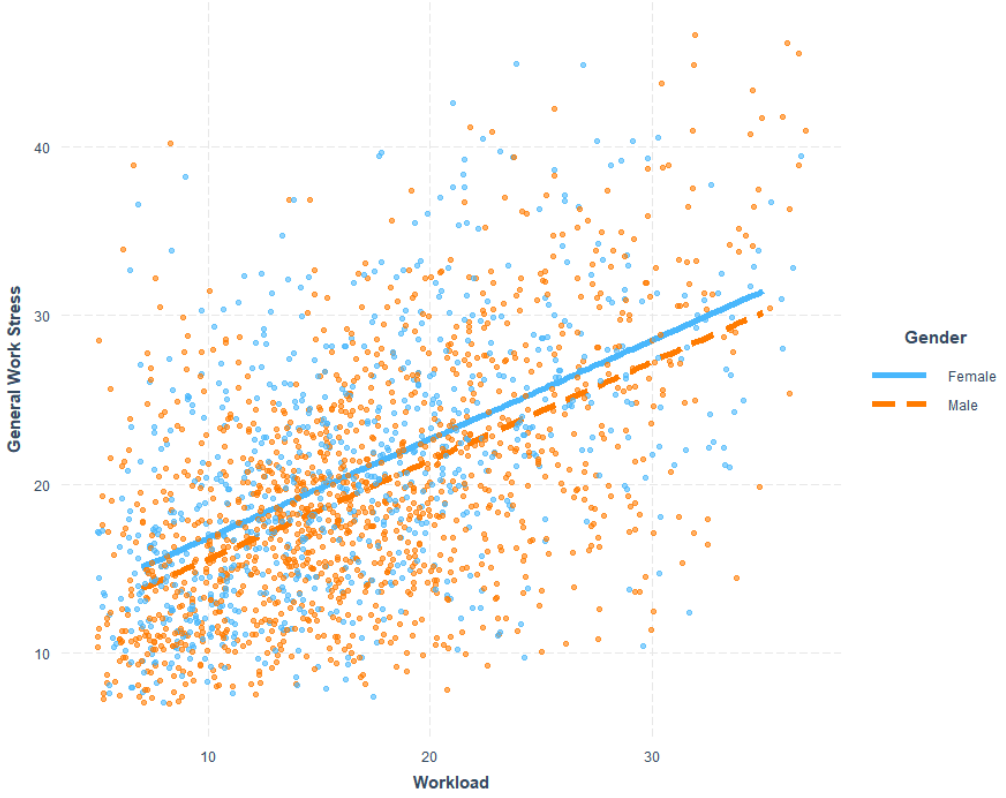
Regression Coefficients of Models 1, 2, and 3 for Workload

	b	*se*	std. *b*	*t*	*p*
Model 1					
Intercept	10.229				
WL	.583	.019	.552	29.980	< .001
Model 2					
Intercept	10.961				
WL	.585	.019	.554	30.252	< .001
Gender	-1.273	.273	-.175	-4.671	< .001
Model 3					
Intercept	10.828				
WL	.593	.031	.562	19.219	< .001
Gender	-1.053	.720	-.176	-1.462	.144
WL × Gender	-.013	.040	-.012	-.331	.741

Note. std.*b* = standardized regression coefficient. WL = Workload. All values are rounded to three decimals.

Figure 4.9

Scatterplot and Regression Lines of Workload and General Work Stress



Relative Importance Assessment

The relative importance of the eight Sources of Work Stress in the prediction of General Work Stress across the Gender-based subgroups was assessed using the *relaimpo* package in *R* (*R* Core Team, 2021). Following the recommendations of Johnson and Lebreton (2004) and Grömping (2006), in addition to simpler relative importance metrics (including the "first", "last", "betasq" and "pratt" statistics), the "lmg" statistic was used as the primary indicator of the relative importance of the predictor variables, providing sequential R^2 contributions, which naturally summed to the total R^2 of the overall model. See the Data Analysis section of Chapter 3 where these metrics are described. Table 4.25 contains the "lmg" values of the predictors for men and women. For ease of interpretation, these values are also plotted in Figures 4.10 and 4.11.

Table 4.25

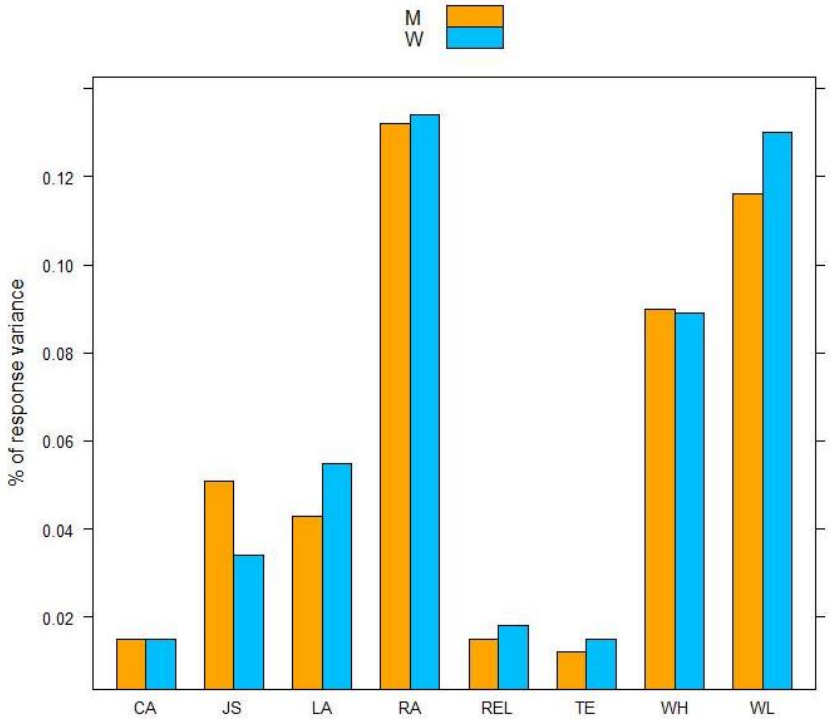
Relative Importance of the Sources of Work Stress for Men and Women

Predictors	R^2 (lmg method)	
	Men	Women
Role Ambiguity (RA)	.132	.134
Relationships (REL)	.015	.018
Tools and Equipment (TE)	.012	.015
Lack of Career Advancement (CA)	.015	.015
Job Insecurity (JS)	.051	.034
Lack of Autonomy (LA)	.043	.055
Work-Home Interface (WH)	.090	.089
Workload (WL)	.116	.130
Total	.475	.488

Note. All values are rounded to three decimals. Predictors were entered into the model in the order listed.

Figure 4.10

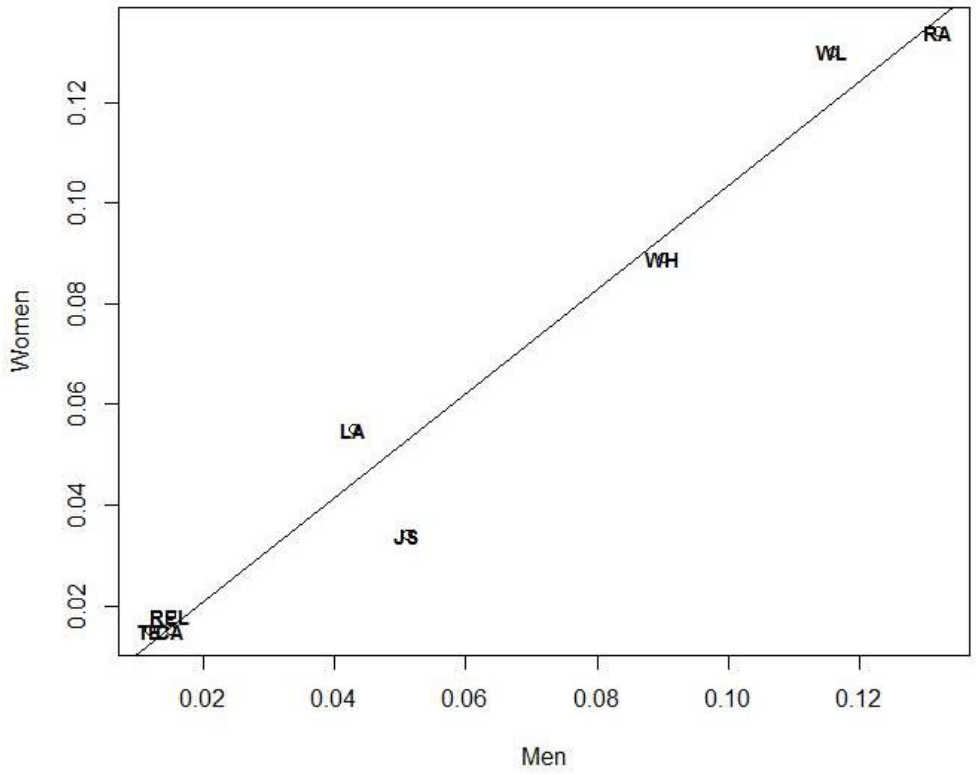
Relative Importance of the Sources of Work Stress in Predicting General Work Stress



Note. The "lmg" statistic is plotted for men (M) and women (W). RA = Role Ambiguity; REL = Relationships; TE = Tools and Equipment; CA = Lack of Career Advancement; JS = Job Insecurity; LA = Lack of Autonomy; WH = Work-Home Interface; WL = Workload.

Figure 4.11

Scatterplot of the "lmg" Relative Importance Statistic for the Sources of Work Stress across Men and Women.



Note. RA = Role Ambiguity; REL = Relationships; TE = Tools and Equipment; CA = Lack of Career Advancement; JS = Job Insecurity; LA = Lack of Autonomy; WH = Work-Home Interface; WL = Workload.

Overall, the eight Sources of Work Stress explained a slightly greater proportion of the variance in General Work Stress for women (R^2 = 48.8%) than for men (R^2 = 47.5%). The least squares line of best fit indicates strong similarity of the relative importance of the Sources of Work Stress across the two groups. It is noticeable, however, that the "lmg" statistics of Job Insecurity, Workload and Lack of Autonomy differed somewhat for men and women, with Job Insecurity contributing to 1.7% more variance for men; and Workload and Lack of Autonomy contributing to 1.4% and 1.2% more variance for women, respectively. The Spearman rank order correlation of the "lmg" statistic across the two groups was .96.

Chapter 5: Discussion

This chapter discusses and interprets the results of the statistical analyses presented in the preceding chapter. The sections to follow begin by reviewing the objectives of the study. Thereafter, the results of the study are summarised and then interpreted and discussed, with reference to theory and previous empirical research. The theoretical and practical implications of the results are then discussed, and finally, in closing the chapter, the limitations of the study are highlighted, where recommendations for further research are also proposed.

Review of Objectives

This study set out to determine whether gender played a moderating role in the link between subjectively experienced work stress and different sources of work stress. The main aim of the study was to explore potential moderating effects of gender in the relationships between general work stress and eight key sources of work stress, as operationalised by the Sources of Work Stress Inventory (de Bruin & Taylor, 2006a).

This was studied on different levels, with the critical research questions of the study being (a) whether the subjective experience of work stress and different sources of work stress carried the same meaning and manifested similarly amongst the two gender-based subgroups, namely men and women; (b) whether the two gender groups differed in terms of their general stress levels and levels of each of the eight identified stressors; and most importantly, (c) whether the relations between general work stress and each of the eight sources of work stress differed for the two gender groups, with a focus on whether the different sources of work stress predicted strain equally well for men and women, or whether gender moderated these relations. A separate research question was also posed in terms of whether the relations between the different sources of work stress differed across the two

gender groups, with a focus on whether there were differences in the relative importance of the different sources of work stress in predicting general work stress across the gender groups.

Operationally, these questions translated to investigations of (a) the measurement invariance and equivalence of the SWSI scales across gender groups, (b) the mean scale scores and total scale score distributions of men and women, (c) equality of slopes and intercepts, and thus, common versus joint regression equations of general work stress on each of the sources of work stress for men and women, and (d) the proportionate contribution of each source of work stress to the predication of general work stress, for men and women independently.

Summary of Results

To broadly summarise the results observed in the preceding chapter, ultimately, more similarities than differences were observed between men and women. Firstly, the finding of partial measurement invariance and equivalence of the SWSI scales by Davis (2015), provided evidence that general work stress and the eight identified sources of work stress, essentially carried the same meaning and manifested similarly amongst the two gender groups. Secondly, the results of the present study showed relatively similar mean scale scores and total scale score distributions for both gender groups, providing evidence that men and women experienced similar, relatively low to moderate levels of general work stress and each of the eight stressors. While neither men nor women were found to experience high work-related stress levels or high levels of exposure to any of the eight stressors, generally speaking, women were found to experience slightly higher levels of overall stress in comparison to men.

Arguably the most noteworthy finding of this study was the equality of slopes of the men's and women' regression lines of general work stress on each of the eight sources of work stress, providing evidence that gender did not moderate the relations between any of the sources of work stress and general work stress. Nevertheless, equal intercepts were only found for the men's and women' regression lines of general work stress on work-home interface, while different intercepts were found for the other seven sources of work stress, namely role ambiguity, relationships, tools and equipment, lack of career advancement, job insecurity, lack of autonomy and workload. These findings provided evidence in support of the use of a common regression equation for men and women for work-home interface, and separate regression equations for the other seven stressors, although a common regression equation would only slightly overpredict for men and slightly underpredict for women, with men's mean levels of general work stress found to be slightly, but consistently, lower than those of women.

Finally, only slight differences were found in the relative importance of the eight stressors in the predication of general work stress across men and women, with the most notable differences observed within job insecurity, which contributed to more variance in work stress for men than for women; as well as within workload and lack of autonomy, which both contributed to slightly greater variance in work stress for women than for men. Overall, all eight sources of work stress collectively explained slightly more variance in general work stress for women than for men.

Discussion of Results

Beginning the discussion with the first research question, as to whether the subjective experience of work stress and different sources of work stress carried the same meaning and manifested similarly amongst men and women, this question was, in fact, answered in

reviewing research evidence of the psychometric adequacy of the SWSI. In this regard, as part of ensuring that the SWSI scales were equally valid and comparable for men and women, an empirical study conducted by Davis (2015; see the Measurement Invariance and Equivalence section of Chapter 3) at Stellenbosch University, examining the measurement invariance and equivalence of the SWSI across gender groups in South Africa, was reviewed. Due to the comprehensiveness of the invariance and equivalence testing found to have been performed (on a similar dataset) in the study, this testing was not repeated in the present study.

Ultimately, the results of the increasingly restrictive measurement invariance and equivalence tests performed by Davis (2015), did not provide support for the full equivalence of the SWSI, as the factor loadings of three items, the intercepts of 31 items, the error variances of four items, the variances of all nine scales and the covariances of 15 pairs of scales, were found to vary across groups. However, taking into account the non-invariance of these specific parameters, support was obtained for the partial measurement invariance and equivalence of the nine SWSI scales across men and women in South Africa.

Furthermore, although in the analyses conducted by Davis (2015), as well as in those conducted by de Bruin and Taylor (2006b), there was evidence of several of the SWSI items functioning slightly differently across men and women, the overall item bias and measurement implications thereof, were considered trivial, given the high reliability of the SWSI scales and clear factor structures (de Bruin & Taylor, 2006a) as well as taking into account the high power of Davis' (2015) study to detect bias, even if trivial. Moreover, on a scale level (of greater relevance in the present study), while the functioning of the nine SWSI scales was also not identical for men and women, the scales were found to function very similarly across the two gender groups, suggesting that bias due to measurement artefacts on the scale level was also negligible and not practically significant.

Overall, these results not only supported the psychometric integrity of the SWSI, showing that the measures were perceived in the same way by men and women and thus, that valid cross-group comparisons could be made, but also provided support for the fact that essentially, general work stress and the eight identified sources of work stress of this study, carried the same meanings for men and women and manifested similarly amongst the two groups. These findings support those of de Bruin and Taylor (2006b) in relation to the General Work Stress, Lack of Autonomy and Workload scales.

With regard to the present study, prior to the main moderation analysis, several preliminary analyses were conducted, the results of which, showed that the data was appropriate for the intended statistical methods of analysis and that the psychometric properties of the general work stress and sources of work stress measures were satisfactory. Firstly, the descriptive statistics indicated that from a descriptive perspective, the items of each of the nine SWSI scales were satisfactory and appeared similar for men and women. Furthermore, the results of the confirmatory factor analysis showed satisfactory fit for the nine-factor solution, with all items displaying relatively strong factor loadings on their corresponding factors. These results verified the factor structures of the SWSI scales and thus, provided additional support for the construct validity of the general work stress and sources of work stress measures.

Inspection of the factor correlations and observed scale score correlations revealed that all eight of the sources of work stress correlated with general work stress as well as with each other. The fairly moderate correlations observed, indicated firstly, that all nine of the scales shared some common psychological meaning and were likely influenced by an underlying stress-related factor, as well as that all nine SWSI scales also measured relatively unique information, as none of the correlations were strong enough to suggest that any of the scales measured exactly the same information. These findings thus, confirmed that all nine

constructs were distinctive, yet related. These correlations were also very similar for men and women, with relatively negligible differences found between the two gender groups. These results mirror those of previous empirical research (de Bruin & Taylor, 2005; 2006a; 2006b).

For both gender groups, role ambiguity had the strongest correlation with general work stress, followed by workload and work-home interface; while tools and equipment had the weakest correlation with general work stress, followed by lack of career advancement and relationships. These correlations were important to keep in mind for the subsequent moderation analyses. For both gender groups, the five strongest correlations amongst the sources of work stress included those between lack of autonomy and relationships, lack of autonomy and lack of career advancement, lack of autonomy and job insecurity, lack of autonomy and role ambiguity, and job insecurity and lack of career advancement; with lack of autonomy displaying, on average, the strongest correlations with the other sources of work stress. These high correlations may speak to the dynamics of different stressors in the workplace.

Theoretically speaking, the moderately strong correlations found amongst these sources of work stress made psychological sense. Firstly, the correlation between lack of autonomy and relationships suggests that poor, untrusting work relationships, especially between subordinates and their supervisors, are often characterised by a considerable amount of micro-management as well as limited autonomy and creative freedom for subordinates; or conversely, that a lack of job control and decision-making authority (often controlled and determined by supervisors) negatively affects supervisor-subordinate relationships. Secondly, the correlation between lack of autonomy and job insecurity suggests that a lack of decision-making authority and limited job control are likely to be met with feelings of insecurity regarding the value of one's job; or conversely, that stress over the security of one's job could also make one anxious and hesitant to exert autonomy and control.

Furthermore, the correlation between lack of autonomy and lack of career advancement suggests that employees lacking the power and authority to be creative and make decisions, are also likely to perceive a lack of opportunity to advance to higher organisational levels; or conversely, that employees who are not advancing to higher organisational levels, are likely to experience low levels of responsibility and control. The correlation between lack of autonomy and role ambiguity suggests that a lack of job control and freedom to make decisions and be creative, is often met with uncertainty and stress over how to complete job tasks; or conversely, that uncertainty regarding one's job role and performance expectations, is likely to be met with feelings of a lack of control over one's work. Finally, the correlation between job insecurity and lack of career advancement suggests that an employee experiencing stress over the security of his/her current job and future employment, is also likely to perceive a lack of opportunity to advance to higher organisational levels; or conversely, that an employee not advancing to higher organisational levels, is likely to feel less secure in his/her job.

On the other hand, for both gender groups, the weakest correlations amongst the sources of work stress included those between workload and relationships, workload and lack of career advancement, work-home interface and tools and equipment, work-home interface and relationships, tools and equipment and workload, and workload and job insecurity; with workload displaying, on average, the weakest correlations with the other sources of work stress. The weak correlations found amongst certain of the stressors, made psychological sense, as theoretically, one would not expect, for example, work-home interface to correlate very strongly with tools and equipment, or for workload to correlate strongly with tools and equipment, lack of career advancement or job insecurity[13], as these constructs do not appear

[13] Conceptually, a stronger correlation would only perhaps, have been expected between work underload and job insecurity.

to share strong theoretical associations with each other. However, on the basis of previous research, certain of these weak correlations, including those between workload and relationships, and work-home interface and relationships, were expected to be slightly stronger. These weak correlations, therefore, counter the opinions of other researchers such as Barling et al. (2005), who suggest, firstly, that workload and relationships correlate in the sense that poor workplace relationships, particularly between supervisors and subordinates, are often associated with work overload for subordinates (as supervisors usually control deadlines and task assignment); and conversely, that work overload negatively affects supervisor-subordinate relationships, through subordinates experiencing feelings of resentment towards their supervisors. Barling et al. (2005) also propose that relationships correlate with work-home interface, in the sense that poor collegial relationships can increase work-to-family conflict; while conversely, family-to-work conflict can negatively affect relationships at work.

As a final check of the psychometric adequacy of the general work stress and sources of work stress measures, the results of the reliability analysis showed that the reliabilities of all nine SWSI scales were satisfactory and similar for men and women. All reliability coefficients were uniformly high and exceeded the acceptable cut-off value of .80, indicating that the majority of the variance in the observed scores could be attributed to stable, systematically working influences, and only a small percentage to random error influences. On the basis of the results of these preliminary analyses as well as those of previous empirical studies (Davis, 2015; de Bruin & Taylor, 2005; 2006a; 2006b), it appeared safe to assume the unidimensionality and internal consistency of each scale, allowing for the computation of total scale scores for further analyses.

Given the satisfactory findings of the preceding, the second research question could be addressed, as to whether or not men and women differed in terms of their subjective

experiences of general work stress and each of the eight stressors. In this regard, inspection of the men's and women's mean scale scores and total scale score distributions, revealed greater similarities than differences between the two gender groups, although slightly greater differences were found in the general work-related stress levels of men and women than in their levels of exposure to and experience of the eight stressors.

Beginning with the eight sources of work stress, the shape of the distributions of the men's and women's total scale scores were relatively similar, with the distributions of both groups generally skewed more to the right, peaking at the lower end to the middle of the range of total scores and declining relatively steeply thereafter. In addition, the mean scale scores of the two groups were also similar, and relatively low in comparison to the maximum total scores of the scales. These results indicated that neither men nor women experienced any of the eight stressors as major contributors to stress. However, generally speaking, women were found to experience most of these stressors to a slightly lesser extent than men, with the exception of work-home interface, which women were found to experience as a slightly greater contributor to work stress than men. On the basis of their mean scores, the levels of both gender groups on each of the eight stressors, from highest to lowest, were as follows: job insecurity, lack of career advancement, workload, lack of autonomy, tools and equipment, role ambiguity, work-home interface, and relationships.

The similarities found between men and women in terms of their experiences of work stressors, contradict a large body of research, such as that of Rivera-Torres et al. (2013), as well as public conversation, suggesting that women are predisposed to and experience disproportionately higher levels of stressors in comparison to men. Even in the case of certain stressors where research has pointed to higher levels for men, from a theoretical perspective, greater differences than those found in this study, were thought to exist between the gender groups. These findings do, however, support the view of researchers such as Nelson and

Burke (2002), who suggest that both men and women are generally exposed to and experience the most common types of work stressors, including job insecurity and workload.

Although the differences observed between the two groups were relatively trivial, the slightly higher mean scores found for men on most of the stressors, counter most isolated studies of stressors such as relationships (e.g., Chrisler & McCreary, 2010; Morrison, 2007), lack of career advancement (e.g., Napasri & Yukongdi, 2015; Risman et al., 2018) and workload (e.g., Bittles & Parsons, 2016; Nelson & Burke, 2002), which suggest that women report higher levels of exposure to these stressors than men. However, these results do somewhat support most research on tools and equipment (e.g., Stafyla et al., 2013), job insecurity (e.g., Burchell et al., 2005; Gaunt & Benjamin, 2007; Klandermans & Van Vuuren, 1999) and lack of autonomy (e.g., Bielecky et al., 2017; Griffin et al., 2002; Vermeulen & Mustard, 2004), where it is suggested that men experience higher levels of these stressors. Moreover, while research on work-home interface remains relatively conflicting, the slightly higher mean score of women on this stressor, does somewhat support the view that women experience (slightly) higher levels of this stressor in comparison to men (see Fuss et al., 2008; Montgomery et al., 2006; Rehman & Roomi, 2012). Overall, it is interesting to note that the highest levels of both men and women were found on the job insecurity and lack of career advancement scales, perhaps speaking to the volatility and uncertainty characterising the modern-day work environment.

In terms of general work stress, the men's and women's mean scale scores and total scale score distributions were also relatively similar. The distributions of both groups were skewed more to the right, peaking just below the middle of the range of total scores and declining relatively steeply thereafter. In addition, the mean scale scores of the two groups were also relatively similar, and slightly below the middle of the range of total scores, indicating that neither men nor women reported experiencing high stress levels. Generally

speaking, however, slightly higher stress levels were found amongst the women. This finding is consistent with a large body of research (Bergdahl & Bergdahl, 2002; Jick & Mitz, 1985; Kneavel, 2020; Redondo-Flórez et al., 2020; Torkelson & Muhonen, 2008) as well as public opinion and conversation (APA, 2012; Wong, 2018), suggesting that women experience higher levels of stress in comparison to men. However, the moderate stress levels found for men and women in general, were somewhat surprising, given the opinion of most researchers as well as the general public, that work-related stress levels of the twenty-first century workforce are considerably high and continue to be on the rise (Bhui et al., 2016; Che et al., 2017; Yasin & Naqvi, 2016).

To address the third and most crucial research question of this study, as to whether gender moderated the relations between different work-related stressors and strain, the results of the separate MMR analyses conducted on each of the eight sources of work stress, provided no support for the presence of a moderating effect in the relations between any of the eight sources of work stress and general work stress. The product/interaction terms of gender and each of the eight sources of work stress (found in Model 3 for each source of work stress) were all non-significant. In addition, the changes in R^2 from Model 2 to Model 3 for each source of work stress, were also non-significant. These results showed that gender did not interact with any of the eight sources of work stress in predicting general work stress and therefore, that each source of work stress predicted general work stress equally well for men and women. On the basis of these results, support was therefore, not obtained for the inclusion of gender as a moderator variable in the hypothesised structural model of this study, or in the conceptual model upon which this structural model and ultimately, this research, was based.

It can be concluded with a high degree of confidence that failure to detect a moderating effect in any of the stressor-strain relationships was due to the true absence of

gender differences in these relations in the population, and was not due to the influence of any statistical artefacts. One can be certain that the absence of a moderating effect found in this study was not a result of low statistical power, as the results of the power analysis showed that the statistical power yielded by the given sample size was optimal. Although the issue of unequal sample sizes across the gender-based subgroups was taken into consideration as a potential contributor to low statistical power, the optimal level of power achieved, did not warrant the revision of any aspects of measurement or design, such as the equalising of moderator-based subgroup sample sizes, which would have ultimately, decreased the total sample size and led to potential power problems in itself. Moreover, failure to detect a moderating effect also cannot be attributed to low reliabilities of the measures used in the study, as the results of the reliability analyses of this study as well as previous empirical studies (de Bruin & Taylor, 2005; 2006a), showed that the reliabilities of the SWSI scales were uniformly high. The results obtained here were also not a result of the SWSI scales being perceived differently by men and women, as the results of the invariance and equivalence testing by Davis (2015) showed that bias due to measurement artefacts on the scale level was negligible, and that the SWSI was partially invariant and equivalent across gender groups in South Africa.

From a statistical perspective, the foregoing results showed that the slopes of the men's and women's regression lines of general work stress on each of the eight sources of work stress, were equal, suggesting that the strength of the relationships between each source of work stress and general work stress, were the same for men and women. However, the results of further analyses showed that statistically significant differences were found in the intercepts of the men's and women's regression lines of general work stress on seven of the eight sources of work stress, including role ambiguity, relationships, tools and equipment, lack of career advancement, job insecurity, lack of autonomy and workload. For these seven

sources of work stress, the effect of gender (found in Model 2 for each source of work stress) was statistically significant. In addition, the changes in R^2 from Model 1 to Model 2 for all seven of these sources of work stress, were also statistically significant. These results showed that while gender did not interact with any of the stressors in predicting general work stress, gender on its own, did contribute to the prediction of general work stress. Note, however, that although statistically significant, the main effects of gender accounted for very modest increments (< 1%) in the variance explained in general work stress above and beyond the main effects of each of the seven sources of work stress.

From a statistical perspective, these results provided evidence that the intercepts of the men's and women's regression lines of general work stress on each of the seven sources of work stress, differed, such that while holding each of the seven sources of work stress constant, the men's mean levels of general work stress were found to be consistently lower (although, only marginally) than those of the women. As such, these results showed that a common/joint regression equation would consistently overpredict the effects of these stressors on general work stress for men and underpredict these effects for women, indicating that separate regression equations were needed for men and women. Note, however, that although separate regression equations would provide more accurate predictions of stress levels, a common regression equation for men and women, would only overestimate for men and underestimate for women by approximately one point, which is small. On the whole, these findings showed that while role ambiguity, relationships, tools and equipment, lack of career advancement, job insecurity, lack of autonomy, and workload predicted general work stress equally well for both gender groups, men and women with the same levels of these seven sources of work stress, experienced different levels of general work stress, with slightly higher levels experienced by women.

These findings are consistent with a large body of research, suggesting that gender in itself, predicts work stress (Baruch et al., 1987; Chrisler & McCreary, 2010), in the sense that women experience higher levels of work stress, and men, lower levels (Bergdahl & Bergdahl, 2002; Jick & Mitz, 1985; Kneavel, 2020; Redondo-Flórez et al., 2020; Torkelson & Muhonen, 2008). Furthermore, the finding of consistently higher mean stress levels for women when holding the stressors constant, alludes to the fact that there are factors outside of those considered in the present study, contributing to slightly higher stress levels for women. Although the aim of this study was not to determine why gender differences such as this might exist, possible contributing factors include firstly, differences in how men and women cope with and respond to stress. For example, Cahill (2005) suggested that certain differences in hormonal systems and brain chemistry and structure of men and women, cause women to react more emotionally to stressful situations, leading to them experiencing more emotional exhaustion in response to stress than men. The differences in stress levels between the two groups might also reflect differences in the coping styles and mechanisms adopted by men and women, suggesting that men, who are typically thought to make use of more problem-focused coping strategies, might adopt healthier, more effective coping mechanisms than women, who are typically thought to use more emotion-focused coping strategies (Brooker & Eakin, 2001; Matud, 2004).

In contrast to the idea that differences in the inherent nature and characteristics of men and women, make women more susceptible to higher levels of stress; external factors possibly contributing to higher work-related stress levels for women include, firstly, the unfavourable workplace climate and gender exclusion that women are commonly faced with, especially in male-dominated industries and occupations (Taylor, 2016). In this regard, there are also a number of unique, gender-specific stressors facing women, such as gender-based violence, sexual harassment, tokenism and sexist discrimination (Matud, 2004), which

although overlooked in the present study, could be significant contributors to greater stress for female workers. A major form of gender discrimination potentially contributing to higher stress levels in women is the gender pay gap that exists in many countries around the world, including South Africa (PwC, 2018). The gender-based disparity in remuneration, in which the average income of female workers is often considerably less than that of male workers, has been recognised as a major stressor for women, even in executive-level jobs, where pay is high (Burke, 1999).

Unlike the results of the MMR analyses conducted on the other seven aforementioned sources of work stress, for work-home interface, the effect of gender (in Model 2) was found to be non-significant, and the change in R^2 from Model 1 to Model 2 was also not statistically significant. These results showed that in addition to the finding of equal slopes of the men's and women's regression lines of general work stress on work-home interface, the intercepts of their regression lines were also equal. From a statistical perspective, these results provided evidence in support of the use of a common regression equation for men and women for work-home interface. On the whole, these findings showed that work-home interface predicted general work stress equally well for both gender groups, and that men and women with the same levels of this stressor, experienced the same levels of general work stress.

The results obtained for this source of work stress were interesting, in that they run contrary to public conversation and opinion as well as to most literature on the stressor (e.g., Fuss, et al., 2008; Montgomery, et al., 2006; Rehman & Roomi, 2012; Rivera-Torres et al., 2013), suggesting that perhaps one of the single greatest reasons for gender differences in stress levels and more specifically, higher levels of stress amongst women, lies within the experience of work-home conflict. In this regard, the general opinion in the media as well as in literature, is that in most societies, women still shoulder the majority of the burden when it comes to household work and family care, and as a result, have to balance work and non-

work roles and responsibilities to a greater extent than men, leading to higher levels of stress for women.

However, the absence of gender differences found in the relationship between work-home interface and work stress, is in line with further developments in research (e.g., Barnett & Hyde, 2001; Karkoulian et al., 2016; Sayer, 2005), which suggest that the gender gap may slowly be closing due to changes in gender roles and societal norms. While, perhaps gender differences may have existed in the experience of work-home interface as a source of stress in the past, the results of this study provide support for the idea that with more women joining the paid workforce, women might be moving further away from their traditional caregiver role and becoming more career-focused, while men might be moving further away from their traditional role of breadwinner and becoming more family-oriented, resulting in a convergence of men's and women's roles and responsibilities, and a shift towards greater similarities in their life circumstances, specifically in relation to work. The absence of gender differences in the relationship between this stressor and strain could also perhaps, be attributed to the introduction of more flexible work arrangements and family management facilities in workplaces of today.

As a final point of discussion of the results of the MMR analyses, inspection of the scale score correlations of men and women, along with the standardised regression coefficients for the eight sources of work stress (bearing in mind the equality of slopes), indicated that for both gender groups, the source of work stress that had the strongest relationship with general work stress, was role ambiguity, while that with the weakest relationship with general work stress, was tools and equipment. The sources of work stress in order of strongest to weakest relationships with general work stress were as follows: role ambiguity, workload, work-home interface, lack of autonomy, job insecurity, relationships, lack of career advancement, and tools and equipment. Furthermore, in terms of the variance

in general work stress explained by each of the sources of work stress independently, role ambiguity also accounted for the most variance in general work stress, and tools and equipment, the least; with the same order of stressors applying in terms of the proportion of variance accounted for in general work stress, from most to least. Based on existing literature, these results were not surprising, where for example, role ambiguity was cited as being one of the most prevalent and widely studied work stressors (Barling et al., 2005), while the limited research and literature available on tools and equipment suggested that it was not a very prevalent or common source of work stress.

Ending off this discussion with the final research question, as to the relative importance of the different sources of work stress in predicting general work stress across the two gender groups, the results of the relative importance assessment showed similar proportionate contributions of the eight sources of work stress to the predication of general work stress, for men and women. For both gender groups, role ambiguity and workload accounted for reasonably high proportions of the variance in general work stress, indicating that in relation to the other stressors, these two stressors were the most important in explaining stress for men and women. These results provide support for those of de Bruin and Taylor (2006a), where workload and role ambiguity were found to be the strongest and most meaningful predictors of general work stress for both men and women. On the other hand, tools and equipment, lack of career advancement and relationships accounted for very little variance in general work stress for either group, suggesting that in relation to the other stressors, these stressors were the least important in explaining stress for men and women.

In combination, all eight stressors accounted for almost 50 percent of the variance in general work stress for both gender groups, with a slightly greater proportion of variance (approximately one percent) accounted for, for women. The most notable differences between the gender groups, although small, were found in the relative importance of job

insecurity, which accounted for slightly (approximately two percent) more variance in work stress for men than for women; as well as in the relative importance of workload and lack of autonomy, which both accounted for slightly (approximately one percent) more variance for women than for men.

Overall, these findings do not provide much support for the proposed differences in the relations between the different stressors across gender groups. However, based on the finding of similar scale score correlations for men and women in this study, in conjunction with the lack of previous empirical research conducted on differences in the relative importance of different stressors in predicting strain, there was evidence to suggest that more similarities than differences would be found in this assessment.

In terms of the slight differences found in the relative importance of job security, workload and lack of autonomy, these results firstly, support research (e.g., Burchell et al., 2005; Gaunt & Benjamin, 2007; Klandermans & Van Vuuren, 1999) suggesting that relative to other stressors, job insecurity is more important in predicting strain for men, where most researchers attribute this to men placing greater value on their work roles, and within a South African context, being the least advantaged and protected by legislation. The results are also consistent with most of the research on workload, which suggests that in relation to other stressors, workload is an important contributor to stress for women, and more important in predicting strain for women than for men, perhaps, due to their greater unpaid workload (Bittles & Parsons, 2016; Lundberg & Frankenhaeuser, 1999). However, the fact that workload accounted for such a substantial proportion of variance in general work stress for men, was interesting, as very little research suggests this to be a significant contributor to stress for men. Moreover, in terms of lack of autonomy, while the literature is relatively conflicting on this stressor, these results support those of researchers (e.g., Goldman, et al., 2013; Rivera-Torres et al., 2013) who suggest that a lack of autonomy is a more important

contributor to stress for women, often attributed to the jobs typically held by women being characterised by lower pay, lower status and lower autonomy.

Overall, taking into consideration the independent contributions of the different sources of work stress found in the MMR analyses, along with existing literature, the findings of role ambiguity contributing to the greatest proportion of variance in general work stress for both gender groups and tools and equipment, the least, was not surprising. However, it was interesting that relationships contributed to so little variance in general work stress, especially for women, and therefore, that greater differences did not exist between men and women, when such a large body of theory and research (e.g., Chrisler & McCreary, 2010; Miner-Rubino & Cortina, 2004; Morrison, 2007) suggested that interpersonal work relationships and conflict were among the most troubling sources of stress for working women, as well as that perhaps the most significant relative relationships to explore in explaining general work stress, were those between relationships and other sources of work stress. Moreover, it was also interesting that lack of career advancement was not a more important stressor for women, given the severe underrepresentation of women in positions of power and authority in South Africa (Ribeiro et al., 2016).

Practical and Theoretical Implications

Given that relatively trivial gender differences were found in the manifestations and levels of, as well as the relationships between, stressors and strain, practically, these results point to the fact that men and women are, in fact, more similar in their experiences of stressors and strain than most researchers or general public opinion might suggest. While larger, more significant differences between the two gender groups might have existed in the past, the rise in female participation in the paid labour force as well as the shift in gender roles and societal norms over the last few decades, could possibly have contributed to closing

this gender gap in work stress. This suggests that perhaps, the idea of gender differences in work stress is outdated, in the sense that the once traditional roles of men, such as that of the breadwinner, and of women, such as that of the caregiver, might not dominate in today's society and workforce. With men and women both moving further away from these traditional gender roles, in terms of women becoming more career-focused and men becoming more family-oriented, practically, the life circumstances (specifically work-related) of men and women seem to be converging.

Aside from changing gender roles, the similarities observed between men and women, especially in the experience of stressors such as job insecurity and a lack of career advancement, as well as of work stress in general, alludes to the effectiveness of South African employment equity and affirmative action legislation, policies and practices, which might have assisted in closing the gender gap in work stress, through the promotion of equality in employment and the protection and upliftment of women in the workplace.

These findings suggest that organisations should no longer operate according to gendered lines, as many did in the past, especially when dealing with the issue of employee stress. For example, many businesses initially began offering childcare assistance as an initiative aimed at alleviating stress and work-home conflict for mothers, however, in today’s workplace, these initiatives should also target fathers, with a focus on reducing work-life imbalance for both gender groups. Furthermore, the absence of significant gender differences in work stressors and strain suggests that differences in work stress could instead, be associated with individual differences in occupation or hours worked, and that it may be more important to consider demographic characteristics other than gender, such as age or number of children, in developing strategies and interventions to alleviate work stress and exposure to certain stressors, such as work-life imbalance.

Nevertheless, with role ambiguity, workload, work-home interface, lack of autonomy and job insecurity, found to be the strongest predictors of work stress and contributing to the most variance in work stress of all the stressors in this study, practically, this implies that organisational interventions should focus on alleviating and assisting employees, both male and female, with managing these stressors in particular. Examples of such interventions include clear job descriptions and task objectives, as well as mentorship to alleviate stress due to role ambiguity; job-sharing and time management workshops to alleviate stress due to workload; flexible work arrangements and childcare assistance to alleviate stress due to work-home interface; vertical loading[14] and work-schedule control to alleviate stress due to a lack of autonomy; and continuous feedback, career planning and further training opportunities to alleviate stress due to job insecurity (Holman et al., 2018). While these stressors should be addressed for both men and women (taking into consideration their individual needs and life circumstances), as a way of ensuring the retention, advancement and equitable representation of women in the workplace, it is important for organisations to take note of and minimise exposure to the stressors more significant to women (contributing to their higher levels of work stress), such as a lack of autonomy and workload, which were of slightly greater importance in the prediction of general work stress for women, as well as work-home interface, of which women were found to experience slightly higher levels.

On this note, the results of the present study also contribute to breaking down gender stereotypes and dispelling misconceptions that women are disproportionately exposed to work stressors and experience considerably higher levels of work stress than men, which could be acting as a barrier hindering more women from entering the workforce. The fact that more similarities than differences were found between the two gender groups, and that only

[14] Vertical loading is a method of increasing autonomy by delegating authority and responsibility, previously limited strictly to higher level management, to lower-level employees (Greenberg, 2011).

slight differences and marginally higher levels of stress were observed for women across a vast range of occupations, age groups, ethnic/cultural groups and other demographic factors, could serve to attract more women into the labour force. These results also contribute to reshaping perceptions held by employers in terms of how women handle and experience stress, which could result in employers becoming more open to the idea of employing women. This could not only contribute to more diverse workplaces, which have proven to be more productive and profitable (Hunt et al., 2018), but could also assist in addressing the skills shortages facing many industries in South Africa (PwC, 2018).

In this regard, however, it remains important for organisations, especially those in male-dominated industries such as technology and accounting, to acknowledge and address unique, gender-specific stressors for women, such as sexual discrimination and harassment, which, although not addressed in the present study, could be significant stress-related barriers to entry and advancement for women (Bowen et al., 2013). It is argued that the gender pay gap is, perhaps, the greatest barrier between women and career advancement, suggesting that this might be a major contributing factor to the underrepresentation of women in positions of power and authority (Sunindijo & Kamardeen, 2017). While this issue also requires some form of macro level intervention, organisations can assist in closing this pay gap through strategies, such as linking rewards to objective measures of performance; ensuring equitable, fair and transparent pay structures and incentive schemes; as well as prioritising the representation and upliftment of women in recruitment and promotional practices.

From a statistical perspective, the results of this study corroborate those of de Bruin and Taylor (2006b) in suggesting that empirical evidence does not support the common practice of using a joint regression equation to control for gender differences, particularly when conducting hierarchical multiple regression analyses. This assumption only held true in the analysis of work-home interface and was not supported in the analyses of the other seven

stressors, suggesting that gender should not merely be controlled for in studies of stressors of strain, and that separate repression equations should be used for the different gender groups. It is noteworthy to mention, however, that for these seven stressors requiring separate regression equations, a joint regression equation for men and women would only slightly overestimate the effects of these stressors on general work stress for men and slightly underestimate for women. Still, this raises an important empirical consideration for similar studies in the future.

Finally, in terms of theoretical implications, the results observed in this study oppose many of the theoretical relationships proposed in literature (see Chapter 2), in the sense that, theoretically, distinct gender differences were thought to exist in the experience of stressors and strain, while in reality, many of these relationships were not supported. In this regard, most studies of the different stressors in isolation, although many not empirical in nature, suggested that role ambiguity, relationships, a lack of career advancement, work-home interface and workload were more prevalent stressors and greater contributors to stress for women, and that in turn, the strength of the relationships between these stressors and general work stress was stronger for women than for men; as well as that tools and equipment, job insecurity and lack of autonomy, were more prevalent stressors and greater contributors to stress for men, and that in turn, the strength of the relationships between these stressors and general work stress was stronger for men than for women. Empirically, however, men and women were found to experience very similar levels of the eight stressors, with women, in fact, experiencing slightly lower levels of most of the stressors. Furthermore, most of the stressors predicted slightly higher stress levels for women than for men, with the exception of work-home interface.

Therefore, while this study did confirm the prediction power and relationships between these key stressors and work stress in general, empirically, gender did not appear to

play a major role in these relations, providing support for the findings of researchers such as Martocchio and O'Leary (1989), who suggested that very little differences in work stress can be explained by gender. Support was, however, provided for the well-documented theory that women experience higher levels of work stress than men (Bergdahl & Bergdahl, 2002; Jick & Mitz, 1985; Kneavel, 2020; Redondo-Flórez et al., 2020; Torkelson & Muhonen, 2008), although the differences found between the two gender groups were small.

The present study, therefore, contributed to theory by providing answers and more solidified conclusions to conflicting literature and inconclusive studies on the topic (see critical review by Gyllensten & Palmer, 2005). The study also contributed by providing a broader picture and a more expansive understanding of stressors and strain, in the sense that where other empirical studies examined one or two particular stressors in isolation, this study considered a number of different key stressors, both in isolation and in combination.

Limitations and Recommendations for Further Research

The present study has certain limitations, which should be highlighted as potential sources of error, which could have had an influence on the results and findings of the study. The first of such limitations relates to the use of self-report measures of general work stress and the eight sources of work stress. Self-reported data has been shown to be problematic in terms of containing several forms of bias, including response bias, mono-method bias and common method variance, specifically when measures of both dependent and independent variables are obtained from the same respondent, which can distort and often inflate correlations between predictor and criterion variables. In addition, Spector (1994) suggests that individuals often hold inaccurate opinions of themselves when reporting on work stress and issues of work overload and work-life imbalance, and thus, for increased accuracy, it is recommended that data be gathered from multiple, more objective sources, such as from co-

workers, supervisors, friends and family members, in addition to self-reported data on how individuals perceive themselves.

Yet another limitation of this study relates to the use of a cross-sectional research design, where researchers such as Bogg and Cooper (1995) recommend that stress research be conducted using a longitudinal research design, to enable the detection of changes in stress levels and exposure to stressors at different points in time. Such changes would have been particularly insightful to study before and after the onset of the COVID-19 pandemic.

Another limitation pertains to the lack of demographic information provided by the research participants of this study. Due to the exact composition of the sample being unknown, it is possible that some of the observations made in this study, could have been a function of other demographic factors which were not controlled for in the study, such as age or job category, or ethnic/cultural group. Finally, due to the measures of the SWSI forming the foundation upon which the variables of interest of the present study were based, it is possible that certain key stressors were overlooked, particularly those such as sexual harassment and gender-based pay discrimination, which might have related differently to general work stress for men and women.

A comforting thought in light of these limitations, is that they form a basis upon which further research can be conducted in the future. With a lack of empirical research conducted on this particular topic, there lies an opportunity for future researchers to address the gaps in this and similar studies. In terms of further research, it is recommended, firstly, that structural models of future studies expand on the hypothesised models presented in the present study, by incorporating additional predictor variables, as well as other moderators and mediators in order to contribute to a better understanding of the relations between stressors and strain at work, and the factors potentially influencing these relations.

Other possible predictors or sources of stress for consideration include gender-specific stressors such as sexual discrimination, gender exclusion and sexual harassment, as well as perhaps, stressors specific to certain occupations, such as exposure to violence and death. Other possible moderators and mediators might include personality characteristics such as neuroticism or locus of control, coping styles and mechanisms, or other demographic characteristics such as age or occupation. It is also recommended that this study (or variations thereof) perhaps, be conducted within the context of specific industries or occupations, where previous research has suggested that occupation and industry type may significantly influence stress levels and exposure to unique and common stressors (Yasin & Naqvi, 2016).

Furthermore, given the limitations of the present study, it is recommended that future studies make use of different measures of stressors and strain, perhaps using a combination of qualitative and quantitative methods of data collection, and adopting a more holistic approach, such as 360-degree feedback, as a way of obtaining data from multiple sources. Some researchers (Taylor, 2016) also recommend using other, more objective methods of stress measurement, such as monitoring levels of the stress hormone, cortisol, or blood pressure levels, as well as using more objective measures of stressors such as workload, where measures of hours worked or Key Performance Indicators (KPIs) could be considered. A final recommendation is that future research be conducted using a longitudinal research design in order to monitor changes in stress levels and exposure to stressors over time, an example of such a study being Gelsema et al.'s (2006) longitudinal study of job stress in the nursing profession.

Conclusion

In closing, while there is a large body of research suggesting that gender plays an important role in the experience of work stress, the results of this study provided evidence

that men and women are more similar in their experiences of stressors and strain than most research or general public opinion might suggest, and that very little differences in work stress can, in fact, be attributed to gender. Although no moderating effect was found, the findings of the study still raised certain empirical considerations for future research and contributed to providing answers to conflicting and inconclusive research of the past.

On the whole, while South Africa is clearly making positive strides towards gender equality in the workplace, it would appear that a gender gap does still exist, particularly in terms of the underrepresentation of women in male-dominated industries as well as in positions of leadership and power, especially in these industries, which can only marginally be attributed to the experience of work stress. This leaves room for future researchers to explore other barriers to entry and advancement for women, and practically, puts an onus on organisations to play their part in not only mitigating those stressors significant and unique to woman, but also in recruiting and promoting more women in the workplace.

References

Abbas, M., Malik, M., & Sarwat, N. (2021). Consequences of job insecurity for hospitality workers amid COVID-19 pandemic: Does social support help? *Journal of Hospitality Marketing & Management*, *30*(2), 1-25. https://doi.org/10.1080/19368623.2021.1926036

Abbott, P., Tyler, M., & Wallace, C. (2006). *An introduction to sociology: Feminist perspectives* (3rd ed.). Routledge.

Adebayo, S. O., & Ezeanya, I. D. (2011). Task identity and job autonomy as correlates of burnout among nurses in Jos, Nigeria. *International Review of Social Sciences and Humanities*, *2*(1), 7-13.

Agai–Demjaha, T., Minov, J., Stoleski, S., & Zafirova, B. (2015). Stress causing factors among teachers in elementary schools and their relationship with demographic and job characteristics. *Open Access Macedonian Journal of Medical Sciences*, *3*(3), 493-499. https://doi.org/10.3889/oamjms.2015.077

Aguinis, H. (1995). Statistical power with moderated multiple regression in management research. *Journal of Management*, *21*(6), 1141-1158. https://doi.org/10.1177/014920639502100607

Aguinis, H. (2004). *Regression analysis for categorical moderators*. The Guilford Press.

Aguinis, H., Beaty, J. C., Boik, R. J., & Pierce, C. A. (2005). Effect size and power in assessing moderating effects of categorical variables using multiple regression: A 30-year review. *Journal of Applied Psychology*, *90*(1), 94-107. https://doi.org/10.1037/0021-9010.90.1.94

Aguinis, H., & Gottfredson, R. K. (2010). Best-practice recommendations for estimating interaction effects using moderated multiple regression. *Journal of Organizational Behavior*, *31*(6), 776–786. https://doi.org/10.1002/job.686

Aguinis, H., Petersen, S. A., & Pierce, C. A. (1999). Appraisal of the homogeneity of error variance assumption and alternatives to multiple regression for estimating moderating effects of categorical variables. *Organizational Research Methods*, *2*(4), 315-339. https://doi.org/10.1177/109442819924001

Aguinis, H., Pierce, C. A., & Stone-Romero, E. F. (1994). Estimating the power to detect dichotomous moderators with moderated multiple regression. *Educational and Psychological Measurement*, *54*(3), 690-692. https://doi.org/10.1177/0013164494054003013

Aguinis, H., & Stone-Romero, E. F. (1997). Methodological artifacts in moderated multiple regression and their effects on statistical power. *Journal of Applied Psychology*, *82*(1), 192-206. https://doi.org/10.1037/0021-9010.82.1.192

Ahmad, A. (2008). Job, family and individual factors as predictors of work-family conflict. *Journal of Human Resource and Adult Learning*, *4*(1), 57-65.

Aiken, L. S., & West, S. G. (1991). *Multiple regression: Testing and interpreting interactions*. SAGE.

Al-Omar, B. A. (2003). Sources of work-stress among hospital-staff at the Saudi MOH. *Journal of King Abdulaziz University: Economics and Administration*, *17*(1), 3-16. https://doi.org/10.4197/ECO.17-1.1

Alsawalqa, R. O. (2021). Women's abuse experiences in Jordan: A comparative study using rural and urban classifications. *Humanities and Social Sciences Communications, 8*, 1-12. https://doi.org/10.1057/s41599-021-00853-3

American Psychological Association. (2012). *Gender and stress* [Press release]. https://www.apa.org/news/press/releases/stress/2010/gender-stress

Andersen, M. L., & Taylor, H. F. (2007). *Sociology: Understanding a diverse society* (4th ed.). Cengage Learning.

Aneshensel, C. S., & Phelan, J. C. (2006). *Handbook of the sociology of mental health*. Springer.

Backteman-Erlanson, S., Padyab, M., & Brulin, C. (2013). Prevalence of burnout and associations with psychosocial work environment, physical strain, and stress of conscience among Swedish female and male police personnel. *Police Practice and Research, 14*(6), 491-505. https://doi.org/10.1080/15614263.2012.736719

Barling, J., Kelloway, E. K., & Frone, M. R. (2005). *Handbook of work stress*. SAGE.

Barnett, R. C., & Hyde, J. S. (2001). Women, men, work, and family: An expansionist theory. *American Psychologist, 56*(10), 781-796.

Baruch, G.K., Biener, L., & Barnett, R.C. (1987). Women and gender in research on work and family stress. *American Psychologist, 42*, 130-136. https://doi.org/10.1037/0003-066X.56.10.781

Batty, D. (2016, December 30). *Women suffer much more work stress than men, says psychiatrist*. The Guardian. https://www.theguardian.com/lifeandstyle/2016/dec/30/women-suffer-much-more-work-stress-than-men-says-psychiatrist

Becker, T. E., Atinc, G., Breaugh, J. A., Carlson, K. D., Edwards, J. R., & Spector, P. E. (2016). Statistical control in correlational studies: 10 essential recommendations for organizational researchers. *Journal of Organizational Behavior*, *37*(2), 157-167. https://doi.org/10.1002/job.2053

Beehr, T. A. (1995). *Psychological stress in the workplace*. Routledge.

Beena, C., & Poduval, P. R. (1999). *Role conflict, role ambiguity and role overload of women executives in organisations* [Doctoral dissertation, Cochin University of Science and Technology]. Semantics Scholar.

Bellman, S., Forster, N., Still, L., & Cooper, C. L. (2003). Gender differences in the use of social support as a moderator of occupational stress. *Stress and Health: Journal of the International Society for the Investigation of Stress*, *19*(1), 45-58. https://doi.org/10.1002/smi.954

Bennett, C. (2001). Genres of research in multicultural education. *Review of Educational Research*, *71*(2), 171-217. https://doi.org/10.3102/00346543071 002171

Bergdahl, J., & Bergdahl, M. (2002). Perceived stress in adults: Prevalence and association of depression, anxiety and medication in a Swedish population. *Stress and Health: Journal of the International Society for the Investigation of Stress*, *18*(5), 235-241. https://doi.org/10.1002/smi.946

Bernaards, C. A., & Sijtsma, K. (1999). Factor analysis of multidimensional polytomous item response data suffering from ignorable item nonresponse. *Multivariate Behavioral Research*, *34*(3), 277-313. https://doi.org/10.1207/S15327906MBR 3403_1

Bernerth, J. B., & Aguinis, H. (2016). A critical review and best-practice recommendations for control variable usage. *Personnel Psychology, 69*, 229-283. https://doi.org/10.1111/peps.12103

Bhui, K., Dinos, S., Galant-Miecznikowska, M., de Jongh, B., & Stansfeld, S. (2016). Perceptions of work stress causes and effective interventions in employees working in public, private and non-governmental organisations: A qualitative study. *British Journal of Psychiatry Bulletin, 40*(6), 318-325. https://doi.org/10.1192/pb.bp.115.050823

Bialosiewicz, S., Murphy, K., & Berry, T. (2013). *An introduction to measurement invariance testing: Resource packet for participants*. American Evaluation Association.

Bielecky, A., Ibrahim, S., Mustard, C. A., Brisson, C., & Smith, P. M. (2017). An analysis of measurement invariance in work stress by sex: Are we comparing apples to apples? *Journal of Articles in Support of the Null Hypothesis, 13*(2), 38-47.

Bittles, A. H., & Parsons, P. A. (2016). *Stress: Evolutionary, biosocial and clinical perspectives*. Springer.

Bogg, J., & Cooper, C. (1995). Job satisfaction, mental health, and occupational stress among senior civil servants. *Human Relations, 48*(3), 327–341. https://doi.org/10.1177/001872679504800306

Bond, T. G., & Fox, M. (2001). *Applying the Rasch model: Fundamental measurement in the human sciences*. Earlbaum.

Bossé, R., Aldwin, C. M., Levenson, M. R., Workman-Daniels, K., & Ekerdt, D. J. (1990). Differences in social support among retirees and workers: Findings from the normative aging study. *Psychology and Aging*, *5*(1), 41-47. https://doi.org/10.1037/0882-7974.5.1.41

Bowen, P., Edwards, P., & Lingard, H. (2013). Workplace stress among construction professionals in South Africa: The role of harassment and discrimination. *Engineering, Construction, and Architectural Management*, *20*(6), 620–635. https://doi.org/10.1108/ECAM-05-2012-0051

Brooker, A., & Eakin, J. M. (2001). Gender, class, work-related stress and health: Toward a power-centered approach. *Journal of Community and Applied Social Psychology*, *11*(2), 97-109. https://doi.org/10.1002/casp.620

Buitendach, J. H., & De Witte, H. (2005). Job insecurity, extrinsic and intrinsic job satisfaction and affective organisational commitment of maintenance workers in a parastatal. *South African Journal of Business Management*, *36*(2), 27-36. https://doi.org/10.4102/sajbm.v36i2.625

Burchell, B., Ladipo, D., & Wilkinson, F. (2005). *Job insecurity and work intensification*. Routledge.

Burke, R. J. (1999). Workaholism in organizations: Gender differences. *Sex Roles*, *41*, 333-341. https://doi.org/10.1023/A:1018818731922

Buzzanell, P. M., & Turner, L. H. (2003). Emotion work revealed by job loss discourse: Backgrounding-foregrounding of feelings, construction of normalcy, and (re)instituting of traditional masculinities. *Journal of Applied Communication Research*, *31*(1), 27-57. https://doi.org/10.1080/00909880305375

Cahill, L. (2005). His brain, her brain. *Scientific American*, *292*(5), 40-47.

Calvarese, M. (2015). The effect of gender on stress factors: An exploratory study among university students. *Social Sciences*, *4*(4), 1177-1184. https://doi.org/10.3390/socsci4041177

Carpenter, S. (1994). Characteristics of gender subtypes: Group and individual differences. *Sex Roles, 31*, 167-184. https://doi.org/10.1007/BF01547713

Carter, S. B. (2012, January 14). Stressed women know it, stressed men... Not so much. Gender differences in stress recognition and management. *Psychology Today*. https://www.psychologytoday.com/us/blog/high-octane-women/201201/stressed-women-know-it-stressed-men-not-so-much

Cazabat, S., Barthe, B., & Cascino, N. (2008). Work load and job stress: Two facets of the same situation? Exploratory study in a gerontology department. *Perspectives Interdisciplinaires Sur Le Travail et la Santé, 10*(1). https://doi.org/10.4000/pistes.2165

Chan, K. B. (2007). *Work stress and coping among professionals*. Brill.

Chandola, T. (2012). *Stress at work*. The British Academy.

Chang, E., & Hancock, K. (2003). Role stress and role ambiguity in new nursing graduates in Australia. *Nursing & Health Sciences, 5*(2), 155-163. https://doi.org/10.1046/j.1442-2018.2003.00147.x

Che, X. X., Zhou, Z. E., Kessler, S. R., & Spector, P. E. (2017). Stressors beget stressors: The effect of passive leadership on employee health through workload and work-family conflict. *Work & Stress, 31*(4), 338-354. https://doi.org/10.1080/02678373.2017.1317881

Cheung, G. W., & Rensvold, R. B. (1999). Testing factorial invariance across groups: A reconceptualization and proposed new method. *Journal of Management*, *25*(1), 1-27. https://doi.org/10.1177/014920639902500101

Chrisler, J. C., & McCreary, D. R. (2010). *Handbook of gender research in psychology: Gender research in social and applied psychology* (2nd ed.). Springer.

Coetzee, M., & De Villiers, M. (2010). Sources of job stress, work engagement and career orientations of employees in a South African financial institution. *Southern African Business Review*, *14*(1), 27-57.

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Lawrence Erlbaum Associates.

Cohen, J. (1992). A power primer. *Psychological Bulletin*, *112*(1), 155-159. https://doi.org/10.1037/0033-2909.112.1.155

Coltrane, S. (1996). *Family man: Fatherhood, housework, and gender equity*. Oxford University Press.

Cooper, C. L., Cooper, C. P., Dewe, P. J., & O'Driscoll, M. P. (2001). *Organizational stress: A review and critique of theory, research, and applications*. SAGE.

Cooper, C. L., & Quick, J. C. (2017). *The handbook of stress and health: A guide to research and practice*. John Wiley & Sons.

Craig, L., & Mullan, K. (2011). How mothers and fathers share childcare: A cross-national time-use comparison. *American Sociological Review*, *76*(6), 834-861. https://doi.org/10.1177/0003122411427673

Cronbach, L. J. (1987). Statistical tests for moderator variables: Flaws in analyses recently proposed. *Psychological Bulletin*, *102*(3), 414-417. https://doi.org/10.1037/0033-2909.102.3.414

Crosley, G. (2006). Where are all the women rainmakers in accounting? *Accounting Today*, *20*(12), 9.

Curtis, H. M., Meischke, H., Stover, B., Simcox, N. J., & Seixas, N. S. (2018). Gendered safety and health risks in the construction trades. *Annals of Work Exposures and Health*, *62*(4), 404-415. https://doi.org/10.1093/annweh/wxy006

Davidson, M. J., & Cooper, C. L. (1992). *Shattering the glass ceiling: The woman manager*. Paul Chapman Publishing.

Davis, S. (2015). *The measurement invariance and measurement equivalence of the Sources of Work Stress Inventory (SWSI) across gender groups in South Africa* [Master's thesis, Stellenbosch University]. SUNScholar Research Repository.

De Bruin, G. P., & Taylor, N. (2005). Development of the sources of work stress inventory. *South African Journal of Psychology*, *35*(4), 748-765.

De Bruin, G. P., & Taylor, N. (2006a). *Sources of work stress inventory: Technical manual*. Jopie van Rooyen & Partners.

De Bruin, G. P., & Taylor, N. (2006b). The job demand-control model of job strain across gender. *SA Journal of Industrial Psychology*, *32*(1), 66-73. https://doi.org/10.4102/sajip.v32i1.227

Desmond, P. A., & Hancock, P. A. (2001). Active and passive fatigue states. In P. A. Hancock & P. A. Desmond (Eds.), *Stress, workload and fatigue* (pp. 455-465). Lawrence Erlbaum Associates.

De Sousa, M. F. (2009). *Relationship between work and non-work stressors and work- life balance amongst global market trading professionals* [Master's dissertation, University of South Africa]. UNISA Institutional Repository.

De Waard, D. (1996). *The measurement of drivers' mental workload* [Doctoral dissertation, University of Groningen]. UMCG Research Database.

Dewe, P., & Trenberth, L. (2012). Exploring the relationships between appraisals of stressful encounters and the associated emotions in a work setting. *Work & Stress*, *26*(2), 161-174. https://doi.org/10.1080/02678373.2012.687042

De Witte, H. (2005). Job insecurity: Review of the international literature on definitions, prevalence, antecedents and consequences. *SA Journal of Industrial Psychology*, *31*(4), 1-6. https://doi.org/10.4102/sajip.v31i4.200

Dhabhar, F. S. (2018). The short-term stress response - Mother nature's mechanism for enhancing protection and performance under conditions of threat, challenge, and opportunity. *Frontiers in Neuroendocrinology*, *49*, 175-192. https://doi.org/10.1016/j.yfrne.2018.03.004

DiDomenico, A., & Nussbaum, M. A. (2008). Interactive effects of physical and mental workload on subjective workload assessment. *International Journal of Industrial Ergonomics*, *38*(11-12), 977-983. https://doi.org/10.1016/j.ergon.2008.01.012

Dunbar, H., Theron, C., & Spangenberg, H. (2011). A cross-validation study of the performance index. *Management Dynamics*, *20*(3), 2-24.

Duxbury, L. E., & Higgins, C. A. (1991). Gender differences in work-family conflict. *Journal of Applied Psychology*, *76*(1), 60-74. https://doi.org/10.1037/0021-9010.76.1.60

Eisler, R. M., & Hersen, M. (2012). *Handbook of gender, culture, and health*. Lawrence Erlbaum Associates.

Elias E. (2018). Lessons learned from women in leadership positions. *Work*, *59*(2), 175-181. https://doi.org/10.3233/WOR-172675

Evans, M. G. (1985). A Monte Carlo study of the effects of correlated method variance in moderated multiple regression analysis. *Organizational Behavior and Human Decision Processes*, *36*(3), 305-323. https://doi.org/10.1016/0749-5978(85)90002-0

Fox, M. L., & Dwyer, D. J. (1999). An investigation of the effects of time and involvement in the relationship between stressors and work-family conflict. *Journal of Occupational Health Psychology*, *4*(2), 164-174. https://doi.org/10.1037/1076- 8998.4.2.164

Frone, M. R., Russell, M., & Cooper, M. L. (1992). Antecedents and outcomes of work-family conflict: Testing a model of the work-family interface. *Journal of Applied Psychology*, *77*(1), 65-78. https://doi.org/10.1037/0021-9010.77.1.65

Frone, M. R., Russell, M., & Cooper, M. L. (1995). Job stressors, job involvement and employee health: A test of identity theory. *Journal of Occupational and Organizational Psychology*, *68*(1), 1-11. https://doi.org/10.1111/j.2044-8325.1995.tb00684.x

Fu, C. K., & Shaffer, M. A. (2001). The tug of work and family: Direct and indirect domain-specific determinants of work-family conflict. *Personnel Review*, *30*(5), 502-522. https://doi.org/10.1108/EUM0000000005936

Fuss, I., Nübling, M., Hasselhorn, H. M., Schwappach, D., & Rieger, M. A. (2008). Working conditions and work-family conflict in German hospital physicians: Psychosocial and

organisational predictors and consequences. *BMC Public Health*, *8*. https://doi.org/10.1186/1471-2458-8-353

Gallie, D., Felstead, A., Green, F., & Inanc, H. (2017). The hidden face of job insecurity. *Work, Employment and Society*, *31*(1), 36-53. https://doi.org/10.1177/0950017015624399

Gamonal-Limcaoco, S., Montero-Mateos, E., Lozano-López, M. T., Maciá-Casas, A., Matías-Fernández, J., & Roncero, C. (2021). Perceived stress in different countries at the beginning of the coronavirus pandemic. *The International Journal of Psychiatry in Medicine*. https://doi.org/10.1177/00912174211033710

Gaunt, R., & Benjamin, O. (2007). Job insecurity, stress, and gender: The moderating role of gender ideology. *Community, Work & Family*, *10*(3), 341-355. https://doi.org/10.1080/13668800701456336

Gelsema, T. I., van der Doef, M., Maes, S., Janssen, M., Akerboom, S., & Verhoeven, C. (2006). A longitudinal study of job stress in the nursing profession: Causes and consequences. *Journal of Nursing Management*, *14*(4), 289-299. https://doi.org/10.1111/j.1365-2934.2006.00635.x

Gershuny, J., & Robinson, J. P. (1988). Historical changes in the household division of labor. *Demography*, *25*(4), 537-552. https://doi.org/10.2307/2061320

Gervais, R. L., & Millear, P. M. (2016). *Exploring resources, life-balance and well-being of women who work in a global context*. Springer.

Goldman, M. B., Troisi, R., & Rexrode, K. M. (2013). *Women and health* (2nd ed.). Academic Press.

Gonzalez-Mulé, E., & Cockburn, B. S. (2021). This job is (literally) killing me: A moderated-mediated model linking work characteristics to mortality. *Journal of Applied Psychology*, *106*(1), 140-151. https://doi.org/10.1037/apl0000501

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

Greenhaus, J. H., & Callanan, G. A. (2006). *Encyclopedia of career development*. SAGE.

Greenhaus, J. H., & Parasuraman, S. (1987). A work-nonwork perspective of stress and its consequences. In J. M. Ivancevich & D. C. Ganster (Eds.), *Job stress: From theory to suggestion* (pp. 37-60). The Haworth Press. https://doi.org/10.1300/J075v08n02_04

Griffin, J. M., Fuhrer, R., Stansfeld, S. A., & Marmot, M. (2002). The importance of low control at work and home on depression and anxiety: Do these effects vary by gender and social class? *Social Science & Medicine*, *54*(5), 783-798. https://doi.org/10.1016/s0277-9536(01)00109-5

Grömping, U. (2007). Relative importance for linear regression in R: The package relaimpo. *Journal of Statistical Software*, *17*(1), 1-27. https://doi.org/10.18637/jss.v017.i01

Gyllensten, K., & Palmer, S. (2005). The role of gender in workplace stress: A critical literature review. *Health Education Journal*, *64*(3), 271-288. https://doi.org/10.1177/001789690506400307

Hair, J. F., Black, W. C., Babin, B. J., Anderson, R. E., & Tatham, R. L. (2006). *Multivariate data analysis* (6th ed.). Pearson Education Inc.

Hamidi, Y., & Eivazi, Z. (2010). The relationship among employees' job stress, job satisfaction and the organisational performance of Hamadan urban health centers. *Social Behavior and Personality, 38*(7), 963-968. https://doi.org/10.2224/sbp.2010.38.7.963

Hampton, C. T., Jr. (2019). *Supervisor-subordinate relationships and its effect on job satisfaction and job performance* [Undergraduate thesis, University of Tennessee]. TRACE: Tennessee Research and Creative Exchange.

Hawkins, E. (2016). *Basic building and construction skills.* Cengage.

Heery, E., & Salmon, J. (2002). *The insecure workforce.* Routledge.

Hill, E. J. (2005). Work-family facilitation and conflict, working fathers and mothers, work-family stressors and support. *Journal of Family Issues*, *26*(6), 793-819. https://doi.org/10.1177/0192513X05277542

Hill, E. J., Jacob, J. I., Shannon, L. L., Brennan, R. T., Blanchard, V. L., & Martinengo, G. (2008). Exploring the relationship of workplace flexibility, gender, and life stage to family-to-work conflict, and stress and burnout. *Community, Work & Family*, *11*(2), 165-181. https://doi.org/10.1080/13668800802027564

Holman, D., Johnson, S., & O'Connor, E. (2018). Stress management interventions: Improving subjective psychological well-being in the workplace. In E. Diener, S. Oishi & L. Tay (Eds.), *Handbook of well-being*. DEF Publishers.

Holmes, E. K., Thomas, C. R., Petts, R. J., & Hill, E. J. (2020). The work-family interface. In W. K. Halford & F. van de Vijver (Eds.), *Cross-cultural family research and practice* (pp. 323-354). Academic Press. https://doi.org/10.1016/B978-0-12-815493-9.00010-7

Hughes, D., & Galinsky, E. (1994). Gender, job and family conditions, and psychological symptoms. *Psychology of Women Quarterly, 18*(2), 251-270. https://doi.org/10.1111/j.1471-6402.1994.tb00454.x

Hunt, V., Yee, L., Prince, S., & Dixon-Fyle, S. (2018, January 18). *Delivering through diversity*. McKinsey & Company. https://www.mckinsey.com/business-functions/people-and-organizational-performance/our-insights/delivering-through-diversity

Ivancevich, J. M., & Matteson, M. T. (1980). Optimizing human resources: A case for preventive health and stress management. *Organizational Dynamics*, *9*(2), 5-25. https://doi.org/10.1016/0090-2616(80)90037-6

Jaccard, J., & Wan, C. K. (1995). Measurement error in the analysis of interaction effects between continuous predictors using multiple regression: Multiple indicator and structural equation approaches. *Psychological Bulletin*, *117*(2), 348-357. https://doi.org/10.1037/0033-2909.117.2.348

Jick, T. D., & Mitz, L. F. (1985). Sex differences in work stress. *Academy of Management Review*, *10*(3), 408-420. https://doi.org/10.5465/amr.1985.4278947

Johnson, J. W., & Lebreton, J. M. (2004). History and use of relative importance indices in organizational research. *Organizational Research Methods*, *7*(3), 238-257. https://doi.org/10.1177/1094428104266510

Johnston, D. W., & Lee, W. S. (2013). Extra status and extra stress: Are promotions good for us? *Industrial and Labor Relations Review*, *66*(1), 32-54. https://doi.org/10.1177/001979391306600102

Kahn, R. L., & Byosiere, P. (1992). Stress in organizations. In M. D. Dunnette & L. M. Hough (Eds.), *Handbook of industrial and organizational psychology* (2nd ed., pp. 571-650). Consulting Psychologists Press.

Kang H. (2013). The prevention and handling of the missing data. *Korean Journal of Anesthesiology, 64*(5), 402-406. https://doi.org/10.4097/kjae.2013.64.5.402

Kaniasty, K., Moore, K. A., Howard, S., & Buchwald, P. (2014). *Stress and anxiety: Applications to social and environmental threats, psychological well-being, occupational challenges, and developmental psychology.* Logos Verlag.

Karasek, R. A. (1979). Job demands, job decision latitude, and mental strain: Implications for job re-design. *Administrative Science Quarterly, 24*, 285-306. https://doi.org/10.2307/2392498

Karasek, R., & Theorell, T. (1990). *Healthy work: Stress, productivity and the reconstruction of working life*. Basic Books.

Karkoulian, S., Srour, J., & Sinan, T. (2016). A gender perspective on work-life balance, perceived stress, and locus of control. *Journal of Business Research, 69*(11), 4918-4923. https://doi.org/10.1016/j.jbusres.2016.04.053

Khamisa, N., Oldenburg, B., Peltzer, K., & Ilic, D. (2015). Work related stress, burnout, job satisfaction and general health of nurses. *International Journal of Environmental Research and Public Health, 12*(1), 652-666. https://doi.org/10.3390/ijerph120100652

Kim, S. (1999). Behavioral commitment among the automobile workers in South Korea. *Human Resource Management Review, 9*(4), 419-451. https://doi.org/10.1016/S1053-4822(99)00028-5

Klandermans, B., & Van Vuuren, T. (1999). Job Insecurity. *European Journal of Work and Organizational Psychology*, *8*(2), 146-223. https://doi.org/10.1080/135943299398294

Kneavel, M. (2021). Relationship between gender, stress, and quality of social support. *Psychological Reports, 124*(4), 1481-1501. https://doi.org/10.1177/0033294120939844

Kornberger, M., Justesen, L., & Mouritsen, J. (2011). When you make manager, we put a big mountain in front of you: An ethnography of managers in a big 4 accounting firm. *Accounting, Organizations and Society, 36*(8), 514-533. https://doi.org/10.1016/j.aos.2011.07.007

Kowal, M., Coll-Martín, T., Ikizer, G., Rasmussen, J., Eichel, K., Studzińska, A., Koszałkowska, K., Karwowski, M., Najmussaqib, A., Pankowski, D., Lieberoth, A., & Ahmed, O. (2020). Who is the most stressed during the COVID-19 pandemic? Data from 26 countries and areas. *Applied Psychology: Health and Well-Being, 12*(4), 946-966. https://doi.org/10.1111/aphw.12234

Krantz, G., Berntsson, L., & Lundberg, U. (2005). Total workload, work stress and perceived symptoms in Swedish male and female white-collar employees. *European Journal of Public Health, 15*, 209-214. https://doi.org/10.1093/eurpub/cki079

Krüger, A. (2005). *A systems approach to the assessment of mental workload in a safety critical environment* [Doctoral dissertation, University of Pretoria].

Kubicek, B., Paskvan, M., & Bunner, J. (2017). The bright and dark sides of job autonomy. In C. Korunka & B. Kubicek (Eds.), *Job demands in a changing world of work: Impact on workers' health and performance and implications for research and practice* (pp. 45-63). Springer International Publishing. https://doi.org/10.1007/978-3-319-54678-0_4

Kuther, T. (2002, October 11). Gender, work, stress, and health. *Science*. http://www.sciencemag.org/careers/2002/10/gender-work-stress-and-health

Landy, F. J., & Conte, J. M. (2010). *Work in the 21st century: An introduction to industrial and organizational psychology*. John Wiley & Sons.

Langan-Fox, J., & Cooper, C. L. (2011). *Handbook of stress in the occupations*. Edward Elgar Publishing.

László, K. D., Pikhart, H., Kopp, M. S., Bobak, M., Pajak, A., Malyutina, S., Salavecz, G., & Marmot, M. (2010). Job insecurity and health: A study of 16 European countries. *Social Science & Medicine*, *70*(6), 867-874. https://doi.org/10.1016/j.socscimed.2009.11.022

Lazarus, R., & Folkman, S. (1984). *Stress: Appraisal and coping*. Springer.

Leung, M., Chan, I. Y. S., & Cooper, C. L. (2014). *Stress management in the construction industry*. John Wiley & Sons.

Li, C. H. (2016). Confirmatory factor analysis with ordinal data: Comparing robust maximum likelihood and diagonally weighted least squares. *Behavior Research Methods, 48*(3), 936-949. https://doi.org/10.3758/s13428-015-0619-7

Lin, K. Y., & Burgard, S. A. (2018). Working, parenting and work-home spillover: Gender differences in the work-home interface across the life course. *Advances in Life Course Research, 35,* 24-36. https://doi.org/10.1016/j.alcr.2017.12.003

Long, B. C., & Kahn, S. E. (1993). *Women, work, and coping: A multidisciplinary approach to workplace stress*. McGill-Queen's University Press.

Lorenzo-Seva, U., & Ferrando, P. J. (2011). FIRE: an SPSS program for variable selection in multiple linear regression analysis via the relative importance of predictors. *Behavior Research Methods*, *43*, 1-7. https://doi.org/10.3758/s13428-010-0043-y

Lundberg, U., & Frankenhaeuser, M. (1999). Stress and workload of men and women in high-ranking positions. *Journal of Occupational Health Psychology*, *4*(2), 142-151. https://doi.org/10.1037/1076-8998.4.2.142

Martocchio, J. J., & O'Leary, A. M. (1989). Sex differences in occupational stress: A meta-analytic review. *Journal of Applied Psychology*, *74*(3), 495-501. https://doi.org/10.1037/0021-9010.74.3.495

Matud, M. (2004). Gender differences in stress and coping styles. *Personality and Individual Differences*, *37*(7), 1401-1415. https://doi.org/10.1016/j.paid.2004.01.010

Mauno, S., & Kinnunen, U. (2002). Perceived job insecurity among dual-earner couples: Do its antecedents vary according to gender, economic sector and the measure used? *Journal of Occupational and Organizational Psychology*, *75*(3), 295-314. https://doi.org/10.1348/096317902320369721

Mayor, E. (2015). Gender roles and traits in stress and health. *Frontiers in Psychology*, 6, 779. https://doi.org/10.3389/fpsyg.2015.00779

McLaughlin. H., Uggen, C., & Blackstone, A. (2012). Sexual harassment, workplace authority, and the paradox of power. *American Sociological Review*, *77*(4), 625-647. https://doi.org/10.1177/0003122412451728

Meister, D. (1971). *Human factors: Theory and practice*. Wiley.

Mels, G. (2007). *Statistical modeling with LISREL 8.80 for Windows*. Scientific Software International.

Mels, G. (2010). *A workshop on structural equation modelling with LISREL 9 for Windows*. Scientific Software International.

Meredith, V., & French, S. (1996). Social policy and women in accounting: A cross- cultural comparison. *International Advances in Economic Research, 2*(1), 76-85.

Meredith, W. (1993). Measurement invariance, factor analysis and factorial invariance. *Psychometrika, 58*, 525-543. https://doi.org/10.1007/BF02294825

Michel, J. S., Kotrba, L. M., Mitchelson, J. K., Clark, M. A., & Baltes, B. B. (2011). Antecedents of work-family conflict: A meta-analytic review. *Journal of Organizational Behavior, 32*(5), 689-725. https://doi.org/10.1002/job.695

Michie, S. (2002). Causes and management of stress at work. *Occupational and Environmental Medicine, 59*(1), 67-72. https://doi.org/10.1136/oem.59.1.67

Mikula, G., Petrik, B., & Tanzer, N. (1990). What people regard as unjust: Types and structures of everyday experiences of injustice. *European Journal of Social Psychology, 20*(2), 133-149. https://doi.org/10.1002/ejsp.2420200205

Miller, H. L. (2016). *The SAGE encyclopedia of theory in psychology.* SAGE.

Miner-Rubino, K., & Cortina, L. M. (2004). Working in a context of hostility toward women: Implications for employees' well-being. *Journal of Occupational Health Psychology, 9*(2), 107-122. https://doi.org/10.1037/1076-8998.9.2.107

Modrek, S., & Cullen, M. R. (2013). Job insecurity during recessions: Effects on survivors' work stress. *BMC Public Health, 13*. https://doi.org/10.1186/1471-2458-13-929

Montgomery, A. J., Panagopolou, E., & Benos, A. (2006). Work-family interference as a mediator between job demands and job burnout among doctors. *Stress and Health: Journal of the International Society for the Investigation of Stress*, *22*(3), 203-212. https://doi.org/10.1002/smi.1104

Morrison, R. (2007). *Gender differences in the relationship between workplace friendships and organisational outcomes* [Research paper, Auckland University of Technology]. AUT Open Repository.

Murphy K. R., & Davidshofer, C. O. (2005). *Psychological testing: Principles and applications* (6th ed.). Prentice-Hall.

Napasri, T., & Yukongdi, V. (2015). A study of Thai female executives: Perceived barriers to career advancement. *Review of Integrative Business and Economics Research*, *4*(3), 108-120.

Näswall, K., & De Witte, H. (2003). Who feels insecure in Europe? Predicting job insecurity from background variables. *Economic and Industrial Democracy*, *24*(2), 182-215. https://doi.org/10.1177/0143831X03024002003

Nelson, D. L., & Burke, R. J. (2002). *A framework for examining gender, work stress, and health*. American Psychological Association.

O'Driscoll, M. P., & Beehr, T. A. (2000). Moderating effects of perceived control and need for clarity on the relationship between role stressors and employee affective reactions. *The Journal of Social Psychology*, *140*(2), 151-159. https://doi.org/10.1080/00224540009600454

Oláh, L. S., Kotowska, I. E., & Richter, R. (2018). The new roles of men and women and implications for families and societies. In G. Doblhammer & J. Gumá (Eds.), *A demographic perspective on gender, family and health in Europe* (pp. 41-64). Springer.

Palmer, S., & Cooper, G. (2007). *How to deal with stress*. Kogan Page.

Pandey, S., & Pestonjee, D. M. (2013). *Stress and work: Perspectives on understanding and managing stress*. SAGE.

Parkes, K. R., & Hughes, E. L. (2020). Individual differences in coping with stress. In B. J. Carducci, C. S. Nave, J. S. Mio & R. E. Riggio (Eds.), *The Wiley encyclopedia of personality and individual differences: Models and theories* (pp. 377-381). Wiley-Blackwell. https://doi.org/10.1002/9781118970843.ch327

Pedhazur, E. J. (1997). *Multiple regression in behavioral research: Explanation and prediction*. Harcourt Brace College Publishers.

Pestonjee, D. M., & Pandey, S. (2013). *Stress and work: Perspectives on understanding and managing stress*. SAGE.

Phillips, J. M., & Gully, S. M. (2011). O*rganizational behavior: Tools for success.* Cengage Learning.

Pillay, S. (2006). *The relationship between job insecurity, job satisfaction and organisational commitment in a telecommunication organisation* [Master's dissertation, University of Kwazulu-Natal].

PricewaterhouseCoopers. (2018). *Women remain under-represented in emerging tech* [Press release]. https://www.pwc.co.za/en/press-room/changing-gender-perceptions-and-behaviours-in-the-workplace.html

Putnik, K., Houkes, I., Jansen, N., Nijhuis, F., & Kant, I. (2020). Work-home interface in a cross-cultural context: A framework for future research and practice. *The International Journal of Human Resource Management*, *31*(13), 1645-1662. https://doi.org/10.1080/09585192.2017.1423096

Rabenu, E. (2021). *21st-century workplace challenges: Perspectives and implications for relationships in new era organizations*. Rowman & Littlefield.

Ram, N., Khoso, I., Shah, A. A., Chandio, F. R., & Shaikih, F. M. (2011). Role conflict and role ambiguity as factors in work stress among managers: A case study of manufacturing sector in Pakistan. *Asian Social Science*, *7*(2), 113-118. https://doi.org/10.5539/ass.v7n2p113

Rayner, C., Hoel, H., & Cooper, C. (2002). *Workplace bullying: What we know, who is to blame and what can we do?* Taylor & Francis.

R Core Team. (2021). R: A language and environment for statistical computing [Computer software]. R Foundation for Statistical Computing. https://www.R-project.org/

Redondo-Flórez, L., Tornero-Aguilera, J. F., Ramos-Campo, D. J., & Clemente-Suárez, V. J. (2020). Gender differences in stress- and burnout-related factors of university professors. *BioMed Research International*, *2020*. https://doi.org/10.1155/2020/6687358

Rehman, S., & Roomi, M. A. (2012). Gender and work-life balance: A phenomenological study of women entrepreneurs in Pakistan. *Journal of Small Business and Enterprise Development*, *19*(2), 209-228. https://doi.org/10.1108/14626001211223865

Republic of South Africa. (1998). *Employment Equity Act, No. 55 of 1998*.

Ribeiro, S., Bosch, A., & Becker, J. (2016). Retention of women accountants: The interaction of job demands and job resources. *SA Journal of Human Resource Management, 14*(1), 1683-7584. http://dx.doi.org/10.4102/sajhrm.v14i1.759

Richardsen, A. M., Traavik, L. E. M., & Burke R. J. (2016). Women and work stress: More and different? In M. Connerley & J. Wu (Eds.), *Handbook on well-being of working women. International handbooks of quality-of-life* (pp. 123-140). Springer.

Riedel, M. (2005). Secondary data. *Encyclopedia of Social Measurement, 3*, 455-461. https://doi.org/10.1016/B0-12-369398-5/00071-2

Risman, B. J., Froyum, C. M., & Scarborough, W. J. (2018). *Handbook of the sociology of gender* (2nd ed). Springer.

Rivera-Torres, P., Araque-Padilla, R. A., & Montero-Simó M. J. (2013). Job stress across gender: The importance of emotional and intellectual demands and social support in women. *International Journal of Environmental Research and Public Health, 10*(1), 375-389. https://doi.org/10.3390/ijerph10010375

Ross, S. D., & Vasantha, S. (2014). A conceptual study on impact of stress on work-life balance. *Sai Om Journal of Commerce & Management, 1*(2), 61–65.

Sarrasin, O., Mayor, E., & Faniko, K. (2014). Gender traits and cognitive appraisal in young adults: The mediating role of locus of control. *Sex Roles, 70*, 122-133. https://doi.org/10.1007/s11199-013-0336-6

Sayer, L. C. (2005). Gender, time and inequality: Trends in women's and men's paid work, unpaid work and free time. *Social Forces, 84*(1), 285-303. https://doi.org/10.1353/sof.2005.0126

Schäfer, T., & Schwarz, M. A. (2019). The meaningfulness of effect sizes in psychological research: Differences between sub-disciplines and the impact of potential biases. *Frontiers in Psychology*, *10*, 813. https://doi.org/10.3389/fpsyg.2019.00813

Schieman, S., Badawy, P. J., Milkie, M. A., & Bierman, A. (2021). Work-life conflict during the COVID-19 pandemic. *Socius*, *7*. https://doi.org/10.1177/2378023120982856

Schoon, I., & Eccles, J. S. (2014). *Gender differences in aspirations and attainment*. Cambridge University Press.

Schwartz, A., Gerberich, S. G., Albin, T., Kim, H., Ryan, A. D., Church, T. R., Green, D. R., McGovern, P. M., Erdman, A. G., & Arauz, R. F. (2020). The association between janitor physical workload, mental workload, and stress: The SWEEP study. *Work*, *65*(4), 837-846. https://doi.org/10.3233/WOR-203135

Seaward, B. L. (2006). *Managing stress: Principles and strategies for health and wellbeing*. Jones and Bartlett Learning.

Sheppard, L., & Aquino, K. (2013). Much ado about nothing? Observers' problematization of women's same-sex conflict at work. *Academy of Management Perspectives*, *27*(1), 52-62. https://doi.org/10.5465/amp.2012.0005

Shields, P., & Tajalli, H. (2006). Intermediate theory: The missing link in successful student scholarship. *Journal of Public Affairs Education*, *12*(3), 313–334. https://doi.org/10.1080/15236803.2006.12001438

Siegle, D. (2017). *Research ethics and informed consent*. University of Connecticut. https://researchbasics.education.uconn.edu/ethics-and-informed-consent/

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

Singh, J., Verbeke, W., & Rhoads, G. K. (1996). Do organizational practices matter in role stress processes? A study of direct and moderating effects for marketing-oriented boundary spanners. *Journal of Marketing*, *60*(3), 69-86. https://doi.org/10.2307/1251842

Sijtsma, K., & van der Ark, L. A. (2003). Investigation and treatment of missing item scores in test and questionnaire data. *Multivariate Behavioral Research*, *38*(4), 505-528. https://doi.org/10.1207/s15327906mbr3804_4

Southwood, K. E. (1978). Substantive theory and statistical interaction: Five models. *American Journal of Sociology*, *83*(5), 1154-1203. https://doi.org/10.1086/226678

Sriharan, A., Ratnapalan, S., Tricco, A. C., Lupea, D., Ayala, A. P., Pang, H., & Lee, D. D. (2020). Occupational stress, burnout, and depression in women in healthcare during COVID-19 pandemic: Rapid scoping review. *Frontiers in Global Women's Health*, 1-20. https://doi.org/10.3389/fgwh.2020.596690

Stafyla, A., Kaltsidou, G., & Spyridis, N. (2013). Gender differences in work stress, related to organizational conflicts and organizational constraints: An empirical research. *International Journal of Economic Sciences and Applied Research*, *6*(1), 91-101.

Stangor, C., & Walinga, J. (2015). *Introduction to psychology*. Flat World Knowledge.

Stansfeld, S., & Candy, B. (2006). Psychosocial work environment and mental health - A meta-analytic review. *Scandinavian Journal of Work Environment and Health*, *32*(6), 443-462. https://doi.org/10.5271/sjweh.1050

Statistics South Africa. (2021). *Statistical release: Mid-year population estimates 2021*. http://www.statssa.gov.za/publications/P0302/P03022021.pdf

Steyn, R., & De Bruin, G. P. (2020). An investigation of gender-based differences in assessment instruments: A test of measurement invariance. *SA Journal of Industrial Psychology*, *46*, 1-12. https://doi.org/10.4102/sajip.v46i0.1699

Stone-Romero, E. F., Alliger, G. M., & Aguinis, H. (1994). Type II error problems in the use of moderated multiple regression for the detection of moderating effects of dichotomous variables. *Journal of Management*, *20*(1), 167-178. https://doi.org/10.1177/014920639402000109

Stone-Romero, E. F., & Anderson, L. E. (1994). Relative power of moderated multiple regression and the comparison of subgroup correlation coefficients for detecting moderating effects. *Journal of Applied Psychology*, *79*(3), 354-359. https://doi.org/10.1037/0021-9010.79.3.354

Stone-Romero, E. F., & Liakhovitski, D. (2002). Strategies for detecting moderator variables: A review of conceptual and empirical issues. *Research in Personnel and Human Resources Management*, *21*, 333-372. https://doi.org/10.1016/S0742-7301(02)21008-7

Stranks, J. (2005). *Stress at work.* Routledge.

Sunindijo, R. Y., & Kamardeen, I. (2017). Work stress is a threat to gender diversity in the construction industry. *Journal of Construction Engineering and Management*, *143*(10). https://doi.org/10.1061/(ASCE)CO.1943-7862.0001387

Taylor, C. J. (2016). “Relational by nature”? Men and women do not differ in physiological response to social stressors faced by token women. *American Journal of Sociology*, *122*(1), 49-89. https://doi.org/10.1086/686698

Taylor, S. E., Klein, L. C., Lewis, B. P., Gruenewald, T. L., Gurung, R. A., & Updegraff, J. A. (2000). Biobehavioral responses to stress in females: Tend-and-befriend, not fight-or-flight. *Psychological Review*, *107*(3), 411-429. https://doi.org/10.1037/0033-295x.107.3.411

Tokar, M., Greeff, A., & Van As, J. (2019, January 23). *The untapped opportunity of female empowerment*. Bizcommunity. http://bizcommunity.com/Article/196/424/185619.html

Torkelson, E., & Muhonen, T. (2008). Work stress and gender: Implications for health and well-being. In K. Naswall, J. Hellgren & M. Sverke (Eds.), *The individual in the changing working life* (pp. 311-327). Cambridge University Press. https://doi.org/10.1017/CBO9780511490064.015

Travis, M. A. (2009). What a difference a day makes, or does it? Work/family balance and the four-day work week. *Connecticut Law Review*, *42(4)*, 1223.

Trayambak, S., Kumar, P., & Jha, A. N. (2012). A conceptual study on role stressors, their impact and strategies to manage role stressors. *IOSR Journal of Business and Management*, *4*(1), 44-48. https://doi.org/10.9790/487X-0414448

Turner, H. A. (1994). Gender and social support: Taking the bad with the good? *Sex Roles*, *30*, 521-541. https://doi.org/10.1007/BF01420800

Väänänen, A., Murray, M., & Kuokkanen, A. (2014). The growth and the stagnation of work stress. *History of the Human Sciences, 27*(4), 116-138. https://doi.org/10.1177/0952695114525168

Vandenberg, R. J., & Lance, C. E. (2000). A review and synthesis of the measurement invariance literature: Suggestions, practices, and recommendations for organizational research. *Organizational Research Methods*, *3*(1), 4-69. https://doi.org/10.1177/109442810031002

Van der Ark, A. (2007). Mokken scale analysis in R. *Journal of Statistical Software, 20*(11), 1-19. https://doi.org/10.18637/jss.v020.i11

Van der Ark, A. (2010). Computation of the Molenaar Sijtsma statistic. In A. Fink, B. Lausen, W. Seidel & A. Ultsch (Eds.), *Advances in data analysis, data handling and business intelligence* (pp. 775-784). Springer.

Van Ginkel, J. R., van der Ark, L. A., & Sijtsma, K. (2007). Multiple imputation of item scores in test and questionnaire data, and influence on psychometric results. *Multivariate Behavioral Research*, *42*(2), 387-414. https://doi.org/10.1080/00273170701360803

Verma, R., Balhara, Y., & Gupta, C. (2011). Gender differences in stress response: Role of developmental and biological determinants. *Industrial Psychiatry Journal*, *20*(1), 4-10. https://doi.org/10.4103/0972-6748.98407

Vermeulen, M., & Mustard, C. (2000). Gender differences in job strain, social support at work, and psychological distress. *Journal of Occupational Health Psychology*, *5*(4), 428-440. https://doi.org/10.1037//1076-8998.5.4.428

Wang, C., Pan, R., Wan, X., Tan, Y., Xu, L., Ho, C. S., & Ho, R. C. (2020). Immediate psychological responses and associated factors during the initial stage of the 2019 coronavirus disease (COVID-19) epidemic among the general population in China. *International Journal of Environmental Research and Public Health, 17*(5), 1729. https://doi.org/10.3390/ijerph17051729

Warren, A. K. (2009). *Cascading gender bias, compounding effects: An assessment of talent management systems*. Catalyst. https://www.catalyst.org/wp-content/uploads/2019/01/Cascading_Gender_Biases_Compounding_Effects_An_Assessment_of_Talent_Management_Systems.pdf

Wiernik, B. M., & Dahlke, J. A. (2020). Obtaining unbiased results in meta-analysis: The importance of correcting for statistical artifacts. *Advances in Methods and Practices in Psychological Science, 3*(1), 94-123. https://doi.org/10.1177/2515245919885611

Wilson, J. M., Lee, J., Fitzgerald, H. N., Oosterhoff, B., Sevi, B., & Shook, N. J. (2020). Job insecurity and financial concern during the COVID-19 pandemic are associated with worse mental health. *Journal of Occupational and Environmental Medicine*, *62*(9), 686-691. https://doi.org/10.1097/JOM.0000000000001962

Wong, K. (2018, November 14). There's a stress gap between men and women. Here's why it's important. *The New York Times*. https://www.nytimes.com/2018/11/14/smarter-living/stress-gap-women-men.html

Wright, B. D., & Linacre, J. M. (1994). Reasonable mean-square fit values. *Rasch Measurement Transactions, 8*(3), 370.

Wright, B. D., & Masters, G. N. (1982). *Rating scale analysis*. MESA Press.

Yasin, S. A., & Naqvi, S. (2016). Gender and institutional differences in job satisfaction, professional stress & work family conflict in academia. *Pakistan Journal of Psychology*, *47*(1), 71-84.

Young, G., Zavelina, L., & Hooper, V. (2008). Assessment of workload using NASA task load index in perianesthesia nursing. *Journal of Perianesthesia Nursing*, *23*(2), 102-110. https://doi.org/10.1016/j.jopan.2008.01.008

Zhou, E. (2020). The "too-much-of-a-good-thing" effect of job autonomy and its explanation mechanism. *Psychology*, *11*(2), 299-313. https://doi.org/10.4236/psych.2020.112019

Zunker, V. (2008). *Career, work, and mental health: Integrating career and personal counselling.* SAGE.

Appendix A

Informed Consent Form (JvR Psychometrics)

Sources of Work Stress Inventory (Gideon P de Bruin & Nicola Taylor)

Informed Consent

This section asks for your informed consent before completing the SWSI

PERMITTED ACCESS

You have been invited to complete the Sources of Work Stress Inventory (SWSI). You understand that participation in completing the SWSI is entirely voluntary and if you wish to withdraw from completing the SWSI, you may do so at any time without explanation.

The information requested of you on this website will be provided to JvR for the purposes of scoring, analysing, and interpreting the SWSI's results.

INFORMATION PRIVACY

It is generally acknowledged that the internet is not an absolutely secure medium, and the privacy of your information, communications, and visits to this website cannot be absolutely guaranteed. JvR is committed to protecting the privacy and security of the information provided.

Please note that personal information gathered during the assessment process will not be used for any marketing purposes and will not be made available to anyone other than the researcher and JvR under any circumstances other than with your written consent.

JvR reserves the right to store de-personalised and aggregated data in its database indefinitely for research and statistical purposes.

YOUR RESPONSIBILITIES

You agree that you are responsible for providing accurate and complete information when completing the SWSI. Completing the SWSI is voluntary and should you have any objections you may withdraw at any point in the assessment. You agree to use and access the website in a manner that will not disrupt, corrupt, or otherwise damage the website. Accordingly, this website shall not be used in a manner that is prohibited by law. Use of this website is subject to your compliance with all applicable laws and regulations in your location. You understand the reason for completing the SWSI. If you do not understand the purpose, please contact the researcher.

NO WARRANTY ON CONTENTS, INFORMATION, OR MATERIALS

The information included in this website does not constitute, and shall not be considered, the advice, recommendation, or endorsement of JvR. JvR shall not be liable for any claims based on the use of the SWSI.

JvR COPYRIGHT, LOGOS, AND TRADEMARKS

There is copyright on the SWSI. These rights are protected by South African intellectual property right laws, international treaty provisions, and other applicable national laws. No portion of this website, including the SWSI's information, text, or images may be copied, modified, or used in any manner without JvR's prior written permission. Unauthorised use of all or part of this website or the SWSI is strictly prohibited and may result in the violation of the SWSI's trademarks, privacy, copyrights, and publicity rights.

GOVERNING LAW
This agreement shall be governed by the laws of the Republic of South Africa.
By clicking "I Accept" below, you are indicating that you understand and agree to the Terms and Conditions of Use of this website.

Appendix B

Ethical Clearance Letter (REC)

UNIVERSITEIT
STELLENBOSCH
UNIVERSITY

NOTICE OF APPROVAL

REC: Social, Behavioural and Education Research (SBER) - Initial Application Form

30 March 2021

Project number: 19320

Project Title: The Moderating Role of Gender in the Relationship between General Work Stress and Different Sources of Work Stress

Dear Miss Cailin Reid

Your REC: Social, Behavioural and Education Research (SBER) - Initial Application Form submitted on 05/03/2021 13:47 was reviewed and approved by the REC: Social, Behavioural and Education Research (REC: SBE).

Please note below expiration date of this approved submission:

Ethics approval period:

Protocol approval date (Humanities)	Protocol expiration date (Humanities)
30 March 2021	29 March 2024

GENERAL REC COMMENTS PERTAINING TO THIS PROJECT:

INVESTIGATOR RESPONSIBILITIES

Please take note of the General Investigator Responsibilities attached to this letter. You may commence with your research after complying fully with these guidelines.

If the researcher deviates in any way from the proposal approved by the REC: SBE, the researcher must notify the REC of these changes.

Please use your SU project number (19320) on any documents or correspondence with the REC concerning your project.

Please note that the REC has the prerogative and authority to ask further questions, seek additional information, require further modifications, or monitor the conduct of your research and the consent process.

CONTINUATION OF PROJECTS AFTER REC APPROVAL PERIOD

You are required to submit a progress report to the REC: SBE before the approval period has expired if a continuation of ethics approval is required. The Committee will then consider the continuation of the project for a further year (if necessary).

Once you have completed your research, you are required to submit a final report to the REC: SBE for review.

Included Documents:

Document Type	File Name	Date	Version
Default	Revised Informed Consent Form 04 03 21	04/03/2021	1
Default	Revised Turnitin Similarity Report 04 03 21	04/03/2021	1
Proof of permission	Revised Research Agreement Cailin Reid 04 03 21	04/03/2021	2
Proof of permission	Revised Commitment as Supervisor Form 04 03 21	04/03/2021	1
Research Protocol/Proposal	Revised Research Proposal Cailin Reid 04 03 21	04/03/2021	2
Default	Revised DESC Report C Reid 04 03 21	04/03/2021	1
Default	Revised Response Letter 05 03 21	05/03/2021	1

If you have any questions or need further help, please contact the REC office at cgraham@sun.ac.za.

Appendix C

Research Agreement (JvR Psychometrics)

JVR PSYCHOMETRICS (PTY) LTD
JOHANNESBURG OFFICE
15 Hunter Street | Ferndale | Randburg | 2194
P.O. Box 2560 | Pinegowrie | 2123 | Johannesburg | South Africa
T +27 11 781 3705/6/7 | F +27 11 781 3703 | E info@jvrafrica.co.za
CAPE TOWN OFFICE
3RD Floor | Gihon Building | Cnr of Bill Bezuidenhout Avenue &. Sportica Crescent
Tygervalley | Cape Town | 7530
P.O. Box 5534 | Tygervalley | 7536 | Cape Town | South Africa
T +27 861 333 916 | F +27 861 004 225 | E capeinfo@jvrafrica.co.za
FREE STATE OFFICE
8 Hugenote Street | Jordania | Bethlehem | 9700 | South Africa
T +27 58 303 3843 | E freestate-info@jvrafrica.co.za

JVR PSYCHOMETRICS

RESEARCH AGREEMENT

As a psychological test provider, JvR Psychometrics (JvR) has encouraged research on the assessments we distribute since our inception in 1993. The company is committed to supporting research that contributes to the expansion of knowledge in the scientific community of Psychology in Southern and Sub Saharan Africa. Research on international and South African tests, distributed and published by JvR ensure that we offer products and services of the highest quality to our customers.

By conducting studies associated with the assessments that JvR distributes, research partners form an integral part of JvR's test development and validation processes. This agreement serves to delineate the roles and responsibilities of JvR and **Cailin Reid (The Researcher)** in the study **The moderating role of gender in the relationship between general work stress and different sources of work stress** that will run from February 2020 until November 2021.

List of assessments included in this agreement

- Sources of Work Stress Inventory (SWSI)

CR

Scope of the agreement:

1. This agreement covers the right to use the SWSI archive data according to these terms in the specified study only.
2. The Researcher will use SWSI data under supervision of Prof Deon de Bruin, for a sample of approximately 2300 individuals.
3. The Researcher will score the data using the scoring key provided by Prof de Bruin.
4. The Researcher will conduct the statistical analysis of the data.
5. The Researcher will provide JvR with a copy of the final manuscript of the study within 2 years of the date of this agreement.
6. Failure to comply with the scope and roles and responsibilities stipulated in this agreement will result in The Researcher being invoiced for the full published price of assessment reports that would have been used if the researcher collected the data herself (price at the time of the infringement).

Cailin Reid's Roles and Responsibilities

1. The Researcher undertakes to ensure that she adheres to the Ethical Guidelines stipulated by the HPCSA, with special attention to the sections on research and psychometric assessment. The Researcher will also ensure that she follows best practice in psychological assessment, such as those described in the *International Test Commission's Test Users Guide*.
2. The Researcher undertakes to respect all copyright and legal rights held by JvR with regard to the security and ownership of test materials. No items of the SWSI may appear in any article, dissertation, thesis, research report or any similar publication that may expose the content of the SWSI items or compromise the security of the questionnaire.
3. The Researcher agrees that JvR Psychometrics is the sole and exclusive licensee of the SWSI and all of the intellectual property embodied in the instrument and the data associated with the administrations of the SWSI. Nothing contained in this agreement is intended or shall be construed as granting The Researcher any proprietary or intellectual property right, or any right, title to or interest in the SWSI or any associated data. The Researcher agrees that she will not use data provided pursuant to this request for any purpose other than the analysis of that data as stipulated in this agreement. The Researcher will not publish or adapt SWSI items or scoring in any form. Violation of this acknowledgement will be a violation of South African copyright law.
4. The Researcher undertakes to ensure that the data provided is held securely and not made available to any third party without prior written consent by JvR.

CR

5. The Researcher will ensure that acknowledgement to JvR for providing the psychological assessment data is given in all research outputs resulting from this study.
6. The Researcher will provide JvR with copies of any research reports related to the use of the SWSI in the study.
7. The Researcher undertakes to inform JvR in advance, should any of the research results related to the SWSI be presented in any professional or public forum.
8. The Researcher will indemnify and hold JvR harmless from any claims, actions, suits, damages, costs and legal fees arising from any breach of The Researcher's obligations specified in this agreement.

JvR Roles and Responsibilities

1. JvR may refer to the research results in JvR publications, including placing the abstract or summary on JvR's website, in the magazine, or in any other published material. The author(s) will be acknowledged in the publication.
2. JvR undertakes to inform The Researcher in advance, should her research report or results related to the use of the SWSI in the study be presented in any professional or public forum.
3. JvR will be available, within reason, to The Researcher for advice on the appropriate use of the various assessments and interpretation of research results.

CR

30 November 2020

Date

X

Dr Nicola Taylor
Director: Research
Signed by: b2af2a77-2092-4f22-9c71-2e0894cfeafa

30 November 2020

Date

X

Cailin Reid
The Researcher

Appendix D

Commitment as Supervisor Form (JvR Psychometrics)

JvR PSYCHOMETRICS (PTY) LTD

JOHANNESBURG OFFICE
15 Hunter Street | Ferndale | Randburg | 2194
PO Box 2560 | Pinegowrie | 2123 | Johannesburg | South Africa
T +27 11 781 3705/6/7 | F +27 11 781 3703 | E info@jvrafrica.co.za

CAPE TOWN OFFICE
3RD Floor | Gihon Building | Cnr of Bill Bezuidenhout Avenue &, Sportica Crescent
Tygervalley | Cape Town | 7530
PO Box 5534 | Tygervalley | 7536 | Cape Town | South Africa
T +27 861 333 916 | F +27 861 004 225 | E capeinfo@jvrafrica.co.za

FREE STATE OFFICE
8 Hugenote Street | Jordania | Bethlehem | 9700 | South Africa
T +27 58 303 3843 | E freestate-info@jvrafrica.co.za

COMMITMENT AS SUPERVISOR

"Supervision" is defined as "the acceptance of liability for the acts of another practitioner".
HPCSA (2008), Ethical and Professional Rules of the Health Professions Council of South Africa as promulgated in Government Gazette R717/2006.

According to the Health Professions Act, Act 56 of 1974, tests, measures, questionnaires, instruments, etc. that tap psychological constructs must be used, interpreted, and controlled by Psychologists. Certain psychological tests can, however, be used by Psychometrists, Psychotechnicians, Registered Counsellors, and other professionals (e.g., Speech and Occupational Therapists) provided that:

"the use of the test has been certified as relevant for that category of users; the tester complies with applicable restrictions placed on the test's use; the tester seeks mentoring from a Psychologist; the tester has been appropriately trained."
cf. Professional Board for Psychology (July 2010), Form 208

Having read the above, I Gideon Pieter de Brum, ID Number 6706125141081 with HPCSA number PS0035386 Telephone number 082 078 2156 and e-mail address deondb@sun.ac.za indicate that I am a Counselling Psychologist (professional HPCSA registration category).

Currently I

- am of good standing and have a valid registration with the HPCSA;
- fulfil the minimum requirements for supervision as set out by my professional body;
- am competent and appropriately trained in the scope that I will be supervising.

I am willing to act as supervisor to Caila Reid commencing from 1 Jan 2020 ending 31 Dec 2021 with HPCSA registration number _____ and ID number _____.

Signed on this 17 day of February 2020

Appendix E

Turnitin Similarity Index

reid_22419780_2021

ORIGINALITY REPORT

20%	16%	11%	3%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

1	scholar.sun.ac.za Internet Source	3%
2	uir.unisa.ac.za Internet Source	1%
3	www.researchgate.net Internet Source	1%
4	hdl.handle.net Internet Source	1%
5	ujcontent.uj.ac.za Internet Source	1%
6	www.coursehero.com Internet Source	<1%
7	de Bruin, Gideon P., and Nicola Taylor. "Development of the Sources of Work Stress Inventory", South African Journal of Psychology, 2005. Publication	<1%
8	De Bruin, Gideon P, and Nicola Taylor. "The job demand-control model of job strain across	<1%

Appendix F

Submission of Minor-Thesis for Examination

Name of student:	**Cailin Reid**
Student number:	**22419780**
Name of study leader:	**Prof. Gideon de Bruin**
Title of thesis:	**The Moderating Role of Gender in the Relationship between General Work Stress and Different Sources of Work Stress**

The following checklist must be adhered to when submitting a minor-thesis for examination:

		✓
1.	Language editing	✓
2.	Referencing according to APA 7th Edition	✓
3.	General editorial care	✓
4.	Ethical clearance letter (REC) included after the reference list	✓
5.	Turnitin similarity index signed off by the study leader	✓

I hereby declare that the work submitted is ready for examination.

C Reid

Signature of study leader **Signature of student**

Date: **Date:** 06/12/2021