

UNIVERSITY OF GHANA

COLLEGE OF HUMANITIES

**THE IMPACT OF MENTAL HEALTH ON MINeworkERS' SAFETY
BEHAVIOURS: THE MODERATING ROLE OF SAFETY CLIMATE.**

BY

EMMANUEL KODWO AMOAKO

(10805568)

**THIS THESIS IS SUBMITTED TO THE UNIVERSITY OF GHANA,
LEGON IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR
THE AWARD OF MPhil IN HUMAN RESOURCE MANAGEMENT
DEGREE**

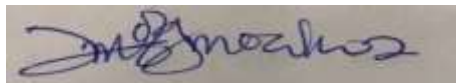


OCTOBER, 2021

DECLARATION

I do hereby declare that this work is the result of my own research and has not been presented by anyone for any academic award in this or any other university. All references used in the work have been fully acknowledged.

I bear the sole responsibility for any shortcomings.



EMMANUEL KODWO AMOAKO

(10805568)

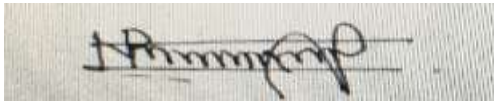
.....13/10/2021.....

DATE



CERTIFICATION

I hereby certify that this thesis was supervised in accordance with procedures laid down by the University.



Dr. SAVIOUR AYERLEY NUBUOR

...14/10/2021.....

DATE

(SUPERVISOR)



DEDICATION

This work is dedicated to the glory of the Almighty God

And

To my loving mother, Agatha and my supportive siblings, Godwin (of blessed memory),

Michael, Evans, Patrick, Sylvanous, Augustine, Francis and Gifty.



ACKNOWLEDGEMENT

I am grateful to the Almighty God for His unflinching Love and unending Grace and Favor that saw me through this program and thesis writing. I express my unending gratitude to my supervisor Dr. Saviour Ayertey Nubuor for the valuable assistance, guidance and insightful contributions throughout the study. I am also grateful to Prof. Kwesi Amponsah-Tawiah for the insights and thought-provoking comments that helped in shaping the study. I express my profound gratitude to all lecturers at the Department of Organisation and Human Resource Management of the University for their inputs during Departmental Seminar Sessions.

Also, my sincerest gratitude goes to Mr. Christopher Nyarko and Mrs Lawrencina Awuah (Ghana Chamber of Mines), for assisting the researcher to get approval from the participating mining companies. More so, I express my heart will appreciation to the management of the participating mining companies and their mine workers for accepting to be part of the study. To my colleagues Abdul-Razak Suleman, Abdul-Amin Bawa, Bridget Akortey-Siaw and Kafui Ntow and the entire MPhil HRM class (2019-2021), I am most grateful for your encouragement and finding time to proofread the thesis. Furthermore, I would like to express my genuine appreciation to my mother, Miss Agatha Nyameke, my brother –Mr. Patrick Amoako and my kids Christodial Amoako-Nyanzu and Godwin Amoako-Nyanzu – who have had my back since day one; I am forever grateful for your tremendous support and prayers. I will like to say thank you to everyone who by one way or the other contributed to the successful completion of this study.

Thank You and God Bless us all.

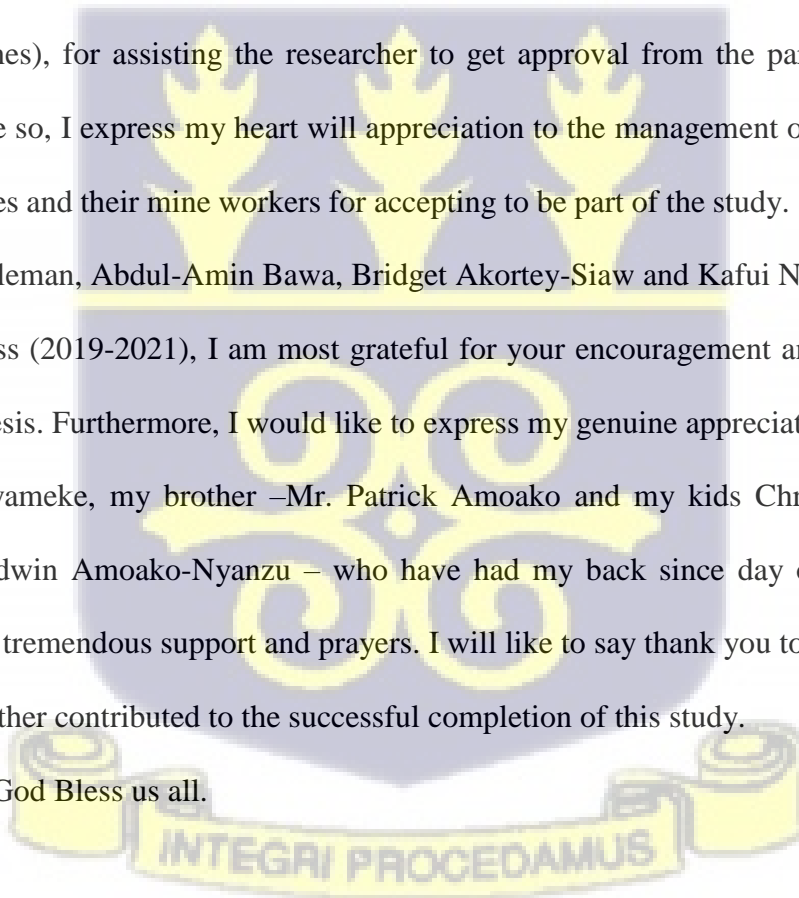


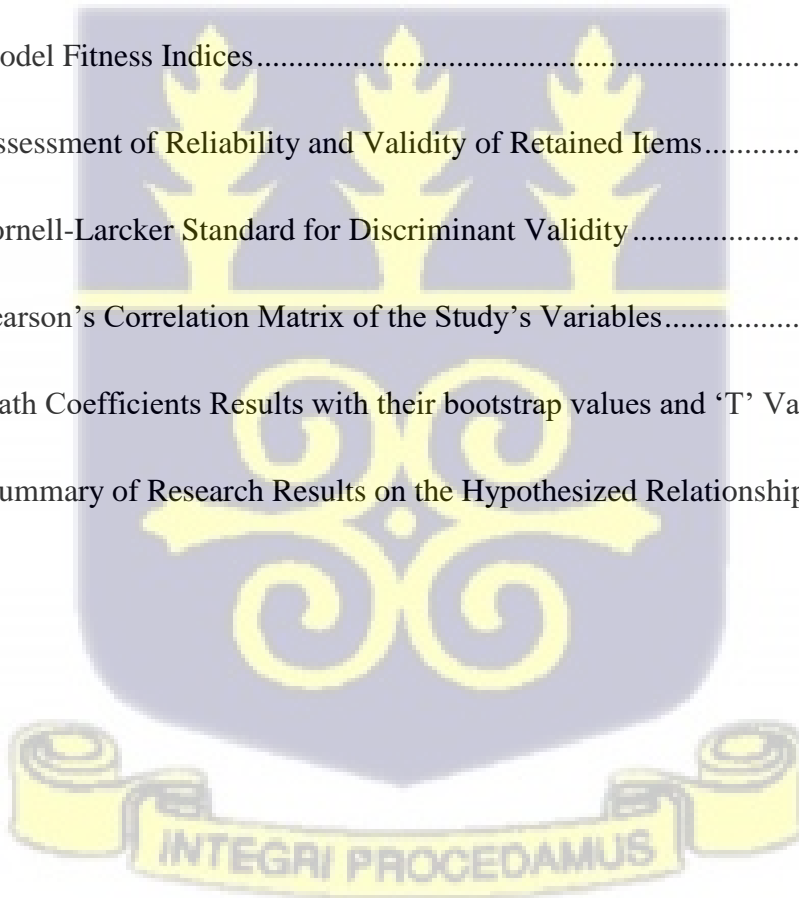
TABLE OF CONTENTS

Contents	Page
DECLARATION	ii
CERTIFICATION	iii
DEDICATION	iv
ACKNOWLEDGEMENT	v
TABLE OF CONTENTS	vi
LIST OF TABLES	viii
LIST OF FIGURES	ix
LIST OF ABBREVIATIONS	x
ABSTRACT	xi
CHAPTER ONE: INTRODUCTION	1
1.1 Background of the Study.....	1
1.2 Problem Statement.....	7
1.3 Research Objectives.....	11
1.4 Research Questions.....	11
1.5 Research Hypotheses.....	11
1.6 Significance of the Study.....	12
1.7 Scope of the Study.....	12
1.8 Chapter Disposition.....	13
CHAPTER TWO: LITERATURE REVIEW	14
2.1 Introduction.....	14
2.2 Literature Search Methods Adopted.....	14
2.2.1 Inclusion Criteria.....	15
2.2.2 Exclusion Criteria.....	16
2.3 Conceptual Review.....	18
2.3.1 The Concept of Mental Health.....	18
2.3.2 The Concept and Dimensions of Employee Safety Behaviours.....	33
2.3.3 The Concept of Safety Climate.....	42
2.4 Theoretical Review.....	45
2.4.1 Social Exchange Theory.....	45
2.5 Empirical Review.....	49
2.5.1 Relationship between Anxiety and Safety Compliance and Participation.....	49
2.5.2 Relationship between Depression and Safety Compliance and Participation.....	52
2.5.3 Relationship between Anxiety, Depression, Safety Climate and Safety Compliance and Participation.....	54
2.6 Mental Health, Safety Climate and Safety Behaviours in Ghana.....	56
2.7 Conceptual Framework.....	59
2.8 Summary of Literature Review.....	60
CHAPTER THREE: METHODOLOGY	61
3.1 Introduction.....	61
3.2 Research Paradigm.....	61

3.3 Research Approach	63
3.4 Research Design.....	64
3.5 Profile of Selected Companies and Population of the Study	65
3.6 Sampling Technique and Sample Size	66
3.7 Sources of Data	68
3.8 Data Collection.....	68
3.8.1 Data Collection Method.....	68
3.8.2 Data Collection Measure	69
3.9 Pilot Study	69
3.10 Data Collection Procedure	70
3.11 Method of Data Analysis.....	72
3.12 Ethical Consideration	73
CHAPTER FOUR: DATA ANALYSIS AND RESULTS PRESENTATION	75
4.1 Introduction	75
4.2 Demographic Characteristics of the Respondents.....	75
4.2.1 Gender of Respondents.....	77
4.2.2 Age of Respondents.....	77
4.2.3 Educational Level of Respondents	77
4.2.4 Respondents Years in the Organization.....	77
4.2.5 Marital Status of Respondents.....	78
4.2.6 Employment Type of Respondents.....	78
4.3 Preliminary Analysis	79
4.3.1 Missing Data Analysis.....	79
4.3.2 Investigation of Outliers	80
4.3.3 Test for Data Normality.....	81
4.4 Structural Equation Modelling Analysis	83
4.4.1 Measurement Model	83
4.4.2 Correlation Analysis among Study Variables	89
4.4.3 Structural Model Analysis.....	91
4.5 Testing of Hypotheses	93
4.6 Discussion of Research Findings	98
CHAPTER FIVE: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS.....	108
5.1 Introduction	108
5.2 Summary of Findings	108
5.3 Implications of the Study Findings	112
5.4 Conclusions	113
5.5 Recommendation.....	115
5.5.1 Recommendations for Practice and Policy.....	115
5.5.2 Study Limitation and Direction for Further Studies.....	117
REFERENCES.....	119
APPENDIX.....	137

LIST OF TABLES

Table 3.1 Population and Sample Size of Selected Companies	68
Table 3.2 Measurement Instruments	69
Table 3.3 Reliability of Study Variables from Pilot Study.....	70
Table 4.1 Demographic Characteristics of the Respondents.....	76
Table 4.2: Results of Data Normality.....	81
Table 4.3: Prevalence of Anxiety and Depression among Study's Respondents.....	82
Table 4.4 Model Fitness Indices.....	85
Table 4.5 Assessment of Reliability and Validity of Retained Items.....	87
Table 4.6 Fornell-Larcker Standard for Discriminant Validity.....	88
Table 4.7 Pearson's Correlation Matrix of the Study's Variables.....	89
Table 4.8: Path Coefficients Results with their bootstrap values and 'T' Values.....	92
Table 4.9: Summary of Research Results on the Hypothesized Relationships.....	98



LIST OF FIGURES

Figure 2.1: Proposed Relationships among Dimensions of Mental Health, Safety Behaviours Dimensions and Safety Climate.	59
Figure 4.1: The Final CFA (Measurement) Model with Standardized Loadings	84
Figure 4.2 Moderation effect of safety climate on anxiety-compliance relationship	95
Figure 4.3 Moderation effect of safety climate on depression-compliance relationship.....	96
Figure 4.4 Moderation effect of safety climate on depression-participation relationship.....	97



LIST OF ABBREVIATIONS

AMS	Africa Mining Services
ANX	Anxiety
CFA	Confirmatory Factor Analysis
DEP	Depression
ILO	International Labour Organization
MAR	Missing At Random
MCRA	Missing Completely At Random
MNAR	Missing Not At Random
NFI	Normed Fit Index
PLS	Partial Least Squares
SC	Safety Climate
SCOM	Safety Compliance
SEM	Structural Equation Modelling
SET	Social Exchange Theory
SPAR	Safety Participation
SRMR	Standardized Root Mean square Residual
WHO	World Health Organization



ABSTRACT

Despite the heavy investment in health and safety, the Ghanaian mining industry continues to record a high number of accidents and workplace injuries. The cost of accident compensations coupled with the loss of productive work hours as well as work-related diseases emanating from accidents and injuries at the workplace are excruciating. Mine workers compliance with safety rules and regulations and the active participation in safety initiatives and activities which could be improved through a good safety climate and enhancing mine workers mental health will contribute to reducing workplace accidents and injuries. To this end, the current study investigates the impact of mental health (anxiety and depression) on employee safety behaviours (compliance and participation) while examining whether safety climate moderates the relationship between mental health and safety behaviours. Grounded in the social exchange theory, the study adopted a quantitative research approach with an explanatory cross-sectional survey research design. A total of two-hundred and seventy-four (274) mine workers purposively selected participated in the study. Responses were obtained from participants through a structured questionnaire which was analyzed using the partial least square structural equation modelling with smart PLS (v.3). The study found that anxiety had a significant negative effect on safety compliance but not participation. Depression was found to have a significant negative effect on mine workers safety compliance and participation behaviours. The findings of the study also show that safety climate moderates the relationships between the dimensions of mental health and mine workers safety behaviour except for the relationship between anxiety and mine workers safety participation behaviour. The study recommends the need for mining companies to develop industry-specific policies on mental health and employee's assistance programs in mental health that will seek to identify and address mental health challenges among mine workers.

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Occupational injuries, work-related diseases and fatalities are disastrous incidents that appear to disrupt the operational activities of organizations. Whilst efforts are being made to eradicate or minimize the occurrences of these incidents, the last decade has witnessed an increasing trend in work-related diseases and occupational injuries (ILO, 2014). The International Labour Organization (ILO) provides that work-related diseases and occupational injuries have increased from 270 million in 2013 to an estimated 330 million in 2016 (ILO, 2014, 2017). They also argued that internationally, more than 2.3 million men and women die from an occupational accident or illness every year. Fatal accidents are responsible for over 350,000 deaths and almost 2 million deaths are attributed to work-related diseases. Additionally, absence from work, loss of productive work hours and serious injuries attributable to non-fatal occupational accidents is estimated to be more than 313 million employees. Further, the ILO provides that annually, work-related diseases reported cases is 160 million. These figures suggest that the approximate number of people who die from workplace injuries or illnesses every day is 6,400 and that 860,000 people worldwide are injured at work.

The United States Bureau of Labor Statistics (BLS) further provides that, fatal work injuries that occurred in the United States in 2017 were 5147 compared with 4690 in 2010 which indicates an increase in workplace injuries and accidents (BLS, 2018). In Africa, the ILO estimates 1 million deaths are associated with workplace injuries and work-related diseases which are recorded predominantly from the construction industry (ILO, 2017). In Ghana, available statistics from the Ghana Chamber of Mines reveals that first aid injuries in 2019 was 197 while the number of

serious injuries stood at 28 even though there were 3 recorded cases of fatal injuries (as against 7 recorded in 2018) and the incidence of near-miss cases fell from 407 in 2018 to 326 in 2019 (Ghana Chamber of Mines, 2020). Similarly, the Ghanaian construction industry recorded 558 cases of the industrial sector's accidents in 2019 (Simpson & Sam, 2020) an indication that occupational accidents are predominant in the various industries of the Ghanaian economy.

The increasing number of reported cases of occupational injuries and accidents are a source of worry to many organizations as its ergonomic implications are excruciating (Agyekum, et al., 2020; Cheng, et al., 2020; Quartey, 2017). Accidents and injuries are considered in the overhead cost and the aggregate cost of production which reduces the overall profitability of the organization (Haupt & Pillay, 2016). In an attempt to address this situation, both management of the organization and the individual employees are assigned some responsibilities that must be performed to the latter. Some of these management responsibilities include safety leadership (Dartey-Baah, Quartey, & Adotey, 2020; Oah, Na, & Moon, 2018) and the creation of a positive safety climate (Goldenhar, et al., 2019; Liu, et al., 2020; Saedi, Majid, & Isa, 2020) while employees are encouraged to exhibit safety behaviours (Cheng et al., 2020; Dartey-Baah & Addo, 2018; Xue, Fan, & Xie, 2020).

Employee Mental Health (EMH) has received researchers' attention in the management literature over the past years because of its growing prevalence among the population. Globally, it is estimated that in every twelve-month period, 20 percent of the world's population would experience common mental health disorders (Considine et al., 2017). In the United States alone, an estimated 17.3 million (7.1% of all U.S. adults) people had at least one major depressive episode in 2017 and 31.1 percent of U.S. adults experienced some forms of anxiety in the same year (National Institute of Mental Health, 2018). Similarly, Sankoh, Sevalie and Weston (2018) posit

that an estimated 18.5 million years are lost to disability due to mental health problems in Africa. These raise concerns about the alarming growth of mental health problems globally.

The concept of mental health has evolved as an interesting and important construct to create and maintain safety, induce safety behaviours as well as reducing occupational injuries and accidents in organizations (Hulls, et al., 2020). Many organizations are striking to improve the mental health of their employees because of the devastating effects of mental health on a number of individual and organizational outcomes such as job satisfaction (Hünefeld, et al., 2020), job performance (Biederman et al., 2012), quality lifestyle (Parletta et al., 2018), organizational performance and employee safety behaviours (Hennekam, Richard, & Grima, 2020). The conceptualization, dimensions and measurement of the employee mental health have yield inconclusive results (Spell & Arnold, 2007). Whiles some researchers believe the concept is considered as a mental illness or disorder (Bronkhorst, et al., 2014; Mei et al., 2021), others believe it goes beyond the absence of the lack of mental disorder to mean the state of complete physical, mental and social well-being of employees (Considine et al., 2017; Han, 2018; Hennekam et al., 2020).

Employee mental health is defined as “a state of well-being in which an individual realizes his or her own abilities, can cope with the normal stresses of life, can work productively and is able to make a contribution to his or her community” (WHO, 2018). Similarly, the American Psychiatric Association (APA, 2018) defines mental health as “a condition that involves changes in emotion, thinking, or behaviour (or a combination of these) that are associated with distress and/or problems while functioning in social, work, or family activities”. To this end, changes in emotions and behaviours could be both positive as well as negative. Whereas the positive changes are directed towards improving work relationships and productivity, the negative changes have unending consequences (Biederman et al., 2012; Hulls et al., 2020; Hünefeld et al., 2020). Though many

employees may have no specific mental disorder, it is evident however that some employees may be mentally healthier than others (Asare-Doku, et al., 2020; Hastuti & Timming, 2021). In a literature review, Suls and Bunde (2005) identified anxiety and depression as the two key components of employee mental health. They assert further that anxiety is an aversive state which emanates from the feelings of being unable to predict, control or obtain desired outcomes. Spell and Arnold (2007) opines that depression is indicated through a general lack of enthusiasm, gloom and despair while anxiety is accompanied by worry, inability to relax, anxiousness, and tension.

Employee safety behaviour is conceptualized to be an integral feature of safety performance such that as employees exhibit safety behaviours, then they are undertaking safety and work performance (Cheng et al., 2020). Safety behaviours are practices that conform to the safety needs of the organization and that are likely to increase the overall safety performance of the firm. Griffin and Neal (2000) provide that the main constituents of safety behaviour are safety participation and safety compliance. The categorization of safety behaviour was drawn on the model of work performance propounded by Borman and Motowidlo (1993). Since its classification, safety behaviour has then been studied as safety compliance and safety participation (Addo & Dartey-Baah, 2019; Cheng et al., 2020; Dartey-Baah et al., 2020; Kvalheim & Dahl, 2016; Xue et al., 2020). Safety compliance is the core safety activities that are performed by individuals in the organization in order to create and maintain safety at the workplace (Griffin & Neal, 2000). Safety compliance behaviour involves the strict adherence to safety requirements and legal obligations, safety standards and safety policies, procedures, rules and the proper use of personal protective apparatus (Addo & Dartey-Baah, 2019; Kvalheim & Dahl, 2016). On the other hand, safety participation is explained as those voluntary behaviours that help to create and maintain an organizational atmosphere that supports safety (Griffin & Neal, 2000). Though such behaviours

do not improve workplace safety directly, Fernández-Muñiz et al. (2014) argue that such behaviours support organizational safety goals and objectives. Safety participation behaviours include attendance of safety meetings, taking safety initiatives, voluntary engagement in safety activities and assisting colleagues on safety issues (Addo & Dartey-Baah, 2019; Fernández-Muñiz et al., 2014; Griffin & Hu, 2013; Griffin & Neal, 2000).

Safety compliance and safety participation are important constructs in reducing occupational injuries and accidents (Hu, Yeo, & Griffin, 2020; Li Jiang, et al., 2010) and have proved to be a great tool in achieving superior safety results and performance (Cheng et al., 2020; Thurston & Glendon, 2018; Windapo & Oladapo, 2012). Inducing safety behaviour in employees could be activated through mental health (Cheng et al., 2020; Dartey-Baah et al., 2020; Enwereuzor et al., 2020; Liu et al., 2020; Vara et al., 2020) and safety climate (Auzoult & Ngueutsa, 2019; Paolillo, Silva, & Pasini, 2016; Saedi et al., 2020; Sinclair, Martin, & Sears, 2010). Igniting safety behaviours in employees through mental health and safety climate would result in reduced accidents and injuries while producing superior safety performance to improve the overall profitability of the organization.

Safety Climate is explained as the employees' discernment of their organization's value for safety (Goldenhar et al., 2019) which is articulated through organizational safety policies, adherence to safety practices and safety procedures (Sinclair et al., 2010). Safety climate describes an employee's perception about the value their organization places on safety and how it values safety issues (Griffin & Neal, 2000). When employees view their organization's value for safety issues as high, then such organizations are characterized by a good safety climate. Similarly, when employees' perceptions of safety values by the organization are low, then such organizations are said to have a poor safety climate. Safety climate is an important concept to induce employees'

safety behaviours. Sinclair et al. (2010) opine that safety compliance and participation would be performed by employees if they perceive that their organization takes issues of safety very seriously. Similarly, strict adherence to safety policies, regulations and practices are exhibited by employees who have a strong conviction that their organizations value safety (Paolillo et al., 2016). More currently, Saedi et al. (2020) assert that employee safety behaviours are demonstrated by employees who work in organizations with a good safety climate. The creation of a good safety climate is the responsibility of the leadership of organizations as Kapp (2012) eludes that safety leadership is an imperative factor to create and maintain a good safety climate. Extant literature suggests that the creation of a safety climate could be done through safety leadership (DeArmond et al., 2018; Mullen & Kelloway, 2009; Saedi et al., 2020; Wu et al., 2011).

The economic development of Ghana and the performance of the Ghanaian economy cannot be discussed without the greater contribution of the mining industry. The mining industry excluding the oil and gas sector accounted for a 12.6 percent contribution to Gross Domestic Product (GDP) in 2019 according to data from the Ghana Chamber of Mines. The mining industry generated direct domestic revenue of GH¢ 4.02 billion and US\$ 6.678 billion from the export of minerals in 2019 for the Government of Ghana while offering 11, 899 direct jobs to Ghanaians (Ghana Chamber of Mines, 2020). It is evident therefore that the importance of the mining industry cannot be overemphasized. However, the International Council for Mining and Metals (ICMM) reports a disturbing over 7 million cases of accidents and injuries in the mining industry for 2018 globally with Africa accounting for about 44 percent (International Council on Mining & Metals, 2020). Interestingly, in Ghana, the mining industry spent about US\$ 463.35 million on compensation for accidents and injuries in 2019 (Ghana Chamber of Mines, 2020), an amount which is very disturbing. Compliance with safety regulations and the active participation in safety activities by

employees which could be enhanced through safety climate and mental health would go a long way to reduce accidents and injuries in the mining sector. This would reduce the amount of money spent on accidents compensations which would increase total revenue and the overall profitability of mining organizations. Consequently, the current study investigates the impact of mental health on employee safety behaviours whiles examining whether safety climate moderates the relationship between mental health and safety behaviours.

1.2 Problem Statement

Employees' safety behaviours are important actions to reduce occupational accidents and injuries at the workplace. Safety compliance and safety participation are critical safety behaviours essential in achieving superior safety performance and reduced workplace injuries and accidents. Mental health and safety climate are important constructs in creating and maintaining safety behaviours at the workplace (Lingard, Zhang, & Oswald, 2019; Singh & Misra, 2020). The mining industry is one that values the health and safety of its employees (Amponsah-Tawiah & Mensah, 2016). The industry continues to invest hugely in the health and safety of its operations. For example, organizations in the Ghanaian mining industry continue to procure the best safety equipments for their employees to work with and spend huge sums of money to train their employees to safely man these equipment (Ghana Chamber of Mines, 2020). Employees after going through such training are expected to comply with safety rules in manning these equipments to avoid accidents and to participate in safety activities such as attending safety meetings and taking safety initiatives. Organizations in the mining industry posit that if they cannot mine safely, then they will not mine at all and this indicates their willingness to invest heavily in the safety of their work. After these investments in safety, one would expect that accidents and workplace injuries would reduce but

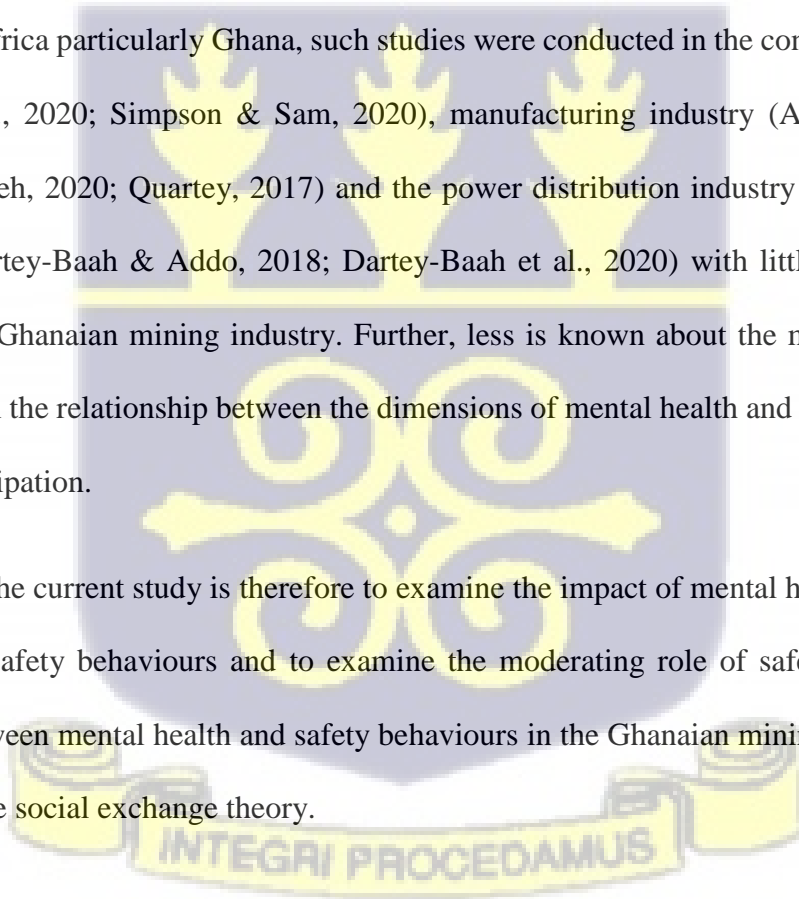
the industry continues to record cases of accidents and workplace injuries. For instance, in Ghana, the mining industry recorded some 197 first aid injuries in 2019 while serious injuries stood at 28 and fatal injuries recorded in the same period was 3 (Ghana Chamber of Mines, 2020). Despite safety processes and procedures being developed and implemented, these statistics demonstrate the goal of zero accidents is yet to be achieved, suggesting a gap in the way safety is viewed and managed (Yaris, Ditchburn, Curtis, & Brook, 2020). It is imperative therefore to examine the mental health of employees in the mining industry and how it affects their willingness to comply with safety regulations and participate in safety activities as most of these investments in health and safety are targeted to improve upon the physical safety of the employees to the neglect of their mental health (Street, Lacey, & Somoray, 2019).

Research on the constructs of mental health is inconclusive. For example, Headey, Kelley and Wearing (1993) opine that the dimensions of mental health are life satisfaction, positive affect, anxiety and depression. McHorney and Ware (1995) posit that anxiety, depression, emotional or behavioural control and positive affect are the underlying constructs of mental health. Similarly, Terluin et al (2004) indicate that distress, depression, anxiety, and Somatization are the dimensions of mental health. Suls and Bunde (2005) provide that anger, anxiety and depression are the key constructs of mental health. Spell and Arnold (2007) further assert that mental health is primarily conceptualized as both anxiety and depression. These different perspective does not offer a better understanding of the concept of mental health. Consequently, Hulls et al (2020) argue that future research on the concept of mental health and its intervention in male-dominated industry like the mines is welcoming in an attempt to provide useful information on the concept for better understanding.

The mining industry compared with other industries provides some unique issues that may impact the mental health of employees in the industry (Asare-Doku et al., 2020). These unique issues include physical hazards, high job demands, remote work locations with limited access to support services and breakdown of family ties, exposure to high risk to injury and male-dominated (Douine et al., 2018; Salas et al., 2015). Some other factors such as type of mine, rostering, high strain and active jobs, shift length, commute type and repetitive jobs have been identified to affect the mental health of miners significantly (Asare-Doku et al., 2020; Lu et al., 2020; Salas et al., 2015). In a narrative review, Asare-Doku et al (2020) avert that the presence of these challenges and factors provides the need to recognize the growing concern of the prevalence of anxiety and depression in male-dominated industries including the mining industry. Other researchers postulate that employees in the mining industry tend to experience higher forms of anxiety and depression than other employees from different industries (Bowers, Lo, Miller, Mawren, & Jones, 2018b; Mclean, 2012; Salas et al., 2015). Consequently, Asare-Doku et al (2020) provide the need to conduct a study to examine the prevalence of anxiety and depression in the mining industry and whether these concepts have impact on other variables including safety compliance and safety participation. Though the Social Exchange Theory (SET) is a widely used theory in social science research in the study of voluntary behaviours (Akarsu, Foroudi, & Melewar, 2020; Chang, 2021; Cook, Cheshire, Rice, & Nakagawa, 2013; Cropanzano & Mitchell, 2005), the theory lack theoretical precision. After a critical literature review, Cropanzano, Anthony, Daniels and Hall (2017) assert that in order to boost the precision and the utility of the social exchange theory to predict human behaviours, more studies in different contexts are needed. The current research responds to this call by applying the social exchange theory in the study of the variables in order to reiterate the relevance of the theory.

Research on safety climate and safety behaviours – safety compliance and safety participation in western countries is extensive. The research on the study variables in the US, Europe, Australia and Asia with different industries – construction industry (Dale, Colvin, Barrera, Strickland, & Evanoff, 2020; Kapp, 2012; Lingard et al., 2019; Zuofa & Ocheing, 2017), education (Barling & Hutchinson, 2020; Mcphee, Samnani, & Schlosser, 2019; Vara et al., 2020; Wu, Chen, & Li, 2008), petrochemical industry (Cheng et al., 2020; Kvalheim & Dahl, 2016; Xue et al., 2020), manufacturing industry (Kapp, 2012; Oah et al., 2018; Saedi et al., 2020), transport industry (Cheng, 2019; Thurston & Glendon, 2018; Wei, et al., 2016) and the ports (Kim & Gausdal, 2017; Lu & Yang, 2010) are very commendable. Though the study variables have received attention by researchers in Africa particularly Ghana, such studies were conducted in the construction industry (Agyekum et al., 2020; Simpson & Sam, 2020), manufacturing industry (Amponsah-Tawiah, Boateng, & Tetteh, 2020; Quartey, 2017) and the power distribution industry (Addo & Dartey-Baah, 2019; Dartey-Baah & Addo, 2018; Dartey-Baah et al., 2020) with little research on the variables in the Ghanaian mining industry. Further, less is known about the moderating role of safety climate on the relationship between the dimensions of mental health and safety compliance and safety participation.

The purpose of the current study is therefore to examine the impact of mental health (anxiety and depression) on safety behaviours and to examine the moderating role of safety climate in the relationship between mental health and safety behaviours in the Ghanaian mining industry within the context of the social exchange theory.



1.3 Research Objectives

The main objective of the study is to examine the impact of the two dimensions of mental health (anxiety and depression) on the dimensions of employee safety behaviours (safety compliance and safety participation). Specifically, the study seeks to achieve the following objectives;

1. To examine the impact of anxiety on safety compliance and safety participation.
2. To assess the impact of depression on safety compliance and safety participation.
3. To find out whether safety climate moderates the relationships between anxiety and depression and safety compliance and safety participation.

1.4 Research Questions

The study seeks to answer the following questions;

1. What is the impact of anxiety on safety compliance and safety participation?
2. What is the impact of depression on safety compliance and safety participation?
3. Does safety climate moderate the relationships between anxiety and depression and safety compliance and safety participation?

1.5 Research Hypotheses

1. Anxiety will have a significant negative effect on safety compliance.
2. Anxiety will significantly predict safety participation negatively.
3. Depression will have a significant negative effect on safety compliance.
4. Depression will significantly predict safety participation negatively

5. Safety climate will moderate the relationship between the dimensions of mental health and the dimensions of safety behaviours such that the impact of the dimensions of mental health on the dimensions of safety behaviours will be stronger when there is a poor safety climate.

1.6 Significance of the Study

The study would contribute to the mental health and safety behaviour literature by explaining the relevance of mental health in predicting the safety behaviours of employees in the Ghanaian mining industry. The study would also throw more light on the safety behaviours predominant in the Ghanaian mining sector and provides a better understanding of safety behaviours from the Ghanaian context. More so, the study would reveal the relevance of the social exchange theory in predicting work behaviours including safety behaviours. Finally, the study can be a reference document for the management of Ghanaian mining companies to identify, formulate and implement measures to improve the mental health of their employees in an attempt to induce more safety behaviours among them.

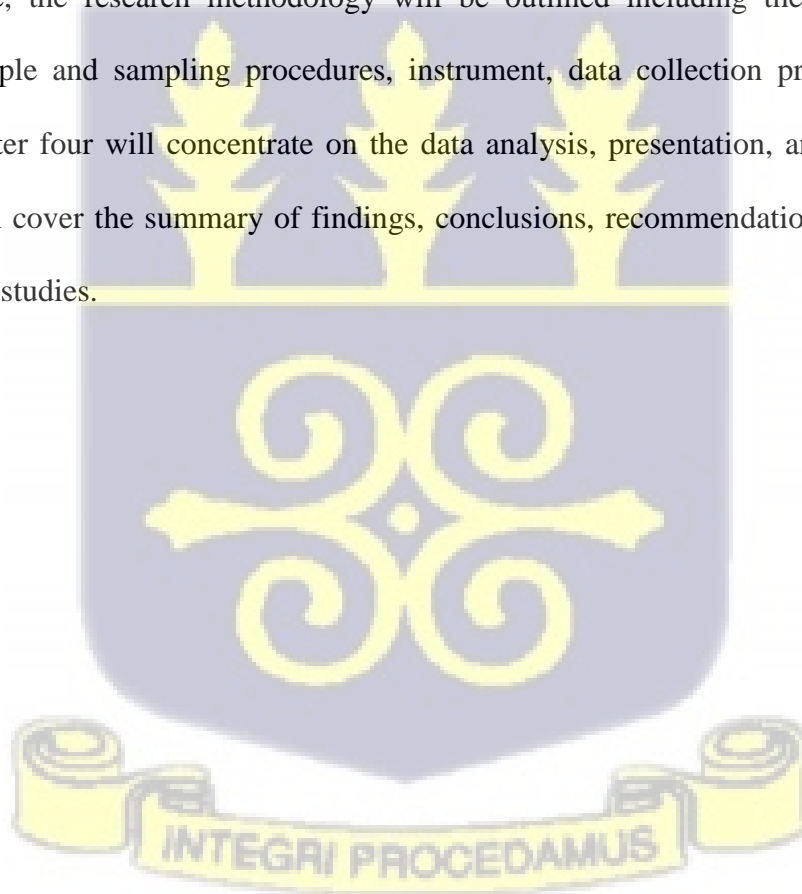
1.7 Scope of the Study

The increasing number of reported cases of workplace accidents and injuries in the mining industry has necessitated the need to improve safety behaviours in the industry. Consequently, the scope of the study will be limited to four companies in the Ghanaian gold mining industry - Gold Fields Ghana – Tarkwa, AngloGold Ashanti Iduaprim Limited, Abosso Gold Fields Limited – Damang and Adamus Resource Limited. The choice of these organizations was because of the increasing number of accidents cases recorded and the associated spending on compensations paid to affected individuals (Ghana Chamber of Mines, 2020) as well as the proximity of these organizations.

1.8 Chapter Disposition

The study will be structured into five chapters. Chapter one (Introduction) will cover the general introduction to the study grouped under the following sub-headings; study background, statement of the problem, the purpose and study objectives, the questions that guide the research, as well as significance of the study, the scope of the study and the limitations of the study. Chapter two (literature review) of the work will look at the assessment on the concept of mental health and its dimensions, safety behaviours, safety climate and the social exchange theory. An empirical review of the relationships among study variables would be provided.

In chapter three, the research methodology will be outlined including the research design, population, sample and sampling procedures, instrument, data collection procedure and data analyses. Chapter four will concentrate on the data analysis, presentation, and discussion and chapter five will cover the summary of findings, conclusions, recommendations, and suggested areas for further studies.



CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

The purpose of the current study is to examine the impact of anxiety and depression on employee safety compliance and safety participation behaviour whiles examining the moderating role of safety climate. Consequently, in this chapter, the researcher reviewed the constructs of the study, explained the theory that underpins the current study while providing justifications for the use of this theory. The chapter further reviewed related studies providing the basis for the formulated hypotheses. The final part of this chapter provided the conceptualization of the research variables in the Ghanaian context as well as the conceptual framework based on the formulated hypotheses.

2.2 Literature Search Methods Adopted

In order to establish the gaps in the literature that the current study seeks to address, a systematic literature review was conducted on the variables of the study – mental health (anxiety and depression), safety behaviours (safety compliance and safety participation) and safety climate. Systematic reviews through the integration of extant literature provide several critical discussions on a specific research theme (Paul & Criado, 2020). It further synthesizes prior studies as a means to identify knowledge gaps that need to be addressed and developing new theoretical frameworks (Kraus, Breier, & Dasí-Rodríguez, 2020). Further, a systematic literature review promotes transparency and replicability of research (Easterby-Smith, Jaspersen, Thorpe, & Valizade, 2015; Jesson, Matheson, & Lacey, 2011).

Information on the research constructs was primarily obtained in scholarly articles published in peer-reviewed journals. These articles were obtained through a search with keywords like “mental

health”, “mental illness”, “psychological distress”, “employee safety behaviours” and “safety climate” in databases – PubMed, Medline, PsycInfo, google scholar, Emerald Insight, EBSCOhost, Wiley, Taylor & Francis, Sage and Science Direct. The number of the database was sufficient as Romero, Guédria, Panetto and Barafort (2020) avert that a minimum of four databases is sufficient for a robust literature search. The adaptation of this method provides the researcher with the opportunity to obtain peer-reviewed articles on research variables from different disciplines of study and renowned publishers like Elsevier, Taylor & Francis, Wiley Online, Springer and Emerald. This search resulted in the generation of several published articles from peer-reviewed journals, books and book sections (chapters), conference proceedings and conference papers which were later subjected to the inclusion and exclusion criteria for inclusion in the systematic literature review.

2.2.1 Inclusion Criteria

In order to design a high-quality systematic literature review, an important stride is for researchers to establish the inclusion criteria which shall serve as a guide in selecting articles and papers for the review. The essence of this criteria is to carefully select high-quality papers that have gone through peer-review process and have met the standards of top-ranked journals for publication (Patino & Ferreira, 2018). Further, the inclusion criteria set boundaries for which if the said papers and articles are evaluated and if such criteria are met, these articles qualify to be part of a systematic literature review (Shaffril, Samsuddin, & Samah, 2020). In the current study, the inclusion criteria were defined to include all literature reviews, theoretical and empirical articles that researched the study variables - mental health (anxiety and depression), employee safety behaviours (safety compliance and safety participation) and safety climate. Whereas the theoretical papers afford the researcher an opportunity to critically examine the theories that have been used to study the

research variables, the empirical papers on the other hand will enable the researcher to establish the relationships that exist among the constructs (Fisch & Block, 2018). They opine further that articles that were purely a literature review summarized studies on the variables of interest by way of synthesizing previous research on the constructs and provide the direction of the trend in research of the said variables. The use of these papers enables the researcher to advance arguments on the theoretical gaps in the literature, understand the trend in current research on the variables as well as the relationship between anxiety and depression and safety compliance and participation that have been empirically tested and which form the bases for the formulated hypotheses.

The methods of archiving and retrieving information have changed over time due to the advancement in technology hence the selection of the theoretical and empirical articles were limited to those that were published from 2011 to April 30th 2021. In sum, a decade span of literature was examined in order to build the review on the most recent literature with consideration on information synthesis and retrieval in the digital age. The abstract of each article was given a review and when necessary, the full text was examined. This was to check whether the article was either theoretical or empirical and if empirical, the article researched the relationship between the study variables in earnest instead of merely mentioning it in service to other purposes. All the articles that met these criteria were later examined in light of the exclusion criteria discussed in the next sub-section.

2.2.2 Exclusion Criteria

Exclusion criteria identify attributes that prevent an article from being included in the systematic literature review as it is not the opposite of inclusion criteria (Connelly, 2020). This criterion is used to exclude irrelevant studies (those articles that do not relate to the current study variables)

from the gathered literature (Arshad et al., 2021). In this study, the review planned to exclude all articles that were published in foreign languages apart from English. The researcher can only read and understand the English language and the thesis is expected to be written in the English language as well hence the exclusion of articles published in other languages excluding English for easy understanding and comprehension. Similarly, all articles from non-recognized journals were excluded from the review. The Association of Business Schools in Britain (ABS) has over the years ranked journals for articles publications to determine the impact factor of these journals. Whilst it is duly acknowledged that the impact factor of these journals differs as some journals rank relatively higher than others (Patino & Ferreira, 2018), all journals ranked by the ABS are generally considered good journals for publication (Paul & Criado, 2020). In that vein, all articles that were published in non-ABS ranked journals were excluded from the systematic literature review. The articles downloaded were crossed checked for duplication. The use of the multiple scholarly search engine could result in the same journal article being downloaded twice each from a different search engine. Consequently, an exclusion criterion was set to remove duplicate articles thus, deleting one or more of a particular article that has been downloaded more than once. Anonymous business reports and articles with anonymous authors were also excluded in the current literature review. The referencing of anonymous business reports and authors are quite a hectic task and sometimes not even possible to reference. On that basis, such reports and anonymous persons who have authored such articles were excluded from the systematic literature review.

Finally, those articles that were found to be irrelevant or not related to the current study variables were also excluded. Though some articles downloaded contained some of the keywords used for the search in its title and abstract, a careful reading of the article revealed that same was not related

to the current study variables. For example, an article by Kirk, et. al (2019) on the title “Safety behaviours, experiential avoidance, and anxiety: A path analysis approach” was excluded in the current review because the content was irrelevant to the current study though some keywords such as anxiety and safety behaviours were part of its title.

The search for articles in scholarly search engines generated a number of results. After the initial cleaning, two hundred and six journal articles (206) were subjected to the inclusion and exclusion criteria. From this figure, the number of duplicate articles was seventy-two (72), articles that were published in non-recognized journals (i.e. journals that are not ranked by ABS) were nineteen (19). Thirty-six (36) articles were authored by anonymous persons which include anonymous business reports while twelve (12) articles were authored in foreign languages. Other articles that were identified to be irrelevant to the current research variables were twenty-seven (27). Currently, this systematic literature review was made up of forty (40) journal articles that met the criteria for selection and comprising twenty-six (26) empirical articles and fourteen (14) theoretical and literature review articles.

2.3 Conceptual Review

This section provides a review on the conceptualization of the study variables – mental health (anxiety and depression), employee safety behaviours (safety compliance and safety participation) and safety climate, their dimensions and their relationship with other variables.

2.3.1 The Concept of Mental Health

Mental health has revolved around as an important construct in global health. Global health has been defined as “an area for study, research and practice that places a priority on improving health

and achieving equity in health for all people worldwide” (Patel, 2014). He avers that based on the three key principles of global health (priority setting, health inequalities and solutions for health problems), mental health should be considered as central in the discussion of global health because the burden of mental health is huge and the determinants and solutions to same are costly. Recognizing the need to prioritize mental health is the first step in achieving superior global health as there can be no health without mental health (Prince et al., 2007). Patel et al. (2013) opine further that anxiety, drug and alcohol abuse and depression which are all mental health problems are among the most common and disabling health conditions worldwide. The general lack of consensus on the definition of mental health has been the major reason for the non-integration of mental health into primary healthcare delivery and global health (Manwell et al., 2015).

Mental health is defined as “a state of well-being in which an individual realizes his or her own abilities, can cope with the normal stresses of life, can work productively and is able to make a contribution to his or her community” (WHO, 2018). To this end, individuals and workers are considered to be mentally healthy when their physical, social and mental wellbeing are guaranteed (Black, Munc, Sinclair, & Cheung, 2019). Similarly, the American Psychiatric Association (APA, 2018) define mental health as “a condition that involves changes in emotion, thinking, or behaviour (or a combination of these) that are associated with distress and/or problems while functioning in social, work, or family activities”. In their view, mental illness arises when individuals encounter problems or challenges as they try to discharge their responsibilities at their workplace, in their families as well as the community. This affirms the postulation that mental illness emanates from different sources including the workplace within which the employee found him/herself, hereditary, the society as well as the individual family relations (Galderisi et. al., 2017). It is

therefore imperative to assess the mental wellness of mine workers not only from the workplace but the other sources as well.

Ideally, given the social and economic benefits of getting employed in the mines, individuals employed in the mining industry tend to have better mental health (Tynan et al., 2018). Further assertion illustrates that the mining sites can provide a vital location for interventions that would seek to alleviate the risk of mental ill-health, support the recovery from mental ill-health and promote the mental health of workers by ascertaining and reducing workplace hazards. The creation and maintenance of a mentally healthy workplace and workforce would maximize worker productivity and wellbeing (Milner, Scovelle, & King, 2018).

However, given the relative longer working hours in the mines which results in mine workers being stressed up coupled with a compressed roster, performing repetitive and physically demanding jobs as well as job insecurity associated with contract works and working in a considerable long distance from home which breaks family ties tend to affect the mental health of mine workers (Bowers et al., 2018; Liu et al., 2015; Milner et al., 2018; Tynan et al., 2018). Compared with individuals with mental health problems, employees who are found to be mentally healthier are found to be productive (Milner et al., 2018), are able to concentrate at work (Cieri & Lazarova, 2020) and are more likely to engage in safety citizenship behaviours (Street et al., 2019). On the other hand, poor mental health is associated with lost productivity (Lu, et al., 2020), workplace injuries (Amponsah-Tawiah, et al., 2013), employee turnover (Haslam, Atkinson, Brown, & Haslam, 2005) and mental illness related presenteeism and absenteeism (Tynan et al., 2018).

Help-seeking behaviours among mine workers who have mental health-related problems are scanty due to the male-dominated nature of the mines (Sayers et al., 2019). Evidence from the literature suggests that females employees are more likely to speak to health and psychological professionals when they encounter mental health-related problems than their male counterparts (Tynan et al., 2016). Male mine workers prefer to keep mental health problems to themselves for fears of stigmatization associated with mental health reportage which tend to affect their productivity at work and reduce their help-seeking behaviours (Considine et al., 2017). It has become necessary therefore to assess the prevalence of mental health in the Ghanaian mining industry which is considered to be one of the male domineering industries in the country where employees are adamant about seeking professional and health assistance when they encounter any mental health-related challenges.

Dimensions of Mental Health

The conceptualization of the dimensions of mental health is inconclusive. Whereas Headey, Kelley and Wearing (1993) opine that, the dimensions of mental health are life satisfaction, positive affect, anxiety and depression, McHorney and Ware (1995) posit that anxiety, depression, emotional or behavioural control and positive affect are the underlying constructs of mental health. Similarly, Terluin et al (2004) indicate that distress, depression, anxiety, and somatization are the dimensions of mental health. Suls and Bunde (2005) provide that anger, anxiety and depression are the key constructs of mental health. Spell and Arnold (2007) further assert that mental health is primarily conceptualized as both anxiety and depression.

Other researchers, for example, Bowers et al (2018) postulate that employees in the mining industry tend to experience higher forms of anxiety and depression than other employees from

different industries. Similarly, Considine et al (2017) avert that the prevalence rates for anxiety and depression in Australian mine workers are relatively higher than other forms of mental illness. More so, anxiety and depression symptoms are predominant in mine workers particularly male workers compared with their female colleagues (Sayers et al., 2019). In addition, though mental health problems such as job stress, burnout, job insecurity and psychological distress feature mainly in mental health research (Tynan et al., 2016), depression and anxiety are found to be more predominant in the mine population (Hulls et al., 2020; Ohrnberger, Fichera, & Sutton, 2017; Tynan et al., 2018).

In a narrative review, Asare-Doku et al (2020) avert that there is the need to recognize the growing concern of the prevalence of anxiety and depression in male-dominated industries including the mining industry and the need to assess its impact on other research constructs such as safety compliance and participation behaviours. Depression and anxiety are two of the most common mental health diseases in the world, with each having a thirty percent lifetime prevalence (Olaoluwa, 2021). Depression and anxiety disorders are extremely common in primary care settings. Half of the persons with one condition are thought to have signs of the other (Weaver et al., 2018). Many risk factors are shared by depression and anxiety, including cognitive biases, environmental exposures, and genetic impacts (Olaoluwa, 2021). In line with the above evidence from literature, the current study conceptualized anxiety and depression to be the main dimensions of mine workers mental health.

Anxiety

Anxiety or anxiety disorder is perhaps the most complex reaction to stressful stimuli and is described as an uncomfortable thrill that an individual feels when the individual is afraid or tense

(Olaoluwa, 2021). Anxiety is a warning indicator that a person is aware of an impending risk and is preparing to cope. According to Suls and Bunde (2005), anxiety is an aversive state which emanates from the feelings of being unable to predict, control or obtain desired outcomes. To this end, anxiety can be considered as something that all humans go through, and if it is mild, it's not just harmful, but it's also regarded as an adaptive response that keeps people always ready to deal with abrupt and dangerous events.

Anxiety is conceptualized as a natural reaction to a perceived threat and is exhibited behaviorally, cognitively and physiologically (Blakey & Abramowitz, 2016). In their view, when individuals perceive the tendency for any danger to happen to them, they tend to be anxious and take reasonable steps to avoid such harm from happening to them such as escaping from the alleged danger. Although anxiety is evolutionarily adaptive, those with pathological anxiety experience anxiousness in the absence of real threats. There are forms of anxiety that are considered harmful and cause obstructions to normal activities and failures while others are considered as constructive, useful and natural and form a component of the personality structure (Adler et al., 2014). The feeling of anxiousness of impending tasks to be completed are considered to be a positive aspect of anxiety as it compels the employee to prepare some coping mechanisms for the impending task. However, when individuals are unable to predict and control events that are happening around them and are unable to achieve any desired outcome, then such employees are believed to be experiencing anxiety that is detrimental or harmful.

Anxiety disorder can be classified into different types. In their view, Balsamo, Cataldi, Carlucci, and Fairfield (2018) argue that the fear and avoidance of situations and places that would cause an individual to panic, feel embarrassed and helpless is considered agoraphobia. The feeling of anxiousness caused by direct physical health problems such as diabetes is referred to as anxiety

disorder due to a medical condition. Whereas the worry about routine and ordinary events and issues are known as a generalized anxiety disorder which affects individuals ability to control what is happening around, panic disorder is characterized by recurring bouts of severe fear or anxiety that peak within minutes (Balsamo et al., 2018). Panic disorders are associated with feelings of impending doom, fluttering, chest pain and shortness of breath. These panic episodes may cause you to worry about them happening again, or you may avoid circumstances where they've happened. Also, Bazargan and Amiri (2018) explained selective mutism as the anxiety disorder where children consistently fail to speak in schools situations but can comfortably speak in different situations like the home with close family members which tend to inhibit the functioning at work, school and social activities. Children who are nervous create self-defeating ideas such as "I am not good at this" and "I will never be able to understand this," which adds to their tension. They further allude that the kind of anxiety that children suffer as a result of the separation from their parents is classified as a separation anxiety disorder.

Social anxiety disorder also known as social phobia is considered as high-level anxiety which include the fear and avoidance of social situations. This is mainly due to the feelings of self-consciousness and embarrassment as well as being concern about how others would judge the individual negatively (Taylor & Alden, 2010). Anxiety disorder can also be substance-induced – the feeling of anxiousness as a result of being exposed to toxic substances, taking medications, withdrawal from medications and the misuse of drugs. When an individual is anxious as a result of being exposed to a specific situation or object, then the said individual is believed to be suffering from specific phobias (Moscovitch et al., 2013). All other forms of anxiety disorders that have the tendency to disrupt the individual activities but do not meet the exact criteria to be classified under the aforementioned anxiety disorders are broadly classified as unspecific anxiety disorder.

In general, there are three prominent antecedents of anxiety – physical or medical, social and hereditary or genetic factors (Olaoluwa, 2021). Factors such as having parents with chronic anxiety disorders (anxiety disorders tend to run in family), screening for anxiety when the individual was a child and non-avoidance of situations that caused panic and fear among siblings or the individual when he was a child are considered as the hereditary or genetic factors that cause anxiety disorders among working adult. Factors such as drug misuse or withdrawal, heart disease, respiratory disorders, diabetes and chronic pain are the leading medical factors that cause anxiety in the working population (Balsamo et al., 2018; Blakey & Abramowitz, 2016; Moscovitch et al., 2013). Other factors such as job insecurity, job stress and performing physically demanding jobs are some of the physical causes of anxiety disorders (Bowers et al., 2018b). The social factors that cause anxiety among the working population include, separation from spouses because of long-distance, work-life imbalance, fear of being judged negatively by others and break-down of family relations (Milner et al., 2018).

Shyness or discomfort in specific situations is not always the symptoms of anxiety disorder as personality traits and life experiences influence how comfortable people are in social situations (Balsamo et al., 2018). Some individuals are more reserved by nature, while others are more outgoing and this tends to affect their anxiety level and how they show it off. The commonest signs of anxious employees include feeling tense and nervous (Silverberg et al., 2019), breathing rapidly and having trouble sleeping (Smith et al., 2019), trembling and sweating (Twenge & Joiner, 2020), feeling weak and having a sense of impending danger (Elhai et al., 2020) and having difficulty controlling worry and inability to concentrate (Poole, Dobson, & Pusch, 2017). Spell and Arnold (2007) opines that anxiety is accompanied by worry, inability to relax, anxiousness, and tension. Anxiety disorder contributes largely to losses in productivity, workplace injuries and high turnover

intentions (Amponsah-Tawiah et al., 2013; Tynan et al., 2018) and can be mitigated when workers seek help earlier (Considine et al., 2017) and stay active by participating in activities that they enjoy and make them feel good about themselves and avoiding alcohol use (Sayers et al., 2019).

Depression

Depression is the most common mental health disorder in the adult population. A study by Bromet et al (2011) to identify the prevalence of depression symptoms in eighteen (18) countries found that within 12 months, 5.6 percent of the population in high income earning countries experience depression symptoms while 5.9 percent of the population in low to middle income earning countries screened for depression. The average lifetime of depression symptoms in twelve months was estimated as 14.6 percent for high income earning countries and 11.1 for low to middle income earning countries (Bromet et al., 2011). This means that though depression is common in low to middle income earning countries as compared to high income earning countries, given the collectivism nature of low to middle income earning countries cultures, depression symptoms last less long in such countries than the high income earning countries with a higher symptoms lifetime. In Ghana, a projection of two million (2,000,000) people screen for depression symptoms within twelve months (Kyei, Oswald, Njoku, Kyei, & Vanderpuye, 2020).

Depression is classified as a mood disorder and can be conceptualized as the consistent feeling of sadness and hopelessness (Lim et al., 2018). It also involves the loss of interest in those activities that one enjoys the most. For example, a strong supporter of Manchester United who loves and enjoys football so much can withdraw from any football-related activities when they are depressed. Everyone has highs and lows moments of their lives for a variety of reasons, so when someone feels low, they are not necessarily said to be depressed even when they say so (Olaoluwa, 2021).

This is because depression is considered as a mood condition that lasts for a long time which has the tendency to impact an individual's capacity to carry out daily tasks, be interested in activities and feel pleasure. Depression can be mild, moderate or severe depending on the intensity of the symptoms and how long the symptoms last and may require different medical treatments (Sharpley, Bitsika, Sarmukadam, & Agnew, 2019). In their view, the American Psychiatric Association explains that though the symptoms of mild or moderate depression can be similar to severe depression, the symptoms in the former are less intense (APA, 2018).

Depression can be conceptualized into different forms. The first type of depression is major depressive disorder, which is explained as an enduring disorder characterized by low self-esteem, inability to concentrate or think, fatigue, disturbed sleep and loss of interest in pleasure which has higher mortality and non-recovery rates and affects about 10 percent of the world population and largely connected with a bigger risk for suicidal behaviours (Wang et al., 2020). Similarly, Sharpley et al (2019) assert that an individual with bipolar disorder goes through mood swings and may develop depressive symptoms before or after an elevated mood, during which they have a lot of energy. Whereas perinatal depression can occur during pregnancy and can last a bit longer like days, weeks and months, postpartum depression includes extreme fatigue and sadness which impair parent's ability to care for their infants (Petralia et al., 2020). Finally, the seasonal affective disorder is the last type of depression that occurs during short periods of winter and rainfall which forces people to withdraw socially and sleep more because of the general lack of sunshine and changes in sleep patterns (Wang et al., 2020).

Extant literature suggests that genetic factors, hormones and chemicals, lifestyle factors, an individual current situations and background, as well as medical conditions, contribute greatly to the development of depression in the population (Lim et al., 2018; Petralia et al., 2020; Sharpley

et al., 2019; Wang et al., 2020). For example, Lim et al (2018) found that lifestyle factors such as having fewer social interactions and not exercising regularly which can lead to weight gain can increase the risk of suffering depressive symptoms. They suggest further that an individual current situation such as job stress, financial issues, ending relationships, retirement and problems at work and home can affect them to be depressed. Though research on genetic factors that causes depression is at an early stage, Wang et al (2020) suggest that particular genes play a key role in developing depression symptoms in an adult population. Similarly, they found that physical health problems such as cancer, chronic illness, diabetes, chronic pain, insomnia and attention deficit hyperactivity disorder can trigger depression in people. If an individual has a family history of depression or mood disorder, then the said individual is more likely to acquire depression as there is evidence to suggest that if the frontal lobe of an individual brain is less active, then the individual is more likely to screen for depression (Timothy, 2020). Drugs and alcohol misuse can affect an individual risk to screen for depression as available evidence suggests that twenty-one percent of individuals who have a substance use problem also experience depression. Also, other factors such as the personal history of mental illness, divorce, stressful events, certain medications, economic problems, loss of loved ones and low self-esteem can cause depression (Olaoluwa, 2021; Sharpley et al., 2019).

Generally, depression symptoms are exhibited through mood changes, cognitive abilities, emotional and physical wellbeing, sleep patterns and behavioural changes which tend to differ slightly in men and women (Olaoluwa, 2021). In men, for example, Olaoluwa (2021) alludes that behavioural changes such as drinking excessively, suicidal thoughts, loss of interest, using drugs, no longer finding pleasure in favourite activities, feeling tired easily, engaging in high-risk activities are symptoms of depression. The women on the other hand exhibit behavioural changes

such as suicidal thoughts, loss of interest and withdrawal from social engagements. Also, mood changes in men include restlessness, anger, irritability and aggressiveness with irritability being the commonest mood change in women (Timothy, 2020). Cognitive abilities signs of depression in men include: delayed responses, inability to complete tasks and difficulties in concentration and that of women is largely talking slowly. The lack of sexual performance and reduced sexual desires are also common symptoms of depression in men. The emotional symptoms of depression tend much more to be the same for both genders which include the feeling of hopelessness, sadness and emptiness. The physical symptoms of depression in women tend to be greater – increased cramps, changes in appetite, decreased energy, aches, weight changes, greater fatigue, pains and headaches whilst men tend to experience headache, fatigue, digestive problems and pains (Olaoluwa, 2021). Individuals experience depression in different ways which may interfere with one's daily work, causing a loss of time and lower productivity (Sharpley et al., 2019; Timothy, 2020).

Mental Health Regulations in Ghana

Mental health in Ghana are generally regulated by the Mental Health Act 2012 (Act 846), specifically in workplace relationships by the Factories, Offices and Shops Act 1970 (Act 328), Workmen Compensation Act 1987 (Act 187) and most importantly the Ghana Labour Act 2003 (Act 651) and the mining industry by the Health, Safety and Technical Regulations, 2012 (L.I. 2182), the Environmental Protection Agency Act 1994 (Act 490) and the Mining Regulations 1970 (LI 665). These acts generally enjoin the management of companies in Ghana and particularly mining companies to ensure a safe workplace for all workers at all times. This will go a long way to improve the mental wellness of the population by increasing access to mental health care which will boost workers confidence and reduce workplace accidents and injuries.

As a former British colony, Ghana's governance and legal systems are modelled upon the United Kingdom's systems as they existed in the colonial era. In 1888, Ghana's first legislation on mental health (Lunatic Asylum Act of the Gold Coast) was adapted. This was however replaced in 1972 by a Mental Health Decree (NRCD 30) which was never implemented (Walker, 2015). After eight years of political processes and broadly consultative development, a new Mental Health Act was enacted by the fifth parliament of the fourth republic in 2012 to replace the unimplemented decree on mental health. The Mental Health Act 2012 (Act 846) was endorsed as an example of mental health legislation best practice by the World Health Organization (Walker, 2015) and primarily focus on the creation of community-based and modern mental health systems and the protection of the rights of individuals living with mental health conditions.

The first section of the act highlights the establishment of the mental health authority which is responsible for ensuring mental health regulations in Ghana. They are charged with the primary responsibility of driving the country's agenda of providing modern and community-based mental health systems. Other salient provisions of the act include the protection of the rights of persons living with mental health disorder (sections 54 – 63), protection of vulnerable groups (sections 64 – 79), voluntary and involuntary admission and treatment procedures for persons with mental illness (sections 39 – 53) and the establishment of mental health fund (sections 80 – 87). There are however some barriers to the effective implementation of the act. Walker (2015) for example identifies the limited dissemination of the act, financial limitations and the Attorney General Department's delays in approving the legislative Instrument as some of the barriers to the implementation of the act.

Similarly, limited infrastructure for mental health care, poor access to patients at non-orthodox mental health facilities and inadequate human resources were cited as some challenges to the

implementation of the act (Walker & Osei, 2017). Despite these challenges, Ghana has made significant efforts to implement fully, the mental health act. While waiting for the Legislative Instrument that has been reviewed and submitted to parliament for approval, the mental health authority has developed a 4-year strategic plan for the implementation of the act and is in the process of drafting a 10-year policy on mental health in Ghana (Walker & Osei, 2017).

Some provisions of the Mental Health Act 2012 (Act 846) are highlighted for their relevance to the current study. For example, sections 54 (2) and (3) protects persons with mental health disorders from being subjected to any acts of discrimination both at their place of residence and at their respective workplaces. Further, this provision suggests that persons with mental health disorders cannot be dismissed from the place of employment on the basis that they have mental health disorders. This places a burden on companies to manage and help workers who develop a mental illness to recover rather than dismissing them from their place of work. Section 63 (2) provides that

“Where an employer has reasonable cause to believe that a worker is suffering from a mental disorder severe enough to affect the work output of the worker, the employer may assist the worker to seek medical advice in accordance with the prescribed procedure” (Mental Health Act, 2012, p.26).

The provision of the section above enjoins the management of institutions and companies to provide support for employees who have mental illness rather than releasing them of their post or terminating their employment. However, where workers are incapacitated to work that warrants the termination of their employment, section 63 (4) of the act provides that, the termination of the employment of persons with mental health disorder should be within the remit of the law

specifically by following the provisions on the fair termination of employment in section 62 of the Labour Act, 2003 (Act 651).

Employment relationships in Ghana are largely governed by the Labour Act 2003 (Act 651). Part XV (sections 118 – 121) of the act provides the regulatory framework for occupational health, safety and environment management in the workplace. Specifically, sections 118 (1) and (2) provides that it is the employer's responsibility to ensure that employees employed work in a conducive environment that is safe, satisfactory and promotes the health of workers. Also, the employer is besieged to prevent accidents and injuries to health arising out of work by minimizing the risks and hazards inherent in the working environment (section 118 (2) (h)). The employee, on the other hand, is expected in accordance with section 118 (3) of Act 651 to use personal protective equipment and safety appliances as provided by the employer and in compliance with the employers' instructions. Section 118 (5) further provides that it is an offence for an employer not to discharge the responsibilities under sections 118 (1) and (2) of the act and is liable to a summary conviction to a fine not exceeding 1000 penalty units or to imprisonment for a term not exceeding 3 years or to both.

Employees are permitted to withdraw from the workplace when they believe that certain situations are capable of causing danger to their lives and health after reporting such situations to their immediate supervisor (section 119). The final bits of part XV (section 121) mandates the sector minister to make regulations through legislative instruments that provide specific measures to be taken by the employer to safeguard the health and safety of his/her workers. Consequently, the Health, Safety and Technical Regulations, 2012 (L.I. 2182) and the Mining Regulations 1970 (LI 665) have been enacted to regulates mining activities in Ghana.

2.3.2 The Concept and Dimensions of Employee Safety Behaviours

Safety behaviour is a major concern to most organizations in the world and Ghana in particular due to its ability to influence a number of organizational outcomes such as achieving superior safety performance and the reduction of accidents and workplace injuries (Amponsah-Tawiah & Mensah, 2016). Employee safety behaviours are conceptualized to be an integral feature of safety performance such that as employees exhibit safety behaviours, then they are undertaking safety and work performance (Cheng et al., 2020). Safety behaviours are generally described as practices that conform to the safety needs of the organization and that are likely to increase the overall safety performance of the firm.

According to Griffin and Neal (2000), safety behaviours include a variety of activities executed by individuals to sustain a safe workplace. These activities include the integration of employee behaviours that help to maintain and improve the overall level of safety in the workplace and individuals' actions of adhering to conventional safety regulations, rules and procedures. Similarly, Lee et al (2019) allude that an individual regards for safety and the behaviours they exhibit in line with safety requirements are regarded as safety behaviours. Safety behaviours are considered as all conducts and actions that are undertaken by workers and management of an organization to promote the practices of safety and can be used to measure the safety performance of the organization (Dartey-Baah & Addo, 2017). These actions include: the attendance to safety meetings (Kapp, 2012), the proper use of personal protective equipment (Kvalheim & Dahl, 2016), taking safety initiatives (Addo & Dartey-Baah, 2019), adherence to safety requirements and legal obligations, safety standards and safety policies (Dartey-Baah & Addo, 2017) and assisting colleagues on safety issues (Griffin & Hu, 2013).

It is important for researchers and practitioners to better comprehend the factors that result in employee safety behaviours. There are several antecedents of employee safety behaviours as recorded in the literature. Kapp (2012) for instance found that greater levels of contingent reward leadership and transformational leadership are associated with greater levels of construction workers safety behaviours and empowering leadership was found to be a significant predictor of safety behaviours (Lee et al., 2019).

Similarly, Dartey-Baah and Addo (2017) found idealised influence to have a significant positive impact on power distribution workers safety behaviours. Investigating the effect of the types of leadership styles and their associated dimensions on safety citizenship behaviors in the power distribution sector in Ghana, Dartey-Baah, Quarkey and Adotey (2020) found that transactional and transformational leadership styles had a strong positive effects on workers safety citizenship behaviours. In a related study, an organizational culture which is defined as a set of norms, core values, patterns and artefacts which oversee the way workers in an organisation interrelate and behave had a significant positive effect on employee safety behaviours (Quarkey, 2017).

Among firefighters in the United States of America, Smith et al (2016) found safety climate as a significant predictor of firefighters safety behaviours. Mcphee et al (2019) further found that perceived safety climate had a significant impact on Canadian university students safety behaviours. In a study to examine the effect of incivility, inconsistent leadership and safety climate on employee safety behaviours, safety climate was found as a significant predictor of healthcare workers safety behaviours (Mullen et al 2018). In the petrochemical industry, safety leadership had a strong positive impact on safety behaviours (Wu et al 2011).

The impact of safety behaviours can be felt in the organization at different levels – individual, group and organizational levels. At the individual level, safety behaviours were found to have a direct positive effect on employee satisfaction (Fernández-Muñiz et al., 2014) and employee turnover intentions (Tao et al 2020) but had a significant negative effect on employee job stress, unsafe behaviours and burnout (Tong et al., 2020). At the group or departmental level, employee safety behaviours were found to contribute greatly to team or groups support (Jiang et al., 2010), group safety climate (Paolillo et al, 2020) and group safety citizenship behaviours (Ye et al., 2020). Employee safety behaviours help the organization to reduce workplace accidents, injuries and near misses (Othman, 2012; Amponsah-Tawiah, Boateng, & Tetteh, 2020; Amponsah-Tawiah et al., 2013; Dartey-Baah & Addo, 2017; Quartey, 2017) and help in achieving superior safety performance (Agyekum et al., 2020; Mcphee et al., 2019; Wu et al., 2008).

Evidence from the literature suggests a consensus on the dimensions of employee safety behaviours. The categorization of safety behaviours was drawn on the model of work performance propounded by Borman and Motowidlo (1993). Based on this model, Griffin and Neal (2000) assert that the main constituents of employees safety behaviours were safety participation and safety compliance. Since its classification, safety behaviours have been studied as safety compliance and safety participation (Addo & Dartey-Baah, 2019; Cheng et al., 2020; Dartey-Baah et al., 2020; Kvalheim & Dahl, 2016; Xue et al., 2020). Broadly, safety compliance refers to the core safety activities that are performed by individuals in the organization in order to create and maintain safety at the workplace whiles safety participation is explained as those voluntary behaviours that help to create and maintain an organizational atmosphere that supports safety (Griffin & Neal, 2000).

Safety Compliance

There are different safety rules and procedures that are enacted to reduce unsafe behaviours and promote safe behaviours among employees in many organizations that are considered to be safety-minded. For instance, employees in safety-minded organizations such as mining companies are expected to carry out assigned tasks in accordance with work procedures, use their personal protective equipment in line with safety rules and apply the appropriate work practices to minimize workplace hazards (Singh & Misra, 2020). According to Griffin and Neal (2000), safety compliance is one of the major determinants of employees safety behaviours and can be explained as the core safety activities that are performed by individuals in the organization in order to create and maintain safety at the workplace. Safety compliance further involves the execution of tasks in a safe manner and the strict adherence to safety rules and regulations.

The narrow view of safety compliance as suggested by Kvalheim and Dahl (2016) explains the concept as behaviours that involve the adherence to safety procedures and standards, legal requirements and regulations. Singh and Misra (2020) acknowledged that the extent to which workers perform their duties and responsibilities at their workplace in a safe manner can be conceptualized as safety compliance. It is evident from these illustrations and conceptualizations that safety compliance can be said to involve two major behaviours – complying with safety rules, regulations and requirements (safety adherence) and the performance of work or duties in a safe manner (working safely). Safety adherence behaviours include: complying with safety rules at work (Chen et al., 2018), adhering to safety regulations (Vara et al., 2020) and observing safety standards (Hu, Yan, Casey, & Wu, 2020). Working safely behaviours also include the wearing of personal protective equipment (Kvalheim & Dahl, 2016), performing work with standardized procedures (Chen et al., 2018) and working with all safety equipment at all times (Othman, 2012).

Evidence from the literature suggests that some employees will only comply with safety rules and work in a safe manner just to avoid the adverse consequences for non-compliance and to keep their respective jobs while others comply with safety rules because they want to create high-quality services and output (Othman, 2012). It has become necessary therefore to examine the different forms of compliance – deep compliance and surface compliance.

Hu, Yeo and Griffin (2020) reconceptualized safety compliance into deep compliance and surface compliance behaviours. According to them, deep compliance encompasses the strategy and intention to complete required tasks and duties in a safe manner. Consistent with deep acting propounded by the emotional labour theory (Grandey, 2003) which states that employees comply with the emotional display rules with the intent of providing superior customer service, and the strategy that flows from that is to induce the emotions that are conducive to customer service. For example, a nurse when dealing with a suffering patient is expected to express empathy and sadness while a flight attendant when serving customers is expected to look cheerful and express a warm welcome. These behaviours are portrayed to express the willingness of employees and their organizations to provide high-quality customer service. In the mining industry, mine workers participate in deep compliance with the intention to maintain workplace safety and devote the required efforts for legislating risk management strategies expected to deliver the desired safety outcomes of the organization – reduction of workplace injuries and accidents (Hu et al., 2020). The intentions for deep compliance drives the attentional and cognitive effort to deliver safety outcomes and changes in mine workers outward behaviours. For instance, during risk analysis, mineworkers who engage in deep compliance take pragmatic steps to scan for risks, be alert to any sign of danger and take reasonable steps to develop strategies for risk reduction.

In contrast, surface compliance involves those behaviours that are geared towards demonstrating a mere compliance to safety rules and procedures (Hu, Yeo & Griffin, 2020). This form of compliance is consistent with surface acting propounded by the emotional labour theory (Grandey, 2003) which suggest that employees comply with safety rules to avoid the negative consequences for non-compliance. For example, for the fears of being punished for not obeying safety rules such as being sacked from the job or suspension without pay, workers will comply with safety directives. The intention of surface compliance drives the strategy to display suitable visible expressions by adjusting an individual's external expressions, which does not require attentional and cognitive efforts to alter inner moods. In the mining industry, mineworkers who engage in surface compliance may complete mandatory safety correspondence and glance through safety training materials with slight efforts invested in working safely (Hu et al., 2020). Surface compliance includes the non-engagement of high-level cognitive activities but involves the approach of directing one's effort towards the display of required behaviours at a shallow level that does not bring about the necessary desired organizational safety outcomes.

Generally, the antecedents of safety compliance behaviours are well documented in the literature. In the Norwegian oil and gas industry, for example, Kvalheim and Dahl (2016) found a stable causal relationship between safety climate and safety compliance over a seven-year period where safety climate accounted for a twenty-seven percent variance in safety compliance behaviours. A study to investigate two hundred and forty-one medical staff in China found that ego depletion had a significant effect on safety compliance behaviours (Chen et al., 2018). Also, safety management practices such as safety rules and procedures, management involvement in safety activities and safety training were found to predict safety compliance behaviours positively and significantly (Subramaniam, Shamsudin, Zin, Ramalu, & Hassan, 2016). Enwereuzor, Adeyemi and Onyishi

(2020) found in Nigerian para-medical staff that trust in a leader, employee involvement and workload had a significant positive effect on safety compliance behaviours. Poor safety leadership, rule clarity and lack of management commitment to safety was found as significant predictors of safety compliance behaviours in South Africa (Othman, 2012).

In Ghana, idealized influence (Dartey-Baah & Addo, 2017), organizational culture (Quartey, 2017), transformational and transactional leadership styles (Dartey-Baah et al., 2020) were found to be strong predictors of employee safety compliance behaviours. Other factors such as management commitment to safety and perceived punishment for non-compliance were positively related to deep compliance and while non-compliance punishments are positively related to surface compliance, management commitment to safety is negatively related to surface compliance behaviours (Hu, Yeo & Griffin, 2020). Addressing the outcomes of safety compliance behaviours, safety compliance behaviours were found to first enable the organization to achieve superior safety performance (Mcphee et al., 2019; Othman, 2012), help in the creation of a good safety climate (Salguero-Caparrós, Pardo-Ferreira, Martínez-Rojas, & Rubio-Romero, 2020) and the reduction of accidents and injuries at the workplace (Hu, Yeo & Griffin 2020; Quartey, 2017).

Safety Participation

Employee safety participation behaviour which is voluntary in nature is mostly overlooked during investigations of the causes of accidents and workplace injuries in safety-minded organizations. Instead, these investigations have generally focused on the non-safe equipment and machines as well as the non-compliance of safety rules as the major causes of workplace accidents and injuries (Liu, Zhou, Cheng, & Zhu, 2020). It is worth noting however that, mineworkers can mishandle mining equipment or operate mining machinery improperly when they refuse to participate and

actively learn from safety training. Similarly, precarious conditions of mining equipment and machinery will not be addressed when mineworkers fail to participate in safety inspections and safety discussions. Neal and Griffin (2006) found using longitudinal data that safety participation had a lagged effect on the number of accidents, later on, demonstrating the need to induce safety participation behaviours in mine workers in an attempt to reduce workplace accidents and injuries. Safety participation refers to employee's voluntary participation in safety activities, which aims to contribute to the development of a supportive safe environment.

Safety participation is conceptualized as those voluntary behaviours that help to create and maintain an organizational atmosphere that supports safety (Griffin & Neal, 2000). Safety participation replicates extra-role behaviours that extend beyond mere compliance to improve safety within the workplace setting and contribute to the development of a supportive safe environment. In their view, Griffin and Hu (2013) opine that safety participation behaviours are voluntary in nature and may not be recognized by the formal reward system of the organization and as such punishment cannot be meted out to individuals for not engaging in safety participation. For example, there are no rewards for attending safety meetings (Griffin & Neal, 2000) and an individual cannot be punished for refusing to assist a co-worker on any safety-related issue (Wei et al., 2016). Safety participation is susceptible to social desirability due to its discretionary nature and includes activities such as voluntary participation in safety meetings (Griffin & Neal, 2000), voluntary participation in safety training and safety related activities (Jiang & Probst, 2016), raising safety concerns (Wei et al., 2016), proactively assisting colleagues to solve safety-related problems (Martínez-Córcoles, Schöbel, Gracia, Tomás, & Peiró, 2012) promoting safety programmes in the organisation (Griffin & Hu, 2013) taking safety initiatives (Paolillo et al., 2016) and making suggestions to improve safety (Thurston & Glendon, 2018). From these examples and

conceptualizations, safety participation behaviours can be broadly categorized into two – prosocial safety participation behaviours and proactive safety participation behaviours.

Proactive safety participation behaviour refers to employees effort to encourages colleagues workers to raise and discuss safety issues in an attempt to recommend innovative suggestions that will seek to reform safety in the work environment (Liu et al., 2020). Ashour and Hassan (2020) assert that proactive safety participation behaviours provide a safety voice to employees in the organizations and help the organization to identify safety problems and take reasonable actions to minimize risk and improve safety incidents. Similarly, the intention to engage in proactive safety participation behaviours improves workplace safety (Liu et al., 2020), manage safety events and reduce safety-related accidents (Hafeez, Abdullah, Zaheer, & Ahsan, 2020). In contrast, prosocial safety participation behaviours which involve greater information sharing includes the employee effort to ensure cooperation among themselves to complete any safety given task and tendency to assist each other with safety-related problems (Liu et al., 2020). Prosocial safety behaviours expedite interactive harmony and help in reducing property damage and minor accidents (Hafeez et al., 2020) and protecting coworkers from dangerous situations (Liu et al., 2020).

Just like safety compliance, the antecedents of safety participation behaviours are well documented in the safety literature. The impact of numerous factors which ranges from organizational to individual have been investigated and their impact well established. For instance, work-to-family conflict had a negative impact on train drivers' safety participation behaviours (Wei et al., 2016). Safety motivation and safety knowledge were found as strong predictors of safety participation behaviours as passive safety leadership weaken these relationships while transformational safety leadership strengthen the impact of safety knowledge and motivation on safety participation behaviours (Jiang & Probst, 2016). Collaborative evidence from Martínez-Córcoles et al (2012)

suggest that empowering leadership had a significant relationship with safety participation while the relationship between the variables are mediated by collaborative learning. In the petrochemical industry, Saedi, Majid and Isa (2020) found safety climate to be a significant predictor of workers safety participation behaviours. This finding is consistent with earlier postulations that employee safety participation behaviours could be induced greatly by safety climate (Kvalheim & Dahl, 2016).

Other factors such as risk exposure (Thurston & Glendon, 2018), safety inspiring (Griffin & Hu, 2013), diversity climate (Paolillo et al., 2016), contingent reward leadership (Kapp, 2012), transactional and transformational leadership (Dartey-Baah et al., 2020) and organizational identification (Thurston & Glendon, 2018) have been found in the literature to be strong predictors of employee safety participation behaviours. Safety participation behaviours largely help the organization to reduce workplace accidents and injuries (Quartey, 2017) and the creation and maintenance of a good safety climate (Salguero-Caparrós et al., 2020).

2.3.3 The Concept of Safety Climate

Safety minded or critical organizations are considered to be entities with greater potential for workplace injuries, high employee stress levels and increased number of workplace accidents and include companies and state institutions operating in the mining industry, emergency services, oil and gas industry and the military including fire service (Nielsen, Eid, Mearns, & Larsson, 2011). Employees in the mining industry for example are exposed to a variety of hazards such as excessive noise which can damage the ear, so much dust in mine sites, transport accidents, dangerous chemicals and explosives and extreme weather conditions for night shift workers (Amponsah-Tawiah et al., 2013). It has become imperative therefore for safety-critical organizations to protect

their employees against life-threatening occupational risks and hazards as well as devise means to prevent the occurrence of these workplace accidents and injuries coupled with employee stress that emanate from the workplace. Workers perceptions of their organization's value for safety and management commitment to workplace safety had evolved as an important construct to influence employee safety behaviours in the quest to reduce workplace accidents, injuries and near misses (Hu, et al., 2020; Quartey, 2017).

Safety climate, the preferred phrase when psychometric surveys are used to uncover safety perceptions is described as a set of perceptions that employees hold regarding the priority of safety in their organization (Kvalheim & Dahl, 2016). Neal and Griffin (2006) postulate that psychological climate refers to a worker's perception of his workplace and the sharing of this perception among employees in a particular organization can be termed as a group or organizational climate. In their view, different forms of climate such as innovation climate, service climate and safety climate predict diverse facets of the work environment. Zohar (2000) asserts that safety climate is the perception that the workforce of an organization has regarding the level of safety. Similarly, safety climate is conceptualized as individual assessments about an organization's policies, procedures and practices enacted to ensure that workers perform their functions in a safe work environment and further explained as the employees' discernment of their organization's value for safety (Goldenhar, et al., 2019) which is articulated through organizational safety policies, adherence to safety practices and safety procedures (Sinclair, et al., 2010). Safety climate describes an employee's perception about the value his or her organization places on safety and how its values safety issues (Griffin & Neal, 2000). In line with these assertions, Amponsah-Tawiah et al (2020) suggest that safety climate refers to the degree to which employees feel the urgency and right attention of management on safety issues. When employees view their

organization's value for safety issues as high, then such organizations are characterized by a good safety climate. Similarly, when employees perceptions of safety values by the organization are low, then such organizations are said to have a poor safety climate. Extant literature suggests that safety climate had mostly been used as an independent variable and its impact on other safety constructs well documented. However, other studies examined the antecedents of safety climate and the following factors were identified. Environmental exposure, management commitment and safety-related practices were found to be significant predictors of safety climate (Dejoy, Smith, & Dyal, 2017).

Also, in a study to examines the degree to which workers in the construction industry recognize that safety is important in their organizations and how job satisfaction affects these observations when a moderating variable which is age, job satisfaction was found as a strong predictor of safety climate (Stoilkovska, Pančovska, & Mijoski, 2015). More so, Nielsen et al (2011) allude that safety climate is positively predicted by authentic leadership among offshore oil installation workers in Norway. Similarly, communication practices, team leader's transactional and transformational leadership styles had a significant positive effect on safety compliance (Lingard et al., 2019). Auzoult and Ngueutsa (2019) also found reflexivity and attitude to safety rules as determinants of safety climate. In recent times, though safety management programs had an effect on safety climate, the impact is said to be weak (Dale et al., 2020).

Safety climate literature has largely focused on the association between safety climate and safety behaviours – safety compliance and safety participation as well as the prevention of accidents and injuries. Studies have shown that a good safety climate is positively related to employees' safety behaviours but adversely related to injuries and accidents. Safety climate is an important concept to induce employees' safety behaviours. Sinclair et al. (2010) opine that safety compliance and

participation would be performed by employees if they perceive that their organization takes issues of safety very seriously. Similarly, strict adherence to safety policies, regulations and practices are exhibited by employees who have a strong conviction that their organizations value safety (Paolillo et al., 2016). More currently, Saedi et al. (2020) assert that employee safety behaviours are demonstrated by employees who work in organizations with a good safety climate. The creation of a good safety climate is the responsibility of the leadership of organizations as Kapp (2012) eludes that safety leadership is an imperative factor to create and maintain a good safety climate.

2.4 Theoretical Review

The study sought to assess the impact of anxiety and depression on mineworkers safety compliance and safety participation behaviours while assessing the moderating role of safety climate. Given that mineworkers safety behaviours are voluntary in nature (Thurston & Glendon, 2018) and influenced largely by organizational systems and procedures, the social exchange theory was adapted to explain the relationship between the research variables.

2.4.1 Social Exchange Theory

The Social Exchange Theory is a widely used theory in the study of relationships at the workplace and voluntary work behaviours (Cropanzano & Mitchell, 2005). Premise on the fact that workplace relationships generate numerous lasting exchanges between the organization and their employees and among employees themselves (Tsai & Kang, 2019), the social exchange theory is applied in examining these exchanges that may be economic or uneconomic in nature. SET was developed based on the seminal works of Blau (1964), the perception of benefits in exchange dealings and the study of social behaviour in the exchange process (Homans, 1958).

The social exchange theorist post that the exchange process usually occurs between two dependent parties – the initiator of the exchange on one hand and the recipient of the action on the other hand (Ward & Berno, 2011). The relationship and process of exchange between these parties grow into mutual commitments, loyalty and trust between them over a considerable long period of time (Vatankhah, 2021). This guarantee that when certain positive actions are initiated for example by the management of an organization because they know their employees to be loyal to them, they shall respond to the actions initiated in a positive manner. On the other hand, when social exchanges develop into trust, then employees can be assured that when they engage in citizenship behaviours, they will trust their organization to reward such behaviours by being fair to all of them.

The social exchange theory argues that the exchange process between the two dependent parties are based on a subjective cost and benefit analysis (Cropanzano, et al., 2017) such that actions and behaviours that were rewarded in the past are repeated and when such behaviours were rewarded frequently, their performance will also be rampant (Chernyak-Hai & Rabenu, 2018). Cook, Cheshire, Rice and Nakagawa (2013) argue that the exchange between the dependent parties is mostly guided by the cost and rewards associated with each exchange process which can be tangible or intangible and usually uneconomic. Similarly, Curcuruto and Griffin (2018) contend that the organization and its members will only engage in an exchange process when they are assured that reward will be maximized and there will be reduction in cost. Consequently, when the parties to the exchange process are guaranteed certain rewards usually uneconomic which comparably is more than the cost associated with the exchange, then the dependent parties will willingly engage in the exchange.

Just as its name suggests, the exchange process between the two dependent parties is usually social in nature that warrants a distinction between social exchange and economic exchange. According

to Blau (1964), economic exchanges are largely characterized by a more precise provisions on the cost and benefits of the exchange process whereas the obligation in the social exchange is largely not specified and uncertain. In economic interactions, parties often expect to receive the material, tangible and extrinsic rewards that are predetermined while the benefits in the social exchange are largely discretionary and can be both tangible or intangible and extrinsic or intrinsic rewards (Reader, Mearns, Lopes, & Kuha, 2017). More so, unlike economic exchange where rewards are predetermined and known which motivates parties to engage in the exchange, the social exchange works well on trust, loyalty and personal obligations which are discretionary as such issues like trust are built on previous exchanges that occurred between the dependent parties (Cook, Cheshire, & Gerbasi, 2020) and stay committed to the exchange process based on the norm of reciprocity.

The behaviours of workers in the organization during the social exchange process, their interactions with their employer and management of their organizations are greatly grounded on the assumption of the social exchange theory – the norm of reciprocity (Cropanzano & Mitchell, 2005; Mitchell, Cropanzano, & Quisenberry, 2012). According to the social exchange theorists, the norm of reciprocity means that parties to the exchange process form favourable or unfavourable reciprocations expectations which further means that if an individual believes that he has benefited from the benevolence of the organization or discretionary actions from colleague workers, then he is obliged to reciprocate these benevolence and discretionary actions with deserving actions in returns (Akarsu et al., 2020; Blau, 1964; Cropanzano et al., 2017). In line with the norm of reciprocity, a good action from one party should be rewarded (reciprocated) with a good treatment from the other and when one receives a good treatment from a colleague, the individual is obliged to reciprocate in the like way (Lee, Kim, Kim, & Kwon, 2017; Redmond, 2015). In proverbial

language, the norm of reciprocity can be understood as “one good turn deserves another” and “an eye for an eye, and a tooth for a tooth”.

Despite its rigorousness in the prediction of social interactions at the organization, SET is limited in some ways. First, SET virtually ignores culture’s role in the rules and norms that guide the social exchange processes at the workplace (Cropanzano & Mitchell, 2005). There is no doubt that the disparities in individual perceptions about rewards and reciprocity in relationships can be attributed largely to their cultural perspectives (Cropanzano et al., 2017). More so, social exchange theory treats the social exchange process as one that is based on trust and discretionary personal obligations which can generate conflict between the parties to exchange when trust is broken and kind gestures are not reciprocated necessitating legal regulations (Cook et al., 2020).

In line with the assumptions of the social exchange theory, the current study argues that, when mineworkers receive support from their organizations with safety-related issues, they will then reciprocate this support from their organization and engage in safety compliance and safety participation behaviours. More so, when organizational systems, policies and practices are geared towards the improvement of mineworkers mental health in an attempt to eradicate the hazards and factors that cause mine workers to be anxious and depressed, then mine workers in return will engage in safety behaviours. For example when mining organizations develop and implement mental health support programs like assistance in times of bereavement, marital problems and mass casualties, mine workers will feel that their organizations are ready to assist them when any mental health issue emerges which make them feel loved and thereby engaging in safety behaviours. On the other hand, when such programs are absent, mineworkers may feel that their organizations do not have them at heart and do not care about their wellbeing and hence withdraw from engaging in any extra-role safety behaviours.

Furthermore, when mineworkers perceive that their organizations treat issues of safety as serious matters and management are committed to safety, they communicate and train on safety needs, reward safety initiatives and provide safety leadership, then employees will reciprocate these positive safety climate attributes and engage in safety compliance and safety participation behaviours. Similarly, when issues of safety are taken for granted by the organization, management is more concerned about targets and speed other than safety, poor safety leadership coupled with the lack of communication and training on safety needs, then based on the norm of reciprocity, mineworkers shall perceive a poor safety climate and withdraw from safety compliance and safety participation behaviours. This affirms that when organizations create a good safety climate and initiate processes to improve workers mental health, they shall engage in safety behaviours.

2.5 Empirical Review

In this section, research on the study variables – dimensions of mental health (anxiety and depression), safety compliance and participation as well as safety climate are reviewed. These reviews form the basis of the formulated hypotheses that were tested after the collection of data.

2.5.1 Relationship between Anxiety and Safety Compliance and Participation

Numerous factors have been identified as antecedents of employees safety behaviours thus safety compliance and safety participation. The focus of this review however examines the impact of anxiety on safety behaviours and other safety citizenship behaviours. It is important to iterate that some safety behaviours are important in reducing the anxiety levels of workers (Yokozawa, Nguyen, & Tran, 2021) whiles the performance of other safety behaviours are influenced by the anxiousness of employees (Calderwood, Bennett, Allison, Trougakos, & Dahling, 2018).

Specifically, literature has found a positive effect of anxiety on safety behaviours in situations where the safety behaviours are performed as precautionary measures to prevent danger from occurring (Knowles & Olatunji, 2021; Yokozawa et al., 2021). On the other hand, the engagement in safety behaviours is reduced when employees are anxious, depicting a negative impact of anxiety on employee safety behaviours (Calderwood et al., 2018; Cheng & Mccarthy, 2018; Nauman, Malik, & Jalil, 2019). To elaborate, in a study to investigate the mediating role of job-related anxiety in the relationship between workers job performance and their self-efficacy among employees in Pakistan, Clercq, Haq and Azeem (2018) found that self-efficacy will only enhance job performance when employees experience lower levels of anxiety. They found further that employees performance were low and engagement in wrong behaviours were high in situations where employees are very anxious. This finding is consistent with Kouchaki and Desai (2015) postulation that anxiety leads to unethical behaviours among employees as it increases threat perception.

Similarly, in a study to understand the dark and bright sides of anxiety, Cheng and Mccarthy (2018) through a systematic literature review, found that anxiety had a negative impact on employees safety behaviours which tend to reduce their job performance. They found through the synthetisation of the literature that job performance reduced drastically among anxious employees than those who screened negative for anxiety. Also, anxiety was found to have a positive effect on counterproductive work behaviours defined as all voluntary behaviours that violate the norms, aspirations and culture of the organization (Chen, Li, Xia, & He, 2017). Counterproductive work behaviours are considered as deviant or misbehaviours (Amponsah-Tawiah et al., 2020) which may include non-compliance with safety rules and regulations and withdrawal from safety participation behaviours. This confirms the assertion that increase levels of anxiety will lead to the

non-performance of safety behaviours and low levels of anxiety will enhance safety compliance and safety participation behaviours and increase the life satisfaction rate of employees (Nauman et al., 2019).

More so, in a three-wave study on the title “Are Anxious Workers less Productive Workers? It Depends on the Quality of Social Exchange”, Mccarthy, Trougakos, and Cheng (2015) recruited 770 Canadian police officers, 595 Canadian police officers and 267 police officers to participate in the first, second and third waves of the study respectively. Through the theoretical lens of SET, the study examined the impact of anxiety on job performance, safety behaviours, resource depletion and emotional exhaustion. Anxiety had a negative effect on resource depletion through emotional exhaustion and anxiety had a significant negative effect on safety behaviours and job performance (Mccarthy et al., 2015). They argued that police officers work are tedious and stressful which increases their anxiety levels because they had to deal with dangerous crime scenes and violent offenders which causes them mostly to ignore the safety rules and regulations governing their work.

Employee anxiety or workplace anxiety was found in other studies to be strong predictors of safety compliance and participation behaviours and other safety citizenship behaviours among workers (Clercq, Ul, & Umer, 2017; Ng, Sorensen, Zhang, & Yim, 2019; Zhang, Shi, Zhou, Ma, & Tang, 2018). These studies found a negative effect of employees’ anxiousness on safety citizenship behaviours as well as safety compliance and participation behaviours. These findings are consistent with others that found similar conclusions in their studies – helping behaviours reduces when employee anxiety levels increases and increase levels of anxiety reduces work performance (Calderwood et al., 2018; Ford, Cerasoli, Higgins, & Andrew, 2011; Wang, Law, Zhang, & Li, 2018).

Contrary to these findings (negative effect of anxiety on safety compliance and participation behaviours), other studies have found a positive effect of anxiety on safety behaviours. For example, when employees are anxious, they perceive danger to occur to them and take reasonable steps to prevent such dangers from occurring (Blakey & Abramowitz, 2016) which motivates them to engage in safety behaviours (Yokozawa et al., 2021). This is in line with other postulations that anxiety has a positive effect on safety behaviours (Evans, Chiu, Clark, Waite, & Leigh, 2021; Knowles & Olatunji, 2021).

Arguing from the norm of reciprocity propounded by the social exchange theorists, when mining organizations direct their efforts to improve upon the anxiety levels of mineworkers, employees will reciprocate these kind gestures by complying with safety rules and regulations and participating in safety activities and in accordance with previous studies (Calderwood et al., 2018; Cheng & McCarthy, 2018; McCarthy et al., 2015), the following hypotheses were formulated.

H1: Anxiety will have a significant negative effect on safety compliance.

H2: Anxiety will significantly predict safety participation negatively.

2.5.2 Relationship between Depression and Safety Compliance and Participation

Research on the impact of depression on safety behaviours and other safety citizenship behaviours are inconclusive. Whereas some studies have found a negative relationship between depression and safety behaviours and negative effect of depression on safety behaviours and safety citizenship behaviours (Beseler, Stallones, & Beseler, 2013; Lerner et al., 2010; Woo, Kim, Hwang, & Frick, 2011), others found a positive relationship between depression and safety behaviours and positive effect of depression on safety citizenship behaviours (Funayama, Furukawa, & Nakano, 2013; Katz, Laposa, & Rector, 2020). To elaborate, in a study to assess the impact of depression on work

productivity, 102 respondents who have been diagnosed with depression were recruited to participate in the study. The respondents' self-rated job performance was assessed before undergoing treatment for eight weeks. Before treatment, depressed employees reported poor safety behaviours and job performance which were improved after undergoing treatment for depression (Woo et al., 2011). This is indicative of the fact that higher levels of depression in employees are associated with low levels of job performance and safety behaviours and improvement in depression levels of employees are associated with increased safety participation and job performance (Beseler et al., 2013; Ciocca et al., 2021).

More so, Lerner et al (2010) found depression to impair work performance as it contributed to absenteeism, presenteeism and unsafe behaviours among two hundred and eighty-six employees who were diagnosed with depression. Depression ability to impair work performance signifies a negative effect of depression on safety behaviours, absenteeism and presenteeism defined as reduced performance whiles at work (Alroomi & Mohamed, 2021). This finding is consistent with the findings of other studies that found a negative relationship impact of depression on work-related behaviours such as citizenship behaviours and work performance (Anwar, 2021; Hennekam et al., 2020).

Furthermore, Mcternan et al (2013) found that the cost of productivity loss due to depression per annum in Australia was estimated at \$2 billion. They demonstrated that depression reduces positive work attitudes such as commitment, safety behaviours and citizenship behaviours but fuels unsafe or deviant behaviours such as unethical and counterproductive work behaviours which lead to loss of productive time. Also, depression-related absenteeism and presenteeism cost Australian companies \$693 million per annum (Mcternan et al., 2013). More currently and in a study to examine the impact of anxiety and depression (caused by job insecurity) on hotel workers task

performance in Spain, depression was found to have a significant negative effect on hotel workers task performance which is achieved through compliance with food safety regulations and voluntary participation of hotel workers in safety activities organized by their companies. There is ample evidence in the literature to suggest a negative impact of depression on safety behaviours, safety citizenship behaviours, performance-related impairment and task performance (Beseler & Stallones, 2010; Wang & Gorenstein, 2014; Weaver et al., 2018).

Despite these findings, other researchers found a positive relationship between depression and safety behaviours as they opine that when employees are consistently feeling hopeless thus being depressed, they tend to engage in safety behaviours to avoid the negative consequences for non-performances (Funayama et al., 2013). In recent times, Katz et al (2020) found a positive relationship between screening for depression symptoms and the performance of safety behaviours.

In accordance with studies that found a negative impact of depression on safety behaviours (Alroomi & Mohamed, 2021; Lerner et al., 2010; Wang & Gorenstein, 2014; Weaver et al., 2018) and the norm of reciprocity in the social exchange process, the study hypothesized that:

H3: Depression will have a significant negative effect on safety compliance.

H4: Depression will significantly predict safety participation negatively.

2.5.3 Relationship between Anxiety, Depression, Safety Climate and Safety Compliance and Participation

Generally, there appear to be a consensus on the safety literature on the impact of safety climate on employees' safety compliance and safety participation behaviours. Most studies that have researched these variables have found a positive relationship between safety climate (Amponsah-

Tawiah et al., 2020; Smith, et al, 2019). The positive relationship means that an effort to improve workplace safety (good safety climate) will enhance safety behaviours among employees while a poor safety climate will demotivate employees to engage in safety compliance and safety participation behaviours. In a study to examine the multi-level safety climate relationship with fire-fighters safety behaviours, Smith et al (2019) found that organizational level safety climate and workgroup safety climate predicted safety compliance and safety participation behaviours positively. This is consistent with the findings of earlier studies which found a positive effect of safety climate on safety behaviours (Schwatka & Rosecrance, 2016; Smith & Dejoy, 2014).

More so, safety climate was found as a positive significant predictor of construction workers safety compliance and safety participation behaviours (Lyu, Hon, Chan, Wong, & Javed, 2018). Similarly, in a study to examine the relationship between safety climate and voluntary safety behaviours while examining the moderating role of employee voice, safety climate positively predicted citizenship behaviours and negatively predicted counterproductive work behaviours as employee voice moderated the relationship between safety climate and citizenship behaviour but not safety climate and counterproductive work behaviours (Amponsah-Tawiah et al., 2020). Consequently, Shin, Gwak and Lee (2015) assert that a good safety climate is able to mitigate the negative effect of mental illness on employee safety behaviours. A poor safety climate will worsen the negative impact of job demands which increase mental illness on safety behaviours (Hall, et al 2013).

Based on the social exchange theoretical lens, interactions within the organization involves social exchanges between two dependent parties – the employer (organization) on one hand and the employee on another hand (Ward & Berno, 2011). In the safety research literature, for example, the management of the organization is known to represent the employer in dealing with the other

party which is the employee (Vatankhah, 2021). Arguing from the norm of reciprocity propounded by SET (Cropanzano et al., 2017), when the management of organizations demonstrate their commitment to safety at work through safety communication, safety training, safety leadership and attending to the safety needs of the employees, workers will reciprocate their management commitment to safety by working safely and participate in safety activities though they may be anxious or depressed. On the other hand, when employees are anxious and depressed and their organization is not showing any concern about their safety needs, safety compliance and safety participation behaviours will decline.

Subsequently, this study hypothesized that safety climate will moderate the relationship between mental health and safety behaviours such that a good safety climate will lessen the negative impact of mental illness on safety compliance and participation behaviours and a poor safety climate will worsen the negative impact of anxiety and depression on safety behaviours. Specifically, the following hypotheses were developed.

H5_a: Safety climate will moderate the relationship between anxiety and safety compliance.

H5_b: Safety climate will moderate the relationship between anxiety and safety participation.

H5_c: Safety climate will moderate the relationship between depression and safety compliance.

H5_d: Safety climate will moderate the relationship between depression and safety participation.

2.6 Mental Health, Safety Climate and Safety Behaviours in Ghana

In this section of the chapter, the researcher acknowledges the contributions of different authors to the development of the research variables in the Ghanaian context. This will throw more light on the state of research on the constructs and the identifiable gaps that need to be addressed. Though the research variables are not entirely new to researchers in Ghana, there is evidence to suggest

that more novel works especially one that seeks to study the constructs in different sectors of the economy is welcomed. Ghana has demonstrated her commitment to improving the mental health of her population through the enactment of the Mental Health Act 2012 (Act 846) that seeks primarily to create a community based mental health systems that will increase access to mental health care (Walker & Osei, 2017).

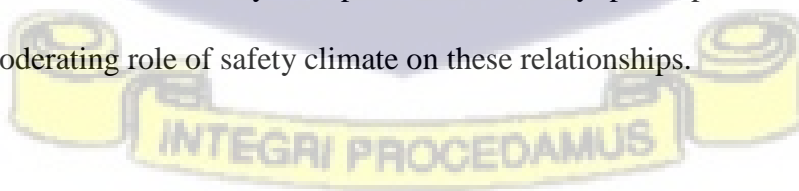
Even though there is an estimation that two million Ghanaians screen for a mental illness especially depression symptoms in twelve months (Kyei et al., 2020), there are indications to suggest that Ghana has recognized the need to integrate mental health care into the primary health care delivery, necessitating the need to make mental health care free provided the individual with mental illness has subscribed to the National Health Insurance Scheme (Walker, 2015). Similarly, against the background that the workplace can be a fertile grounds to cause mental illness, provisions of the Labour Act 2003 (Act 651) enjoins organizations and companies to ensure that their employees work in a safe work environment that will help to improve upon the mental health of the working population (Agyekum et al., 2020).

In Ghana, researchers have acknowledged that employee safety behaviours are an important construct to reduce adverse safety outcomes such as the prevention of workplace accidents, injuries and near misses (Amponsah-Tawiah et al., 2013). Safety compliance, safety participation and safety citizenship behaviours have evolved as an important construct to prevent the occurrence of accidents and injuries at the workplace (Amponsah-Tawiah & Mensah, 2016; Dartey-Baah et al., 2020; Quartey, 2017). Researchers have argued that there are several constructs that serve as the antecedents of safety compliance and safety participation behaviours in different sectors of the Ghanaian economy. For example, transactional and transformational leadership styles were found as significant predictors of safety citizenship behaviours – a term that was used interchangeably

with safety compliance and safety participation behaviours in the power distribution sector (Dartey-Baah et al., 2020).

In the same sector, idealized influence had a significant positive effect on power distribution workers safety behaviours while active management by exception had a significant positive effect on safety participation and not safety compliance (Dartey-Baah & Addo, 2018). In the manufacturing sector, Quartey (2017) found organizational culture as a significant positive predictor of employees safety behaviours. He avers that organizational factors such as organizational leadership, safe working conditions and the satisfaction that employees derive from their jobs are the major determinants of safety compliance and participation behaviours among employees which help to reduce accidents and incidents at the workplace.

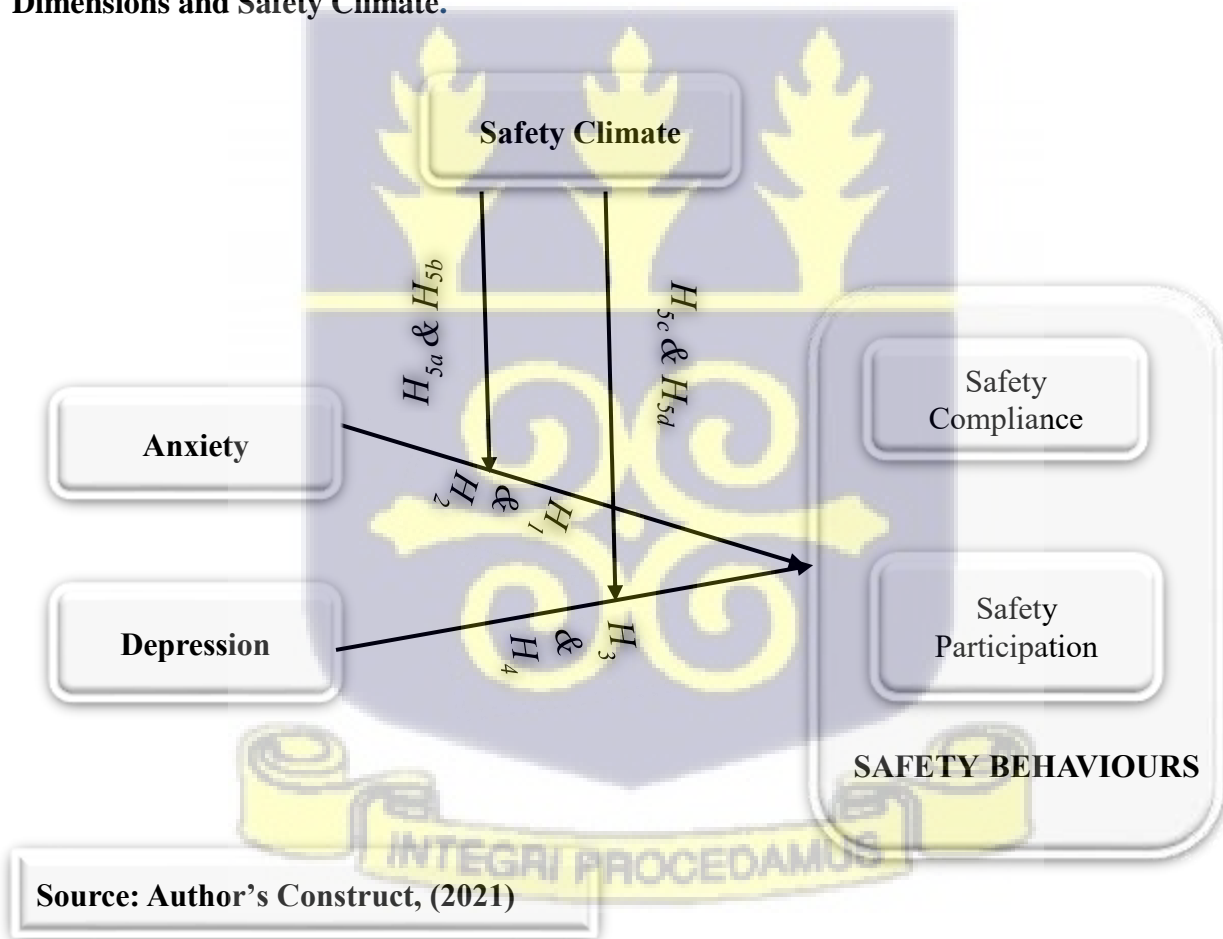
More so, safety climate was found as a significant predictor of safety citizenship behaviours as employee voice was also found to moderate the relationship between safety climate and citizenship behaviours (Amponsah-Tawiah et al., 2020). It is evident that research on the study's variables is not lacking, however, there has not been a research that examined the impact of mental health specifically anxiety and depression on safety behaviours to the best knowledge of the researcher. Given that the mining industry is characterized as one that is safety minded (Amponsah-Tawiah & Mensah, 2016), the current study examines the impact of anxiety and depression on mine workers safety compliance and safety participation behaviours while examining the moderating role of safety climate on these relationships.



2.7 Conceptual Framework

The conceptual framework as shown in figure 2.1 below illustrates the relationships that exist among researcher constructs. The conceptual framework was ground on the social exchange theory and the empirical review of the relations between mental health (anxiety and depression) and mine workers safety compliance and safety participation behaviours. It is evident from the framework that, anxiety and depression have some relations with safety behaviours and safety climate moderates such relations.

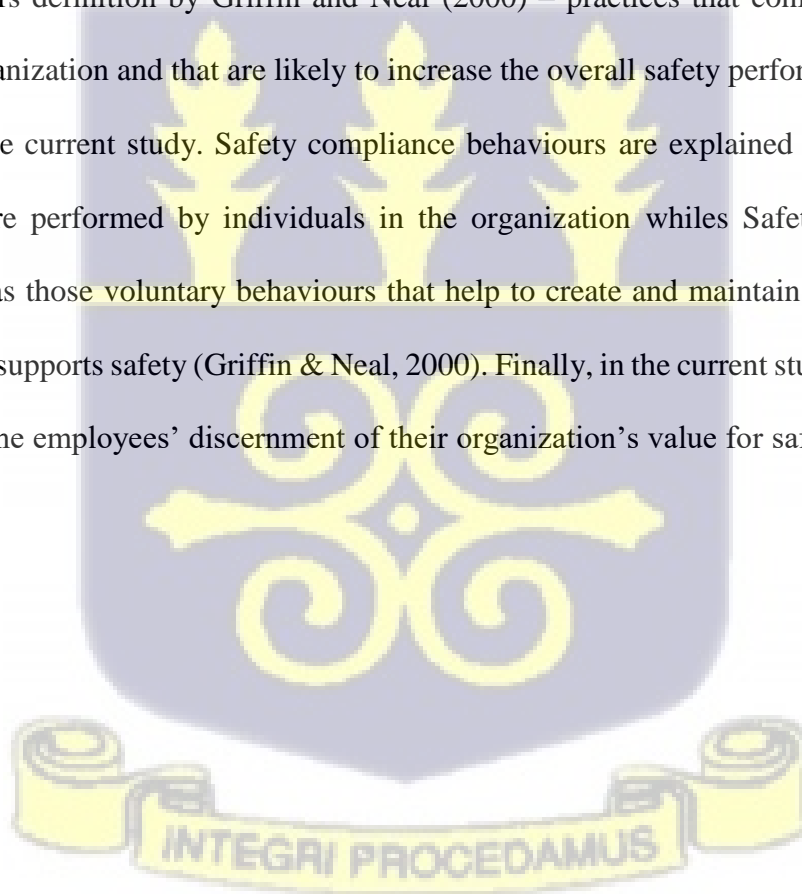
Figure 2.1: Proposed Relationships among Dimensions of Mental Health, Safety Behaviours Dimensions and Safety Climate.



2.8 Summary of Literature Review

In sum, the study adopts the World Health Organization's definition of mental health which is defined as "a state of well-being in which an individual realizes his or her own abilities, can cope with the normal stresses of life, can work productively and is able to make a contribution to his or her community" (WHO, 2018). Specifically, anxiety is defined as an aversion state which emanates from the feelings of being incapable to predict, control and obtain desired outcomes (Suls & Bunde, 2005) while depression is conceptualized as the persistent feeling of hopelessness and sadness (Lim et al., 2018).

Safety behaviours definition by Griffin and Neal (2000) – practices that conform to the safety needs of the organization and that are likely to increase the overall safety performance of the firm is adopted by the current study. Safety compliance behaviours are explained as the core safety activities that are performed by individuals in the organization while Safety participation is conceptualized as those voluntary behaviours that help to create and maintain an organizational atmosphere that supports safety (Griffin & Neal, 2000). Finally, in the current study, safety climate is explained as the employees' discernment of their organization's value for safety (Goldenhar et al., 2019).



CHAPTER THREE

METHODOLOGY

3.1 Introduction

The focus of this chapter is on the research methodology that was used to conduct the study - comprising the research paradigm, research approach and design. The chapter also deals with a description of the organizations, their population size and how participants were drawn from these organizations to participate in the study. More so, the chapter offers a detailed account of the measurement instruments, the data collection procedures used, as well as the methods of data analysis and the ethical issues considered in the current study.

3.2 Research Paradigm

For every research, the philosophical assumptions, values, concepts and practices that establish the way of perceiving the reality of the researcher influences the study (Rahi, 2017). These assumptions are commonly known for the generation of knowledge in the social, human and natural sciences (Tharsika & Pratheepkanth, 2020). In the opinion of Sobh and Perry (2006), a paradigm refers to the researcher's world view or the overall conceptual framework which guides the researcher to conduct the study. Similarly, Park, Konge and Artino (2020) aver that a research paradigm provides the guidelines within which scientific research is to be carried out. The design and method of data collection are largely influenced by the philosophical beliefs of the researcher. These philosophies are distinguished by their various principles – ontology, methodology, epistemology, axiology and logic. Some of these paradigms that are discussed widely in literature include; positivist/post-positivist, interpretivist, realist and pragmatist (Creswell, 2015; Saunders, Lewis, & Thornhill, 2016).

As observed earlier, the various paradigms are differentiated by the axioms – ontology, epistemology and methodology that underpin them. Whereas ontology provides the basics for understanding reality, epistemology provides awareness about the natural surrounding and methodology on the other end delivers the processes for data collection (Tharsika & Pratheepkanth, 2020).

The interpretivist assumes that the reality is constructed socially and therefore subjective and complex. The positivist debunks this claim and asserts that the reality is independent, external and perceived and hence objective in nature. The pragmatist believes that though the reality is external, it is complex and it is as a results of the practical consequences of ideas. From an epistemological point of view, the interpretivist argues that relative agreements surround the knowledge that is made up of mental structures while the positivist claim that evidence and data shape knowledge. The pragmatist combines these diverse views and contends that the integration of different perspectives will help in the interpretation of the data. Though the interpretivist can use quantitative methods in its data collection, it usually uses qualitative. Similarly, the positivist and pragmatist can use either quantitative or qualitative, but the quantitative is largely utilized by positivists but a mixed method is typical of a pragmatist (Creswell, 2015).

The positivist research paradigm which assumes that there is a single, tangible and objective reality and knowledge is independent and generated objectively, allows for the usage of experiments and surveys to conduct research (Park et al., 2020; Tharsika & Pratheepkanth, 2020). In using this paradigm, researchers are expected to formulate hypotheses and test them empirically to identify the causes and effects among study variables. The current study is set out to test empirically, the formulated relationship between anxiety and depression and safety compliance and participation

whiles examining the moderating role of safety climate. Consequently, the positivist paradigm was adopted because it was the most aligned paradigm for this study.

The positivist paradigm was adopted because this study is set out to explain the relationships that exist among research variables with a less focus on the detailed understanding of research constructs and perspectives surrounding the phenomenon. This necessitates the need for impartial sources of knowledge. In an attempt to answer the research questions, the positivist paradigm allows for the researcher to collect data from large respondents using questionnaires. By using a quantitative method, numerical figures are assigned to research variables that allow for the easy understanding of the relationships that exist among variables objectively devoid of the biases of the researcher.

3.3 Research Approach

In the view of Creswell (2015), the research approach denotes the plans and procedures for research that offer a detailed explanation of the broad assumptions underpinning the study, the methods of data gathering, analysis and explanation. Different approaches – qualitative, quantitative and mixed methods can be utilized to undertake the research and depending on the objectives of the research, one of the aforementioned approaches would best fit. The qualitative research approach investigates deeper, the reasons why people behave the way they do by analyzing their subjective meanings through the collection of non-standardized data (Saunders, Lewis, & Thornhill, 2011).

The qualitative approach was not adopted because the focus of the current study is not to solicit an in-depth subjective opinion of a small number of mine workers. Arguing from a positivist point of view, the quantitative approach collects factual data that can be measured and quantified in an

attempt to explain the causal relationships that exist among research variables (Kothari, 2004). The mixed-method approach uses a combination of both the quantitative and qualitative approaches simultaneously to comprehend each other in order to obtain a stronger outcome.

The objective of the current study is to examine the relationships between anxiety/depression and safety compliance and participation while examining the moderating role of safety climate among a large number of mine workers. To this end, the quantitative approach was employed to recruit a relatively larger number of respondents which increases the probability of generalizing the findings to the entire population. Yet again, the quantitative approach allows for the researcher to explain the variables by collecting numerical data that are analyzed with statistical tools and interpreted thereafter for ease of understanding (Park et al., 2020). More so, the quantitative data if honestly and thoroughly gathered can be more dependable and generalized as the data are easily assessed because they can be organized in a short time frame (Kothari, 2004). From a positivist philosophical perspective and the arguments advanced for the quantitative approach, the researcher was certain that the quantitative approach was more aligned with the current study.

3.4 Research Design

In line with the positivist quantitative research approach, an explanatory cross-sectional survey research design was adopted to solicit respondents' opinions about the study variables. The explanatory research design was appropriate for the current study because the research set out to understand the study variables by establishing the causal relationship (Saunders et al., 2011) that exist between anxiety and safety compliance and participation as well as the nexus between depression and safety compliance and safety participation. Further, the current study sought to examine whether safety climate moderates the association between anxiety/depression and safety

compliance/participation. More so, the study used a cross-sectional survey that was relatively flexible and inexpensive and allowed for the administering of questionnaires to a large number of respondents at a particular point in time (Park et al., 2020; Saunders et al., 2011) sampled in the interest of the larger population who for reasons like time constraints could not be studied entirely.

3.5 Profile of Selected Companies and Population of the Study

AngloGold Ashanti Iduapriem Limited operates two open-pit mines at Teberebie and Iduapriem. These properties are made up of a concession of 110km² which is located in Ghana – Western Region. These properties are located about 10 kilometres south-west of the Gold Fields Tarkwa mine and some 70 kilometres north of Takoradi, the regional capital of the Western Region. Africa Mining Services is responsible for supplying the various mining equipment and machinery, incidental goods recruiting the skilled labour necessary for the proper completion of the works and the performance of the contract. At the Iduapriem mine, Africa Mining Services has engaged 657 workers with 38% of the workforce coming from the catchment areas and the host region, and the rest being employees from the other regions of Ghana.

Gold Fields Ghana Limited (GFGL) was incorporated in Ghana in 1993 as the legal entity holding the Tarkwa concession mining rights. Gold Fields Ghana Holdings Limited holds 71.1% of the issued shares of GFGL. IAMGold, through its affiliates, holds 18.9% and the Government of Ghana holds a 10% free carried interest, as required under the Mining Law of Ghana. The Tarkwa mine operates under mining leases covering a total area of approximately 20,800 ha. Abosso Gold Fields Limited (AGL) is a Ghanaian registered company that owns and operates the Damang Gold Mine. The Tarkwa and Damang mines employed a workforce of 6493 including contractors.

Adamus Resources Limited is Ghana's newest gold producer listed on the Australian Stock Exchange and Frankfurt Stock Exchange Open Market (FSE). Adamus Resources Limited owns 90% of the Nzema Gold Project located in south-western Ghana which is being developed as an open-pit operation with a current workforce of 327 workers.

To summarize the population that participated in the study, there was the need to define eligibility criterion which when met, one qualified to be part of the study. To this end, mines workers who were directly involved in mining activities such as heavy industrial equipment operators, crusher operators, truck drivers and safety managers participated in the study. Though every employee or visitor on the mine site is obliged to comply with all safety protocols at all times, those who were directly involved in mining are tasked specifically to adhere to all safety regulations and are sometimes reported to be depressed. In line with this eligibility criteria, seventy (70) mines workers from AngloGold Ashanti Iduapriem, one Hundred (100) each from Gold Fields (Tarkwa and Damang) and fifty (50) from Adamus Resource Limited respectively were expected to partake in the study. Participants were recruited from these companies because these organizations continue to record high cases of accidents and workplace injuries (Ghana Chamber of Mines, 2020). These mining companies are also closer to each other that made mobility of the researcher and the associated cost during data collection moderate.

3.6 Sampling Technique and Sample Size

Sampling refers to the procedure of selecting a subset of participants to analyze the subset in order to obtain a better understanding of the entire population and draw conclusions and inferences about it (Kothari, 2004). According to Saunders et al. (2011), researchers rarely have access to the complete population in order to acquire information due to a variety of issues such as cost, time,

and accessibility. It is therefore imperative to select a portion of the population for the study using scientifically proven techniques. Consequently, the stratified sampling technique was used to select organizations and the purposive sampling techniques was used to select respondents for the study. The stratified sampling technique involves a division of the population into smaller groups called strata based on identifiable characteristics (Sobh & Perry, 2006).

Judging from the fact that the selected companies had different safety policies and frameworks that differentiated them, each company was treated as a separate stratum within which a sample was drawn for the study. This was to ensure that each company had fair representation (depending on its population) in the respondents that participated in the study. Each from stratum, respondents were purposively selected to participate in the study. Purposive sampling is a non-probability sampling method in which the units to be observed are chosen based on the researcher's assessment of which will be the most useful or representative (Etikan, Musa, & Alkassim, 2016). Mineworkers who met the eligibility criteria above mentioned were purposively recruited, and the questionnaires were accordingly administered.

A sample is a portion of a target population that has been chosen to participate in a scientific study (Kothari, 2004). The sample should be representative enough to facilitate the generalization of research findings to the entire population. To ensure sample representativeness, the researcher adopted Miller and Brewer (2003) sample size determination formula which states that from any given population, the sample size is determined as follows;

$$n = \frac{N}{1+N(\alpha^2)} ; \text{ Where } n=\text{sample size, } N=\text{Target population, and } \alpha=\text{error term. The sample sizes}$$

from the various companies using this formula are summarized in the Table 3.1 below.

Table 3.1 Population and Sample Size of Selected Companies

Name of Mining Company	Population	Sample Size based on (Miller & Brewer, 2003) formula
AngloGold Ashanti Iduapriem	70	60
Gold Fields-Tarkwa	100	80
Gold Fields-Damang	100	80
Adamus Resource Limited	50	44
Total	320	274

Source: Author's Construct (2021)

3.7 Sources of Data

Primary data and secondary information were used in the current study. Structured questionnaires were administered to obtain the primary data. In the questionnaires, participants were asked to respond to questions measuring their views on the study variables. The secondary information comprised of the profile of the organizations and their staff strength which were retrieved from their various websites and human resource management departments respectively.

3.8 Data Collection

3.8.1 Data Collection Method

Respondents were polled using a survey questionnaire to collect the main data. This method refers to all data collection procedures in which respondents are requested to answer the same set of questions in a predetermined order (Creswell, 2015). The method was chosen because the answers to the questionnaires are in respondents own judgements and words do not give room for interview bias (Etikan et al., 2016). Also, this method provides excellent population representativeness, which translates into good statistical significance after data analysis. More so, the survey offers respondents the opportunity to give well-thought responses because they have enough time and it is regarded as a flexible and less expensive data collection instrument (Kothari, 2004).

3.8.2 Data Collection Measure

The survey questionnaire was divided into four sections – section A-D. The first section collected data on the demographic characteristics of the respondents – gender, age, educational qualifications, and marital status among others. Section B was made up of questions that assessed mineworkers level of mental health (anxiety and depression). Anxiety and depression scales were adapted from McHorney and Ware (1995) general mental health scale. Responses were obtained on a five-point Likert scale ranging from 1 (never) to 5 (all of the time).

Section C assessed mine workers safety behaviours (safety compliance and safety participation) using Griffin and Neal (2000) safety behaviours scale and responses were obtained on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Section D assessed the safety climate that existed in the various companies by using Zohar (2000) safety climate scale. Responses were obtained on a 5-point Likert scale ranging from 1 (completely disagree to 5 completely agree). The measurement instruments are summarized in the table below;

Table 3.2 Measurement Instruments

Construct	Role	Description
Safety Behaviours (Griffin & Neal, 2000)	Dependent Variable	Safety Compliance (4 items); Safety participation (4 items) 1= Strongly Disagree; 5= Strongly Agree
Mental Health (McHorney & Ware, 1995)	Independent Variable	Anxiety (4 items); Depression (4 items) 1= Never; 5= All of the time
Safety Climate (Zohar, 2000)	Moderating Variable	10-item scale 1= completely Disagree 5= Completely Agree

Source: Author's Construct (2021)

3.9 Pilot Study

A small-scale pilot study was undertaken with the purpose of assisting the researcher in determining how well to conduct the study on a bigger size scale. The primary goal of the pilot

study was to see how reliable and appropriate the measurement scale was in the Ghanaian environment. At the preparatory stage of the study, it was also necessary to ensure that all inaccuracies, miscalculations, and errors in the questionnaires were fixed before the actual survey takes place and hence the need for the pilot study. In that vein, the researcher recruited three casual mine workers each from the four mining companies who participated in the pilot study. Comparing the original Cronbach alpha reliability statistics to those that were obtained from the pilot study, it was evident that the scales adapted were reliable (Cronbach alpha values of above .7 as postulated by (DeVellis, 2003) in the Ghanaian context and hence could be used for the major survey. The results are presented in Table 3.3 below;

Table 3.3 Reliability of Study Variables from Pilot Study

Variables	Cronbach's Alpha (Original)	Cronbach's Alpha (Obtained)	Items	Valid Cases
Anxiety	.89	.90	4	12
Depression	.89	.93	4	12
Compliance	.86	.90	4	12
Participation	.87	.86	4	12
Safety Climate	.78	.72	10	12

Source: Field Data (2021).

3.10 Data Collection Procedure

An introductory letter obtained from the Organization and Human Resource Management Department of the University of Ghana together with a research proposal was sent to the management of the Ghana Chamber of Mines for approval. Per the standards covering the conduct of research in the Ghanaian mining industry, all researchers are to seek approval for their research first from the chamber, before proceeding to pursue institutional approval. The Ghana Chamber of Mines is a voluntary private-sector employers' association representing companies and

organizations engaged in the minerals and mining industry in Ghana. The principal objective of the chamber is advancing and protecting the mining interests of the shareholders. The researcher was later invited to the chamber of mines to undertake a proposal defence. Certified with the objectives and justification of the study, the chamber of mines wrote to introduce the researcher to the selected mining companies.

The selected mining companies approved for the study to be conducted in their respective companies on certain terms that should be agreed upon by the researcher. They indicated that there were no financial obligations on the part of the companies to be paid to the researcher for conducting the study. The researcher was obliged not to collect any form of electronic data unless approval in writing was issued to that effect and the researcher was expected to present a written report to the companies at the end of the study. The researcher was expected to undergo mandatory safety induction before data collection will commence and should further indicate acceptance of these terms by filling a form designated for that purpose. In response, the researcher filled the necessary forms and submitted the same and was given a schedule to attend the safety induction. The safety induction is a programme designed by companies in the mining industry to introduce visitors to their mining site and encourage them to adhere strictly to safety protocols at the mine site at all times. During the induction, the researcher was schooled on the various sign used at the site and what they meant. Also, the accessible and prohibited areas at the various mine sites were made known to the researcher and most importantly, the researcher was not to be seen on the mine site without wearing the necessary personal protective equipment. Once the induction was completed, the researcher was assigned a supervisor (usually from the health, safety and environment departments) to guide the researcher to collect the needed data.

After all these processes were completed, the actual data collection began. Prior, to recruiting the respondents, the researcher enlightened the mineworkers about the rationale of the study and what it seeks to achieve. The respondents were informed that the essence of the data collection was purely academic and their participation in the study was voluntary. They were further assured of confidentiality and anonymity of their responses. The consent of the participants was sought verbally by the researcher before the questionnaires were handed over to them to be answered and collection of the completed questionnaire was deferred to a later date with the aid of the assigned supervisor. When the completed questionnaires were due for collection, the researcher met the respondents at their usual safety meetings and expressed gratitude to the workers verbally. A letter of gratitude was later sent to the companies together with the reports as obliged. A total of two-hundred and eighty-five (285) questionnaires were retrieved out of the three-hundred and twenty (320) questionnaires distributed.

3.11 Method of Data Analysis

The questionnaires were checked foremost for completeness. From this check, a total of eleven (11) questionnaires were found to be incomplete and was therefore not valid for analysis. Two-hundred and seventy-four questionnaires were found to be completely and hence was entered into the statistical software for onward analysis. The data was analyzed with Statistical Package for Social Sciences (SPSS v.20) and Partial Least Squares (SmartPLS v.3).

Descriptive statistics such as frequencies and percentages were used to describe the demographic characteristics of the respondents and mean and standard deviations were used to describe the continuous variables – anxiety, depression, safety compliance, participation and climate. Prior to

the main analysis, preliminary analysis – skewness and kurtosis were conducted to ascertain the normality of the data.

The Partial Least Squares Structural Equation Modelling (PLS-SEM) was used to test the direct relationships between dimensions of mental health (anxiety and depression) and the dimensions of safety behaviours (safety compliance and participation). The SEM technique offers the most suitable and effective estimation technique for a sequence of distinct multiple regression equations estimated concurrently (Hair et. al., 2014). It further provides the individual item loadings onto their corresponding variables as well as permits mistakes and errors to be observed in variables (Sarstedt et. al., 2014). The moderating role of safety climate in the relationship between anxiety and depression and safety compliance and participation was also analyzed using the SEM in smart PLS.

3.12 Ethical Consideration

This section clarifies the most significant facets of ethical principles and how these aspects were integrated into this research. Wijk and Harrison (2013) mostly admit that the rights of a respondent in a study - the right to confidentiality, privacy, anonymity and voluntary participation. The researcher explained the rationale and objectives of the study and sought their consent before administering the survey to the respondent. Also, they were made known that participation in the study was voluntary and hence no respondent was forced to participate in the study. Participation was purely voluntary. To ensure anonymity, the questionnaire was designed such that respondents were not asked to divulge information that will appear to reveal their identity. Participants were further assured that the data collected were meant for research purposes and that no other

individual will have access to the research data. To this end, the researcher went to the mine site to collect the completed questionnaires personally and have hence been kept under lock.



CHAPTER FOUR

DATA ANALYSIS AND RESULTS PRESENTATION

4.1 Introduction

This chapter discusses the analysis of the data obtained in the survey and the presentation of the findings as well as a discussion of the results in relation to existing literature. Descriptive statistics – frequencies and percentages were used to describe the demographic characteristics of the respondents. Results from preliminary analysis of data – missing data analysis, examination of outliers, normality test which confirms that the data does not violate the assumptions of multivariate data analysis are presented. More so, the results from the testing of hypotheses using the PLS-SEM are discussed. The response rate of the study was 85.63 percent obtained after 274 valid questionnaires were retrieved out of the 320 questionnaires distributed.

4.2 Demographic Characteristics of the Respondents

This section presents the distribution of gender, age, educational qualification, and years in the organization, employment type and marital status of respondents sample from the four mining companies. The results of the demographic characteristics of the study's respondents are presented in Table 4.1 below;



Table 4.1 Demographic Characteristics of the Respondents

Variable	Frequency (n)	Percentage (%)
Gender		
Male	247	90.1
Female	27	9.9
Age		
21 - 30 years	159	58
31 - 40 years	47	17.2
41 – 50 years	40	14.6
51 – 60 years	28	10.2
Educational Level		
SSCE/WASSCE	103	37.6
Diploma/HND	21	7.7
First Degree	120	43.8
Master Degree	15	5.5
Professional Certificate	11	4.0
Others	4	1.5
Number of Years in Organization		
Less than 1 year	52	19
1 - 3 years	91	33.2
4 - 7 years	65	23.7
8 – 10 years	42	15.3
11 – 13 years	10	3.6
14+ years	14	5.1
Marital Status		
Single	161	58.8
Married	96	35
Divorced	12	4.4
Widowed	3	1.1
Separated	2	0.7
Employment Type		
Contract Staff	128	46.7
Temporal Staff	53	19.3
Permanent Staff	93	34
Nature of Mine/Department		
Surface Mine	274	100
Mining	257	93.8
Health, Safety & Environment	17	6.2
Total	274	100

Source: Field Data (2021)

4.2.1 Gender of Respondents

The statistics in relation to the gender of the respondents as presented in Table 4.1 revealed that a total of 247 representing 90.1 percent were males while 27 respondents representing 9.9 percent were females. This outcome indicates that the mining industry which is characterized by the use of heavy industrial equipment and machines is a male-dominated industry.

4.2.2 Age of Respondents

The statistics as shown in Table 4.1 show that a total of 159 respondents (representing 58%) were between the ages of 20-30 years; 47 respondents (representing 17.2%) were within the age range of 31-40 years; 40 respondents (representing 14.6%) were between 41-50 years and the remaining 28 respondents representing 10.2 percent were with the age range of 51-60 years. This finding indicated that the mining industry is characterized by a youthful population.

4.2.3 Educational Level of Respondents

With regards to the level of education of respondents, the results as presented in Table 4.1 revealed that out of the 274 participants, the majority of the respondents (156 representing 57%) have received University or tertiary education and 103 respondents representing 37.6 percent had received secondary education. This indicates that majority of the respondents had received some form of formal education and thus are able to read, understand and respond to the survey appropriately.

4.2.4 Respondents Years in the Organization

Data was collected on the number of years spent by respondents in their respective organizations. This was to provide an overview of the working experience of respondents in their current at the

organization. Results, as presented in Table 4.1 shows that majority of the respondents 208 which represent 75.9 percent were in their formative years at the organization thus, have spent one to seven years with their organizations. Though some respondents have spent a good number of years with their companies, few (14 which constitute 5.1%) were in their prime (over 14+ years with the mine companies). This indicates that the majority of the respondents were early-career employees in their developing stages.

4.2.5 Marital Status of Respondents

The study sought to know the marital status of the mineworkers as it could contribute to the anxiety and depression levels at work via the work-family conflict. The results as presented in Table 4.1 indicates that the majority of the respondents (161 which represent 58.8%) were not married with a significant number of respondents too being married (96 representing 35 percent) were married. This implies that some of the participants have to alternate between work and family roles.

4.2.6 Employment Type of Respondents

Against the background that companies in the mining industry employ the services of contractors to undertake specific mining services to aid minerals production in Ghana, the study sought to find out the employment type of respondents. The results as presented in Table 4.1 shows that majority of the respondents were contract staff (128 which constitute 46.7%), though quite a number of the respondents (93 representing 34%) were permanent staff.

4.2.7 Nature of Mine and Respondents Department

The study sought to ascertain the nature of mine activities in the companies. Results, as presented in Table 4.1, shows that the companies engage in surface mine (274 respondents, 100%). The

respondents were asked to indicate their department of operation and from the results, the majority of the respondents (257 which constitute 93.8%) were operating from the mining department with few others from the health, safety and environment department (17 respondents, 6.2%). This is indicative of the fact that the participants selected purposively by the researcher actually met the eligibility criteria discussed earlier.

4.3 Preliminary Analysis

Preliminary data analysis prior to hypotheses testing was conducted to ensure that the data did not breach any of the assumptions of multivariate data analysis. To this end, missing value or data analysis, examination of outliers as well as normality test were carried out to ensure that the data conforms to the principal assumption of the structural equation modelling technique which states that the data for modelling should be devoid of missing values, outliers and should be normally distributed.

4.3.1 Missing Data Analysis

A missing data – which can be missing completely at random (MCAR), missing at random (MAR) and missing not at random (MNAR) are data values that are not stored for the variable in the observation of interest (Karanja, et al., 2013). Whereas, the missing completely at random data is missing data not related to either the specific value which is supposed to be obtained or the set of observed responses, the missing at random data at those missing values unrelated to the variable under which the missing values occur, but related to other variables in the data and the missing not at random are those missing values that are related to the variables under which they are missing (Kang, 2013; Karanja et al., 2013). Missing data not at random must be dealt with because it can affect the statistical analysis of the data.

The popular approaches for dealing with missing data, not at random include listwise and pairwise case deletions which involve the complete elimination of the responses of the case (respondent) where the missing data was identified (Kang, 2013). Other approaches – mean substitution, involves the calculation of the mean value of the variable and replaces the missing data with this value and expectation-maximization which adequately estimates missing values even in non-normal data, unlike others who generate biased estimates and precisely underestimate the standard errors (Moss, 2009). To check for missing values, the researcher used frequencies to initially checking for missing data. The output generated showed that there were no missing data but to cross-checked this output, missing value analysis was conducted in SPSS which confirmed the initial results generated by the frequencies.

4.3.2 Investigation of Outliers

One of the most important assumptions underlying structural equation modelling analysis is that the data should not contain outliers and must be normally distributed. Consequently, an investigation of outliers was conducted by the researcher to ensure data's conformity to multivariate data analysis principles or assumptions. An outlier is an extremely small or large value of two or more variables (multivariate outlier) or a single variable (univariate outlier). Outliers investigation was done in SPSS using histogram, stem and leaf diagram and boxplot. The results from these tests showed that some potential outliers existed in the data as cases that were considered as outliers were given in the boxplot. These cases were then checked with the paper questionnaires to ensure that the responses inputted were indeed the same as the captured. Rarely, some few responses were wrongly captured and the same were rectified. Though some of the

outliers that were correctly captured were not deleted but those that occurred for more than two observed variables had their entire responses deleted from the data set.

4.3.3 Test for Data Normality

In conformity with multivariate data analysis such as structural equation modelling assumption – data should be normally distributed, data normality test is very important. This is because data normality can affect the reliability and accuracy of the conclusions drawn from the data (Sarstedt, et. al., 2014). Hair, et al (2014) noted further that it is a requirement in structural equation modelling that the data should be normally distributed to prevent instances of bloated figures of model fit measures. Subsequently and in line with the D’Agostino skewness test and the Anscombe-Glyn kurtosis test (Öztuna, Elhan, & Tüccar, 2006), the normality of the data was examined. For data to be normally distributed, Tabachnick and Fidell (1996) recommended that the absolute values of the skewness and kurtosis of the various latent variables must be between the range of -2 and +2. The results of the normality test conducted in SPSS is presented below;

Table 4.2: Results of Data Normality

Variable	Mean	Std. Deviation	Skewness	Kurtosis
Anxiety	3.38	1.137	-.213	-.775
Depression	3.29	1.110	-.149	-.424
Safety Compliance	4.43	.650	-1.306	1.156
Safety Participation	4.40	.879	-1.547	1.062
Safety Climate	3.96	.607	-.416	-1.486

Source: Field Data (2021)

The results in Table 4.8 show that the skewness and kurtosis values obtained for the latent variables fell between the rule of thumb of -2 and +2 as postulated by Tabachnick and Fidell (1996) which indicates that the data set was normally distributed and fit for structural equation modelling and other multivariate data analysis.

Prevalence of Anxiety and Depression among Study’s Respondents

The study sought to assess the prevalence of mental health conditions in the mining industry. Comparing the mean values, the study found anxiety and depression to exist in the mining industry through self-reported anxiety symptoms were higher (M = 3.38) than self-reported depression symptoms (M = 3.29). The details of the prevalence rate are presented in Table 4.3 below;

Table 4.3: Prevalence of Anxiety and Depression among Study’s Respondents

Variable/ Responses	Anxiety		Depression	
	Frequency (n)	Percentage (%)	Frequency (n)	Percentage (%)
Mean	3.38		3.29	
Never	44	16.1	56	20.4
Sometimes	28	10.2	47	17.2
Much of the time	153	55.8	131	47.8
Most times	31	11.3	24	8.8
All the time	18	6.6	16	5.8
Total	274	100	274	100

Source: Field Data (2021)

From the table, the majority of the respondents (153 which constitute 55.8%) reported that they were anxious much of the time within the past few weeks before the data collection. Similarly, 131 respondents representing 47.8 percent reported that they were depressed much of the time within the past few weeks prior to the data collection. Though a number of the respondents indicated that they had never been anxious or depressed (n = 44 & n = 56) for anxiety and depression respectively,

some mine workers also indicated they have been anxious and depressed all the time ($n = 18$ which constitute 6.6% & $n = 16$ which constitute 5.8% respectively).

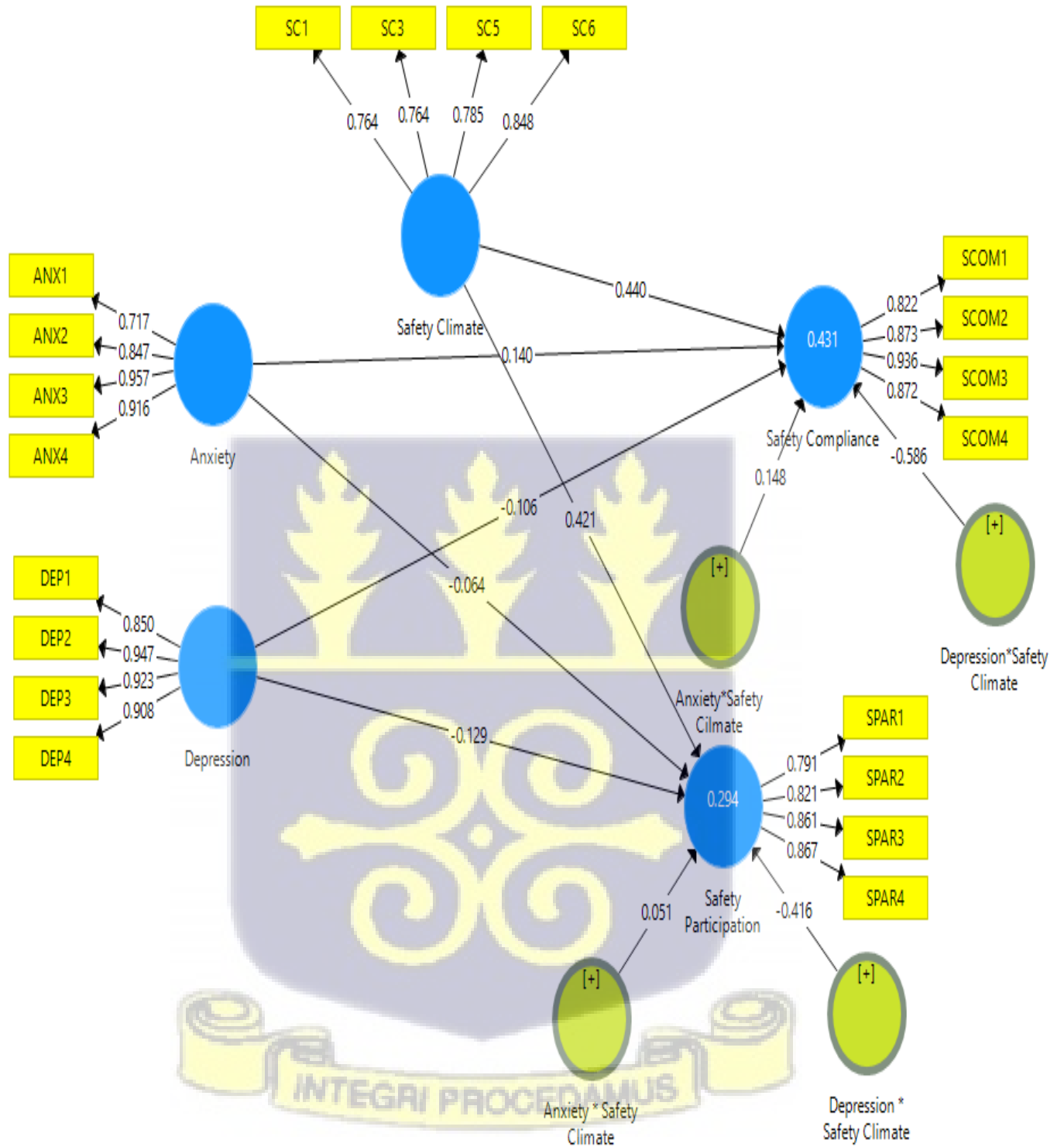
4.4 Structural Equation Modelling Analysis

The structural equation modelling analysis technique that was used to analyse the data for the current study has two components, the measurement model – which relates to item loadings; and the structural model – which relates to path coefficient measures.

4.4.1 Measurement Model

The use of a measurement model helps the researcher to determine how well the various items load onto the main latent variable (Sarstedt & Cheah, 2019). The researcher used a confirmatory factor analysis (CFA) to determine the factor loadings of each item onto their respective variables in an attempt to validate the developed constructs adopted. The choice of the confirmatory factor analysis allowed the researcher to assess the unidimensionality of the scales, purify individual items as well as examined the construct validity among study variables. The CFA model was developed using the variables of the study – anxiety and depression (dimensions of mental health), safety compliance and safety participation (dimensions of employee safety behaviours) and safety climate. A careful study of the initial model fit measures was relatively unimpressive as some items loadings onto their main variable did not meet the recommended threshold of 0.7 and above as recommended by Hair et al (2014). In line with their recommendation, the items that did not meet the aforementioned threshold were deleted in an attempt to boost the model fit indices. Consequently, six items – items 2, 4, 7, 8, 9, 10 (SC2, SC4, SC7, SC8, SC9, SC10) of safety climate were deleted. The other items of the other constructs met the threshold and were therefore kept for further analysis as presented in Figure 4.1 below;

Figure 4.1: The Final CFA (Measurement) Model with Standardized Loadings



Source: Field Data (2021)

Validation Test of the Measurement Model

The model fitness test was conducted to assess whether the model fits the data or otherwise. Numerous statistical tools (fit indices) - chi-square, Standardized Root Mean square Residual (SRMR) and Normed Fit Index (NFI) are available in smart PLS. The chi-square unlike the SRMR and NFI are mostly used for large samples (Henseler & Schuberth, 2020) while the other aforementioned fit indices were good for the relatively small sample of the current study. In that line, the SRMR and the NFI values were considered in interpreting the model fitness. For a proposed model to be considered fit, Hu and Bentler (1999) suggested that an SRMR value of 0.08 or less was acceptable. A less than 0.08 value for SRMR also meant that the model was not misspecified (Henseler, Ringle, & Sarstedt, 2015). Similarly, Bentler and Bonett (1980) asserted that a model is considered fit if the NFI value lies between 0 and 1. The more the closeness of the NFI to 1, the better the fit (Dijkstra & Henseler, 2015). The results of the model fitness analysis are presented in table 4.3 below;

Table 4.4 Model Fitness Indices

Fit Indices	Threshold	Authors	Final CFA Model
SRMR	<0.08, excellent; .08-1, acceptable	(Henseler et al., 2015; L. Hu & Bentler, 1999)	0.071
NFI	>0.7, excellent; 0.7-1, acceptable	(Bentler & Bonett, 1980; Dijkstra & Henseler, 2015)	0.833

Source: Field Data (2021)

The results of the CFA model fitness analysis presented in Table 4.4 showed that the conceptualized model was fit to the data as the SRMR value of 0.071 and the NFI value of 0.833 met the various threshold criteria above mentioned.

Reliability and Validity

The Cronbach alpha, composite reliability and the Average Variance Extracted (AVE) were computed to assess the reliability of the scale items. This was to ensure that the scales adopted for the study would yield consistent results on recurrent trials. Prior to the reliability analysis, the researcher examined the factor loadings of the items estimating the reflective construct. The items that met the recommended threshold of 0.7 (Hair et al., 2014) were maintained and the others were deleted. Conventionally, the Cronbach alpha values – which should be 0.7 or more have been used to determine the reliability of measurement scales (DeVellis, 2003). However, in using the PLS-SEM for analysis, Hair et al (2014) recommended that the composite reliability values should be used to interpret the measurement scale reliability. This is because, the composite reliability does not assume the same item loadings for different items and does not consider the number of items being evaluated (Hair et al., 2014). They recommended further that for a scale to be considered reliable, the composite reliability should be at least 0.7.

The validity of the measurement scale was assessed to ascertain whether the scales actually measured what it intended to measure. Specifically, the construct validity – the measure of the degree to which the scales sufficiently measure the theoretical concept that it was designed for was assessed using the convergent validity and discriminant validity (Henseler & Schubert, 2020). Whereas the convergent validity measures the extent to which different scales concur to the measurement of the same construct, the discriminant validity measures the extent to which different assessment methods diverge in the measurement of the different constructs (Henseler et al., 2015). To assess the convergent validity, the average variance extracted values for the research variables were examined. Fornell and Larcker (1981) posit that in order for a construct to exhibit

convergent validity, the average variance extracted should be a minimum of 0.5. The results of the reliability analysis and the convergent validity are presented in Table 4.5 below;

Table 4.5 Assessment of Reliability and Validity of Retained Items

Variable		Factor Loadings	Cronbach Alpha	Composite Reliability	Average Variance Extracted
Anxiety	ANX1	0.717	0.901	0.921	0.746
	ANX2	0.847			
	ANX3	0.957			
	ANX4	0.916			
Depression	DEP1	0.850	0.930	0.949	0.824
	DEP2	0.947			
	DEP3	0.923			
	DEP4	0.908			
Safety Compliance	SCOM1	0.822	0.899	0.930	0.768
	SCOM2	0.873			
	SCOM3	0.936			
	SCOM4	0.872			
Safety Participation	SPAR1	0.791	0.857	0.902	0.698
	SPAR2	0.821			
	SPAR3	0.861			
	SPAR4	0.867			
Safety Climate	SC1	0.764	0.807	0.870	0.626
	SC3	0.764			
	SC5	0.785			
	SC6	0.848			

Source: Field Data (2021)

The results from the reliability and convergent validity show that the factor loadings of the retained items met the recommended threshold of 0.7 with the highest item loading being 0.957 (ANX3). Similarly, the scales used were proven to be reliable as the composite reliability values for all the variables exceeded the recommended minimum value of 0.7 with the highest being 0.949 (depression). More so, the data was free from discriminant validity problems as the average variance extracted values were 0.5 or more with the highest being 0.824 for depression.

Fornell-Larcker Criterion for Discriminant Validity

The Fornell-Larcker procedure for examining discriminant validity was employed to assess whether the research variables were exhibiting discriminant validity or otherwise. In their view, Fornell and Larcker (1981) suggested that for a scale to have discriminant validity, the square root of its average variance extracted of the latent variable is greater than the squared correlation coefficient between the latent variables. The results of the Fornell-Larcker criterion for discriminant validity are presented in Table 4.6 below which indicated that the scales were discriminately valid.

Table 4.6 Fornell-Larcker Standard for Discriminant Validity

	1	2	3	4	5
1. Anxiety	0.864				
2. Depression	0.795	0.908			
3. Safety Compliance	0.003	0.121	0.877		
4. Safety Participation	0.200	0.184	0.362	0.863	
5. Safety Climate	0.165	0.254	0.435	0.557	0.791

Source: Field Data (2021)

4.4.2 Correlation Analysis among Study Variables

A correlation analysis was conducted to examine the linear relationship among study variables. The results of the Pearson r correlation coefficient computed in SPSS are presented in Table 4.7 below;

Table 4.7 Pearson’s Correlation Matrix of the Study’s Variables

Variable	1	2	3	4	5	6	7	8
1. Gender	1							
2. Age	-.056	1						
3. Years in Organization	.037	.705**	1					
4. Anxiety	.027	.031	.066	1				
5. Depression	.072	.008	.032	.766**	1			
6. Safety Compliance	.022	.028	.147*	-.168**	-.225**	1		
7. Safety Participation	.078	.114	.046	-.171**	-.318**	.680**	1	
8. Safety Climate	.014	.006	.019	-.146*	-.265**	.127*	.143*	1

** . Correlation is Significant at 0.01

* . Correlation is Significant at 0.05

Source: Field Data (2021)

The results of the correlation analysis show that there was a significant negative relationship between mineworkers mental health (anxiety and depression) and their safety behaviours (safety compliance and participation). Specifically, anxiety had a low negative association with safety compliance ($r = -.168, p < 0.01$) which indicates that an increase in mine workers anxiety will result in a reduction in safety compliance. Similarly, anxiety had a low negative relationship with safety participation ($r = -.171, p < 0.01$), indicative of the fact that a reduction in the depression levels of mineworkers will motivate them to participate in safety activities. Also, depression had

a moderate negative relationship with safety compliance ($r = -.225, p < 0.01$) which indicates that an increase in the depression level of mineworkers will lead to a reduction in their safety compliance behaviours. More so, depression had a negative relationship with safety participation ($r = -.318, p < 0.001$) which also mean that a reduction in mine workers depression will encourage them to participate in safety activities like attendance to safety meetings and taking safety initiatives. Safety climate had a significant positive relationship with mineworkers safety behaviours (safety compliance and participation). Precisely, there was a positive relationship between safety climate and safety compliance ($r = .127, p < 0.05$) and safety participation ($r = .143, p < 0.05$) which indicate that a good safety climate will energize mine workers to engage in safety behaviours and while a relatively poor safety climate will reduce safety compliance and participation among mine workers.

Hair et al (2014) opined that a correlation coefficient of 0.90 or more between variables signifies considerable multicollinearity between them. As shown in the correlation matrix, there is an absence of multicollinearity among the research variables because none of the correlation between the variables was more than 0.90. For demographic variables such as age and gender to be used as control variables in a model, there should be a significant relationship between such variables and the dependent variables (Kothari, 2004). In the current study, gender had weak and insignificant ($r = .022$ & $r = .078, p > 0.05$) relationship with safety behaviours and age had a similar results ($r = .028$ & $r = .114, p > 0.05$). On the basis of the weak correlation among the demographic variables (age and gender) and the dependent variables (safety compliance and participation), these variables were not used as controls in the model.

4.4.3 Structural Model Analysis

The assessment of the measurement model for normal fit indices and the reliability of the variables as well as the divergent and discriminant validity of the construct was to ensure that the various assumptions of multivariate data analysis were not violated. Certified with the results from the various tests, the structural model as shown in Figure 4.1 previously was assessed. In the said figure, the amount of variance (R^2) in the dependent variables (safety compliance and safety participation) is accounted for. The individual contributions of the various independent (anxiety and depression) and the moderating (safety climate) variables given by the path coefficient were also presented in the figure.

To assess the significance and the path effect level in the structural model, bootstrapping was conducted to generate the t-values of the various path coefficient estimated. The bootstrapping in PLS-SEM is a nonparametric procedure that allows the testing of the statistical significance of various results such as R^2 values, Cronbach's alpha and the path coefficients (Kock, 2018). The results from the bootstrapping enabled the researcher to assess the actual and factual statistical significance of the effect of anxiety and depression on safety compliance and participation as well as the moderating effect of safety climate. To undertake this, a ten percent statistical significance level ($p < 0.10$) was set as the benchmark. This meant that, when the p-value of any of the estimates was greater than 0.10, such estimates were considered to be statistically insignificant. The results of the structural model as well as the various bootstrapping statistics are summarized in Table 4.8.

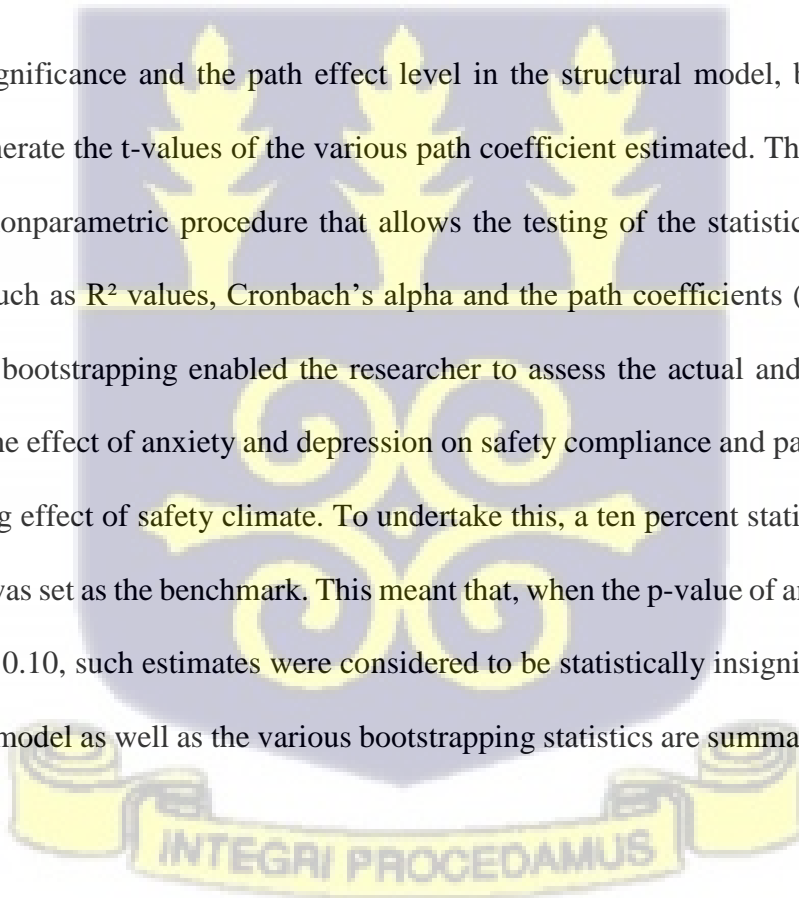


Table 4.8: Path Coefficients Results with their bootstrap values and ‘T’ Values

Path	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (O/STDEV)	P Values
Anxiety ---> Safety Compliance	-0.140	-0.141	0.115	1.659	0.098
Anxiety ---> Safety Participation	-0.064	-0.065	0.115	1.596	0.111
Depression ---> Safety Compliance	-0.106	-0.104	0.136	3.906	0.000
Depression ---> Safety Participation	-0.129	-0.128	0.121	4.796	0.000
Safety Climate ---> Safety Compliance	0.440	0.441	0.094	4.700	0.000
Safety Climate ---> Safety Participation	0.421	0.393	0.058	7.264	0.000
Moderation					
Anxiety*Safety Climate ---> Safety Compliance	0.148	0.146	0.188	1.899	0.058
Anxiety * Safety Climate---> Safety Participation	0.051	0.049	0.128	1.922	0.155
Depression*Safety Climate ---> Safety Compliance	-0.586	-0.582	0.111	4.937	0.000
Depression * Safety Climate ---> Safety Participation	-0.416	-0.415	0.130	3.840	0.000

Source: Field Data (2021)

The results of the PLS-SEM as presented in figure 4.1 showed that, anxiety and depression together with safety climate accounted for 43.1 percent variance in mine workers safety compliance behaviours ($R^2 = 0.431$). Similarly, the independent variables together with the moderating variable accounted for a 29.4 percent variance in mine workers safety participation behaviours. This indicates that changes in mine workers safety behaviours can be as a result of changes in their mental health as well as the nature of the safety climate present in their respective companies. The effects of the dimensions of mental health (anxiety and depression) on the dimensions of safety behaviours (safety compliance and safety participation) are further discussed in the next sub-section.

4.5 Testing of Hypotheses

H1: Anxiety will have a significant negative effect on safety compliance.

The first hypothesis tested anxiety as a predictor of mineworkers safety compliance behaviours. From the results, anxiety had a significant negative effect on mineworkers safety compliance ($\beta = -0.140$, t -statistics = 1.659, $p < 0.10$). This indicates that mineworkers safety compliance behaviours was negatively predicted by anxiety hence H1 was accepted.

H2: Anxiety will significantly predict safety participation negatively.

The second hypothesis of the study was to examine the impact of anxiety on mineworkers safety participation behaviours. The results showed that though mine workers safety participation behaviour was negatively predicted by anxiety, the result was not statistically significant ($\beta = -0.064$, t -statistics = 1.596, $p > 0.10$). The insignificant level of this estimate meant that the researcher failed to accept the second hypothesis of the study.

H3: Depression will have a significant negative effect on safety compliance.

The next hypothesis was to assess the significant negative effect of depression on safety compliance. The results obtained indicated that depression had a significant negative effect on mineworkers safety compliance behaviours ($\beta = -0.106$, t -statistics = 3.906, $p < 0.000$). This meant that depressed mine workers are less likely to engage in safety compliance behaviours. Consequently, H3 of the study was accepted.

H4: Depression will significantly predict safety participation negatively.

Hypothesis four of the study tested depression as a predictor of mineworkers safety participation behaviours. The results revealed that depression had a significant negative effect on mineworkers

safety participation behaviours with the original sample ($\beta = -0.129$), statistics ($t = 4.796$) and significant level ($p < 0.000$). This is indicative of the fact that mineworkers safety participation behaviours was predicted negatively by depression and hence H4 was accepted.

H5a: Safety climate will moderate the relationship between anxiety and safety compliance.

The hypotheses of the study tested whether safety climate moderates the relationship between anxiety/depression and safety compliance/participation. Specifically, this hypothesis tested the moderating role of the relationship between anxiety and safety compliance behaviours. The results showed that safety climate had a significant effect on the relationship between anxiety and safety compliance ($\beta = 0.148$, t-statistics = 1.899, $p < 0.10$). As shown in Figure 4.2 below, poor safety climate worsen the negative effect of anxiety and mine workers safety compliance behaviours. The result of the interaction effect further indicate that when mine workers are anxious but perceive that their organization is concerned about their safety, then they will be motivated to comply with safety rules and regulations. Consequently, H5a was accepted.

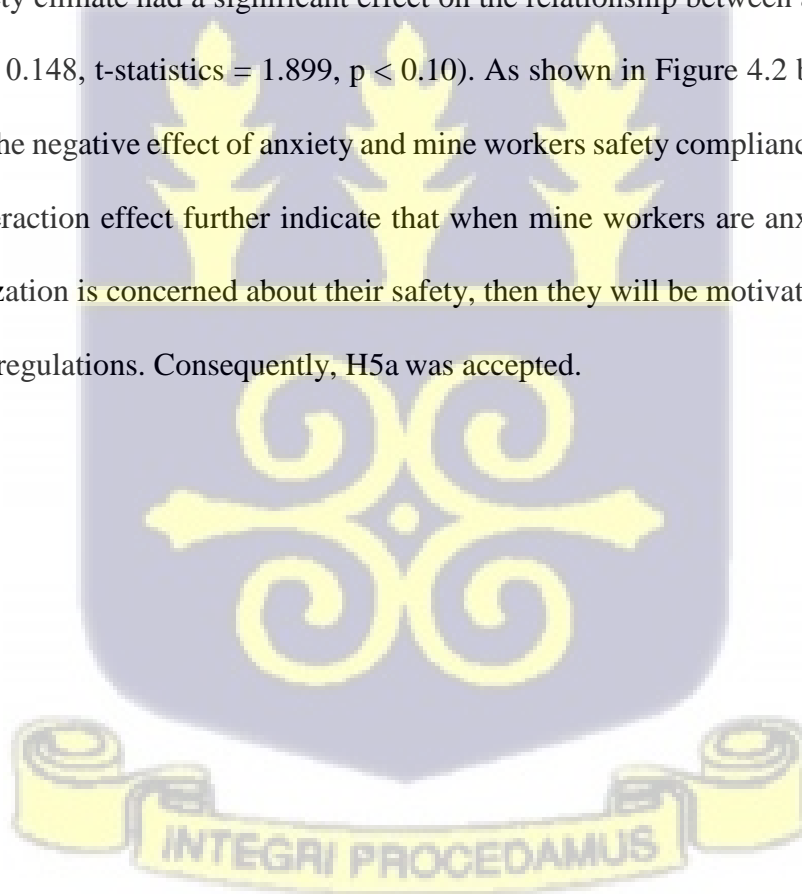
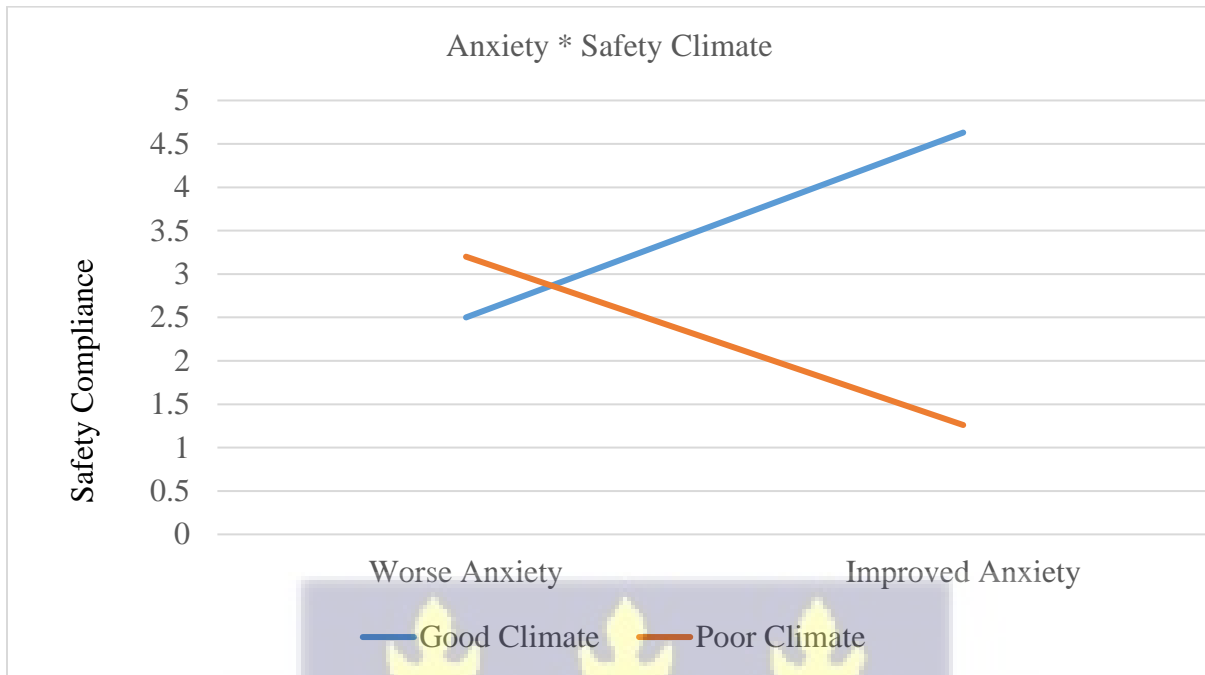


Figure 4.2 Moderation effect of safety climate on anxiety-compliance relationship



Source: Field Data (2021)

H5_b: Safety climate will moderate the relationship between anxiety and safety participation.

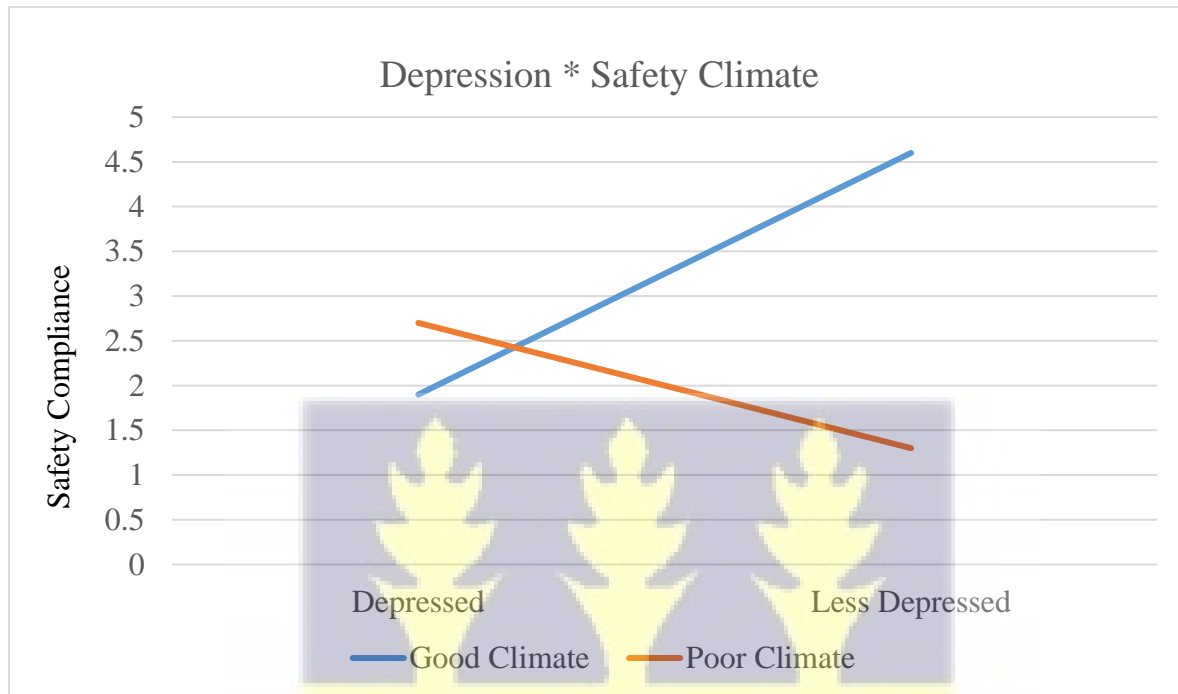
This hypothesis examined the moderating role of safety climate on the relationship between anxiety and mine workers safety participation behaviours. The results showed that safety climate had no significant effect on the relationship between anxiety and safety participation ($\beta = 0.051$, t -statistics = 1.922, $p > 0.10$). Thus H5_b was rejected.

H5_c: Safety climate will moderate the relationship between depression and safety compliance.

The current hypothesis tested whether safety climate moderates the relationship between depression and safety compliance. The results revealed that safety climate had a significant effect on the relationship between safety compliance and mine workers anxiety levels ($\beta = 0.586$, t -

statistics = 4.937, $p < 0.000$). As shown in figure 4.3 below, a good safety climate mitigates the adverse effect of depression on safety compliance behaviours and hence $H5_c$ was accepted.

Figure 4.3 Moderation effect of safety climate on depression-compliance relationship

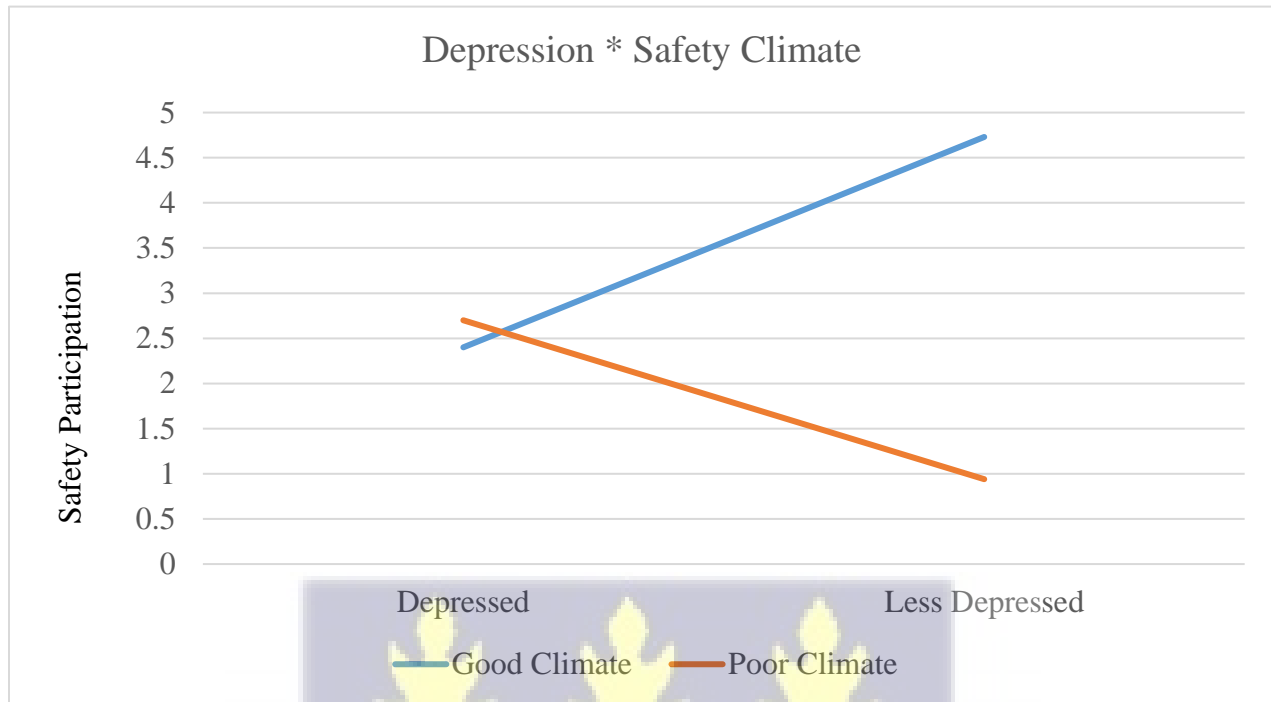


Source: Field Data (2021)

H5_d: Safety climate will moderate the relationship between depression and safety participation.

The final hypothesis of the study tested the moderating effect of safety climate on the relationship between depression and safety participation of mineworkers in Ghana. The results revealed that safety climate had a significant effect on the relationship between depression and mine workers safety participation behaviours ($\beta = 0.416$, t -statistics = 3.840, $p < 0.000$). The interaction effect as shown in figure 4.4 shows that the negative impact of depression on mineworkers safety participation behaviours is mitigated by a good safety climate. Consequently, $H5_d$ was accepted.

Figure 4.4 Moderation effect of safety climate on depression-participation relationship



Source: Field Data (2021)

In summary, the above statistical results show that anxiety had a significant negative effect on safety compliance but not participation while depression had a significant negative effect on mineworkers safety compliance and participation behaviours. More so, safety climate moderates the relationships between all exogenous variables and endogenous variables except for the relationship between anxiety and safety participation whose results was not significant. The results from the testing of hypotheses are summarized in Table 4.9.

Table 4.9: Summary of Research Results on the Hypothesized Relationships

Hypothesized Relationships	Statistical Results	Outcome
H1: Anxiety ---> Safety Compliance	Negative effect	Significant
H2: Anxiety ---> Safety Participation	Negative effect	Insignificant
H3: Depression ---> Safety Compliance	Negative effect	Significant
H4: Depression ---> Safety Participation	Negative effect	Significant
H5 _a : Anxiety * Safety Climate ---> Safety Compliance	Moderation effect	Significant
H5 _b : Anxiety * Safety Climate---> Safety Participation	Moderation effect	Insignificant
H5 _c : Depression * Safety Climate ---> Safety Compliance	Moderation effect	Significant
H5 _d : Depression * Safety Climate ---> Safety Participation	Moderation effect	Significant

Source: Field Data (2021)

4.6 Discussion of Research Findings

This section discusses the results of the study in relation to previous findings documented in literature about the impact of anxiety and depression on safety compliance and participation behaviours and the moderating role of safety climate on anxiety-safety behaviours and depression-safety compliance and participation relationships. To begin, the study sought to examine the prevalence of anxiety and depression symptoms among mineworkers in Ghana. The study found mild to moderate anxiety symptoms among mineworkers in accordance with McHorney and Ware (1995) scale of mental health. A total of 212 representing 77.3 percent mine workers responded in affirmative to the self-reported anxiety symptoms. This indicates that anxiety is prevalent in mine workers as mining companies need to institute employee assistance programs to reduce the negative impact of anxiety on organizational safety outcomes. This finding is consistent with (Bowers, et al., 2018) assertion that anxiety symptoms exist among people who find themselves at

workplaces that are prone to the occurrence of accidents and workplace injuries. The prevalence of anxiety in mine workers supports others studies that found anxiety symptoms among their respective study's respondents (Considine et al., 2017; Sayers et al., 2019). In accordance with McHorney and Ware (1995) mental health scale, the study found mild to moderate depression symptoms among mine workers. Of the 274 mine workers who participated in the study, 202 workers representing 73.8 percent responded in affirmative to the self-reported depression symptoms. This indicates the prevalence of depression among mineworkers which is consistent Ohrnberger, Fichera and Sutton (2017) suggestion that depression symptoms are predominant in the population. More currently, Asare-Doku et al (2020) asserted that in the mining industry, the commonest form of mental illness was anxiety and depression, a view that is supported by other researchers (Hulls et al., 2020; Tynan et al., 2018).

The mining industry is an industry that is characterized by a lot of physical hazards and dangerous chemicals that mineworkers are expected to work with coupled with high job demand and exposure to high risk to injuries (Douine et al., 2018). This contributes to the feeling of impending danger to occur at the workplace which increases the anxiety levels of mineworkers. Feeling tensed, worried, restless and impatient attributable to high job strains and long shift of work in the mines contributed greatly to the anxiety levels of mine workers. The study also found the majority of respondents (128 representing 46.7%) to be contract staff and given the job insecurity with contract works (Salas et al., 2015), mineworkers depression levels were increased. When an individual screens for anxiety, there is a greater possibility of the person showing depression symptoms (Weaver et al., 2018) which supported the study's finding of mild to moderate anxiety and depression symptoms in mine workers.

The first objective of the study was to examine the impact of anxiety on safety compliance and safety participation behaviours. To achieve this objective, two hypotheses were formulated and tested empirically. The first hypothesis was tested to assess the impact of anxiety on mineworkers safety compliance behaviours. The results of the study indicated that anxiety has a significant negative impact on mineworkers safety compliance behaviours. This means when mineworkers continue to be anxious, restless and nervous, they tend not to comply with safety rules, regulations and procedures. The feeling of anxiousness may be accompanied by the inability of mine workers to control issues happening around them (Suls & Bunde, 2005) which affects their ability to function properly in the organization including the compliance of safety rules. The significant negative impact of anxiety on safety compliance among mine workers is consistent with the findings of previous studies (Calderwood et al., 2018; Cheng & McCarthy, 2018; Nauman et al., 2019) which established that compliance with safety rules and regulations are declined in anxious employees but predominant among less anxious workers.

However, the findings contradict other studies (Evans et al., 2021; Yokozawa et al., 2021) which found a positive impact of anxiety on safety compliance behaviours. In their view, when mineworkers become tense as a result of any perceived threat or danger, they tend to comply with safety rules and regulations in an attempt to prevent such danger from harming them. The negative impact of anxiety on safety compliance behaviours may be attributed largely to the age of mine workers. The correlation matrix showed a positive relationship between age and safety compliance though the relationship was insignificant. The study found the majority of the respondents (159 which constitute 58%) to be with the age range of 21 – 30 years and given the youthful nature of the population, there is a greater tendency to ignore safety rules mainly due to youthful exuberance, curiosity in finding new ways to doing things, peer influences and lack of proper understanding of

safety rules and how these rules help to prevent workplace accidents and incidents (Evans et al., 2021; Mcphee et al., 2019).

The second hypothesis was tested to examine the impact of anxiety on mineworkers safety participation behaviours. Though the study found a negative impact of anxiety on safety participation behaviours, the effect was insignificant. This means being anxious, impatient, tense and nervous may not necessarily lead to not participate in safety activities and initiatives. Being nervous for example about how to operate a new machine at that workplace may even motivate the employees to participate in safety training as a means to learn how to operate the said machine. However, workers can withdraw from safety activities such as attendance to safety meetings and briefings, discussion of safety issues with supervisors and performing a voluntary task to help improve workplace safety when they feel restless, impatient and anxious.

The negative impact of anxiety on safety participation behaviours provides evidence to support other research findings (Mccarthy et al., 2015; Ng et al., 2019; Wang et al., 2018; Zhang et al., 2018) who have established that anxiety promotes unethical behaviours, deviant or unsafe behaviours and counterproductive work behaviours whiles anxiety demoralize employees to engage in safety citizenship behaviours and safety participation behaviours. The findings however contradicted the findings of few studies that found a positive impact of anxiety on safety participation behaviours (Knowles & Olatunji, 2021; Yokozawa et al., 2021). According to studies that found a positive effect of anxiety on safety participation and as previously mentioned, they view safety participation behaviours as those behaviours that will help the workers to stay alert and prevent any harm from occurring to them.

The norm of reciprocity propounded by the social exchange theorists (Blau, 1964; Cropanzano & Mitchell, 2005) argues that social exchange in the organization should involve the reciprocity of good gestures for good gesture and when one party receive a bad treatment, the party is expected to reciprocate in the like manner. In line with this assertion, when organizational processes, systems and procedure seeks to reduce anxiousness among the mineworkers, mine workers are expected to reciprocate by engaging in safety compliance and safety participation behaviours. Similarly, when organizational systems, procedures and processes ignore the mental health and safety needs of the workers, mine workers are expected to reciprocate this treatment by withdrawing from safety activities and initiatives and non-compliance with safety rules and regulations. Deducing from the findings that anxiety had a negative impact on mineworkers safety compliance and participation behaviours, it is argued that the systems, processes and procedures in the participating mining companies ignored the safety needs and mine workers anxiousness.

The second objective of the study was to examine the impact of depression on safety compliance and safety participation behaviours of mine workers. To achieve this objective, two hypotheses were formulated and tested empirically. The third hypothesis tested to assess the impact of depression on safety compliance behaviours found that depression had a significant negative effect on mineworkers compliance behaviours. This means that when mineworkers are depressed, downhearted, and moody and have very low spirits towards work, compliance with safety rules and regulations are likely to decline. On the other hand, when organizational factors and job demand factors interplay to improve upon or reduce the depression levels of mineworkers, safety compliance behaviours can be guaranteed. Also, if the organization seeks to ignite compliance with safety rules, regulations, procedures and ensuring that miners work safely, then reasonable actions should be taken to reduce depression among workers.

The negative impact of depression on safety compliance behaviours are consistent with findings in previous studies (Beseler et al., 2013; Lerner et al., 2010; Woo et al., 2011) which found that compliance with safety regulations and the procedure is enhanced when employee depression is improved. In their views, higher levels of depression are associated with low compliance with safety rules whereas lower levels of depression are associated with greater compliance with safety rules and regulations. This finding however contradicts (Funayama et al., 2013) claim that depressed employees tend to comply with safety rules to avoid the negative consequences of non-compliance.

The next hypothesis tested to examine the impact of depression on safety participation behaviours found that depression had a significant negative impact on mineworkers safety participation behaviours. The study found that withdrawal from the attendance of safety meetings, the unwillingness of workers to discuss safety problems with their supervisors and reduced commitment to engage in voluntary tasks to help improve workplace safety were rampant when workers self-reported that they were depressed. The significant negative impact of depression on safety participation support evidence documented in the literature (Alroomi & Mohamed, 2021; Wang & Gorenstein, 2014; Weaver et al., 2018) which found that safety participation behaviours and citizenship behaviours in employees could be improved when their depression level is improved. This finding however disputes the claim that when employees are depressed, they participate in safety behaviours in an attempt to revive their interest in performing those activities that they enjoyed doing in the past (Katz et al., 2020).

The significant negative effect of depression on safety compliance and safety participation behaviours can be attributed to some demographic factors – age, years in the organization and the gender of workers. As indicated earlier, the study's respondents were characterized by the youthful

population as the majority of the respondents were within the age range of 21-30 years. This age bracket is characterized by curiosity, disregards safety rules due to youthful exuberances and greater peer influences (Mcphee et al., 2019) which ultimately affects their levels of compliance with safety rules, standards, procedures and regulations. Similarly, male workers are less likely to report mental illness and to seek treatment due to their muscular nature (Considine et al., 2017) which affect their ability to concentrate at work, comply with safety rules and procedures, participate in safety-related activities and remain productive at work.

The current study found that the majority of the respondents were male (247 which constitutes 90.1%) and against the background that male workers hardly report mental illness and seek the appropriate professional assistance, it was not surprising that the study found a negative impact of anxiety and depression on mine workers safety compliance and participation behaviours. Also, the correlation matrix revealed a positive relationship between the number of years spent with the organization (working experience) and safety compliance and participation behaviours. This means that the more the number of years' people spend with the organization, the more they stay committed to the organization and the more they engage in safety behaviours. The study found that majority of the respondents were early-career individuals who have spent 1-3 years with their respective organizations (n = 143; 4.2%). It was therefore not surprising that given the positive relationship between working experience and safety compliance and participation and against the background that the majority of the respondents were early-career individuals, anxiety and depression had a significant negative impact on mineworkers safety behaviours.

The negative effect of anxiety and depression on safety behaviours revealed that within the context of the social exchange theory's norm of reciprocity, the organizational processes, procedures and systems ignored the safety needs and mental wellbeing of mineworkers which necessitated the

non-compliance with safety procedures, regulations, rules, standards and the intentions of miners to work safely as well participate in safety activities, attend safety meetings and undertaking safety initiatives. Contrary, if the organizations have taken reasonable actions to improve the anxiety and depression states of mine workers through employee assistance programs and early diagnosis and treatment of anxiety and depression, mine workers would have reciprocated by using all the safety equipment to do their job, use correct safety procedures to undertake their job, attend safety briefings and meetings, discuss safety problems with supervisor more frequently and participate in safety programs and initiatives.

The final objective of the study was to assess whether safety climate moderates the relationship between anxiety and depression and safety compliance and safety participation. To this achieve this objective, four hypotheses were formulated and tested empirically. The first of the four hypotheses tested the moderating role of safety climate on the relationship between anxiety and safety compliance and found that the interaction effect of anxiety and safety climate had a significant effect on mineworkers safety compliance behaviours. This means that a good safety climate which is demonstrated by management commitment to safety, safety communication, safety training and safety leadership mitigates the negative effect of anxiety on safety compliance behaviours. This further illustrates that though employees may be anxious, however when they perceive that their management is committed to their safety needs which reassures them of management determination to improve workplace safety, then mine workers will comply with safety rules, regulations and standards.

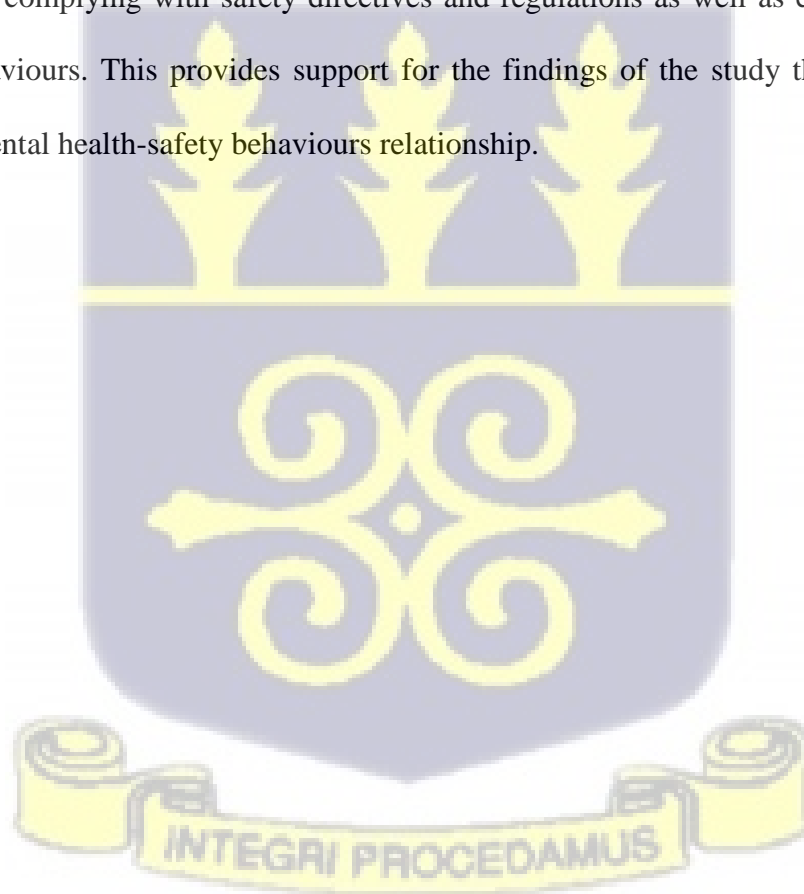
The second of the four hypotheses tested the moderating role of safety climate on the relationship between anxiety and safety participation behaviours. Though the study found some form of moderation, the effect was not significant thereby concluding that safety climate does not moderate

the anxiety-safety participation relationship. Drawing from these findings, it is argued that anxious employees mostly perceive danger to occur and are mostly on the look to engage in those citizenship behaviours that will help to eradicate or minimize the harmful impact of the perceived hazard. Consequently, anxious employees will not assess the climate conditions before acting meaning that regardless of the safety climate conditions, conscious efforts will be made to participate in safety activities to avoid any danger from occurring. These findings are consistent with earlier studies (Amponsah-Tawiah et al., 2020; Schwatka & Rosecrance, 2016; Smith & Dejoy, 2014; Smith et al., 2019) that have documented a positive effect of safety climate on employees safety compliance behaviours and provided support for the claim that safety climate help to strengthen the positive effect of other variables such as organizational culture and leadership styles on safety behaviours and help to mitigate the negative impact of other variables such as job stress, anxiety, depression and general mental illness on employees safety compliance and participation as well as safety citizenship behaviours.

The final two hypotheses tested the moderation effect of safety climate on the relationship between depression and safety compliance and participation behaviours. The findings supported the formulated hypotheses as safety climate moderated the relationship between depression and safety compliance and the depression-safety participation relationship. These results indicate that mining companies should endeavour to improve upon their safety climate by addressing promptly, the safety needs of their workers, providing safety leadership and creating, maintaining and staying committed to safety issues that the workplace. These actions if fully in place reassure workers that their organization is committed to their safety needs and will take any safety-related challenge seriously and so even if they are depressed or anxious, they will still engage in safety behaviours. This finding provides support for the growing body of knowledge (Hulls et al., 2020; Lyu et al.,

2018; Shin et al., 2015) that is an important construct that can help to buffer the relationship between positive work and organizational factors and safety behaviours in employees is safety climate.

Arguing from the norm of reciprocity as explained by the social exchange theory (Mitchell et al., 2012), when organizational systems and procedures cause the anxiety and depression states of workers to deteriorate yet the same system seeks to address the safety concerns of the employees and have demonstrated their commitment to creating a conducive and safe working environment, employees will reciprocate their management commitment to the creation of a safe working environment by complying with safety directives and regulations as well as engaging in safety citizenship behaviours. This provides support for the findings of the study that safety climate moderate the mental health-safety behaviours relationship.



CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter of the study presents the summary of the research findings in relation to the research objectives and questions. The chapter also highlights the conclusions that can be drawn from the findings as well the implications of the research findings to practice (management of mining companies in Ghana), policy and implications for future research. The concluding section of the chapter also presents the various recommendations put forward by the researcher based on the findings of the current study.

5.2 Summary of Findings

The increasing number of reported cases of occupational injuries and accidents are a source of worry to many organizations in Ghana mainly due to the fact that the ergonomic implications of workplace accidents and injuries are excruciating (Agyekum, et al., 2020). In the Ghanaian mining industry, the cost of accident compensations coupled with the loss of productive work hours as well as work-related diseases emanating from accidents and injuries at the workplace violate the zero tolerance for unsafe behaviours agenda being pursued by mining companies.

Mineworkers compliance with safety rules and regulations and active participation in safety initiatives and activities which could be improved through a good safety climate and enhancing mine workers mental health will contribute to reducing workplace accidents and injuries and increase the awareness and adherence to zero tolerance for unsafe behaviours agenda. To this end, the current study investigates the impact of mental health on employee safety behaviours whiles examining whether safety climate moderates the relationship between mental health and safety

behaviours. Specifically, the study sought to assess the impact of anxiety and depression (dimensions of mental health) on mineworkers safety behaviours (safety compliance and safety participation) while examining the moderating role of safety climate on these relationships.

Grounded in the social exchange theory, the study adopted a quantitative research approach with an explanatory cross-sectional survey research design. The population of the study comprised of mineworkers from four mining companies - selected using the stratified sampling technique. Based on Miller and Brewer (2003) formula for determining sample size, two-hundred and seventy-four (274) mineworkers from each participating company were purposively selected to participate in the study. Responses were obtained from participants through a structured questionnaire which was later inputted in the statistical package for social sciences (SPSS v.20). The data was extracted to conduct the partial least square structural equation modelling using smart PLS (v.3).

Consistent with the findings of previous studies, the mining industry can be considered a male-dominated industry. This is evident due to the fact that the majority of the study's respondents (90.1%) were males. The study also found that majority of the respondents (46.7%) were contract workers which affirms the assertion that most mining companies in Ghana employ the services of contractors to provide mine services to aid minerals production. The results of the study revealed that currently in Ghana, most mining companies engage in surface or open-pit mining as all respondents (100%) indicated that their respective companies engage only in surface mining which is characterized by open mining activities. There was evidence from the findings of the study to suggest that anxiety and depression were prevalent in the Ghanaian mining industry. The findings suggest that 55.8 percent of the respondents' self-reported anxiety symptoms much of the time which was relatively higher than self-reported depression symptoms (47.8 percent).

The first objective of the study sought to examine the impact of anxiety on safety compliance and safety participation. Prior to the structural equation modelling to examine the impact, the result from the correlation coefficient showed a significant negative relationship between anxiety and safety compliance and participation. This means that when the management of mining companies take concrete steps to minimize the anxiety levels of mineworkers, safety compliance and participation will be enhanced. On the other hand, if the anxiety of mineworkers keeps on deteriorating every now and then, mineworkers engagement in safety compliance and participation will reduce. Further analysis with the structural model using the path coefficient and the bootstrap indicated that anxiety had a significant negative effect on safety compliance ($\beta = -0.140$, t-statistics = 1.659, $p < 0.10$) thus anxiety accounted for 14 percent variations in mine workers safety compliance behaviours. Though the study found a negative effect of anxiety on safety participation ($\beta = -0.064$, t-statistics = 1.596, $p > 0.10$), it only accounted for an insignificant 6.4 percent variance in mine workers safety participation behaviours. The results are consistent with the social exchange theory which basically states that based on the norm of reciprocity if the organization influences its employees positively, the employees shall reciprocate these positive influences by engaging in positive work behaviours.

The second objective of the study was to examine the impact of depression on mineworkers safety compliance and participation behaviours. Consequently, the second research question was what is the impact of depression on safety compliance and safety participation? To answer this question, the path coefficient, the bootstrap results as well as the 'T' statistics from the structural equation modelling were used to assess the impact of depression on safety compliance and safety participation. Preceding this analysis, the correlation coefficient was used to explain the direction of the relationship between safety compliance and participation and depression. The results

showed a significant negative relationship between depression and safety compliance and participation of Ghanaian mineworkers. This means that to induce safety compliance among mineworkers, their depression levels must reduce drastically. Similarly, if the management of mining companies expect their workers to undertake safety initiatives and participate in safety activities, they should ensure that their employees are not depressed or moody. The results of the correlation analysis further indicate that depressed mined workers are most likely to withdraw from safety compliance and participation activities.

From the further analysis in the structural equation modelling, depression was found to have a significant negative impact on safety compliance ($\beta = -0.106$, t -statistics = 3.906, $p < 0.000$) which is indicative of the fact that depression accounted for a 10.6 percent in mine workers safety compliance behaviours. Similarly, depression was also found to impact safety participation negatively and significantly ($\beta = -0.129$, t statistics= 4.796, $p < 0.000$). This shows that a 12.9 percent variations in mine workers safety participation behaviours can be attributable to depression.

The final objective of the study was to examine the moderating role of safety climate on the relationships between anxiety and depression and safety compliance and safety participation. To achieve this objective, four hypotheses relating to the moderating role of safety climate were tested. The study found that safety climate moderated the relationship between anxiety and safety compliance but did not moderate the relationship between anxiety and safety participation. This means that the negative effect of anxiety on safety compliance is weakened by a good safety climate such that though anxiety affects safety compliance negatively, the presence of a good safety climate will mitigate the negative effect of anxiety on safety compliance.

The study also found that safety climate moderated the relationship between depression and safety compliance. Yet again, the negative effect of depression on mineworkers safety participation behaviours was moderated by safety climate. These results revealed that the negative effects of depression on mineworkers safety compliance and safety participation behaviours are strengthened by a poor safety climate. This further illustrates that a poor safety climate characterized by a poor value of safety by management of mining companies will enhance the negative effect of depression on mineworkers safety compliance and participation behaviours.

5.3 Implications of the Study Findings

The findings of the study contribute to knowledge in three different ways. First, the findings contribute to the growing body of knowledge about mental health, its dimensions and its impact on individual-level factors by highlighting the prevalence of anxiety and depression in the Ghanaian mining industry. This study further illustrated the impact of anxiety and depression on mineworkers safety compliance and safety participation behaviours. The implication of the research findings to theory also suggested the mechanisms through which the negative impact of anxiety and depression on safety compliance and safety participation behaviours could be mitigated. The final implication of the study to existing knowledge lies in its ability to use the social exchange theory to predict the impact of the dimensions of mental health and safety compliance and safety participation behaviours.

The research findings provide an understanding to management of mining companies about the prevalence rate of mental illness among the population particularly mining workers and the need to develop drastic measures to assist employees with mental health challenges. Due to the male domineering nature of the mines, efforts should be made to detect and diagnose mental illness

earlier in an attempt to assist employees with mental illness to reduce the prevalence rate. Given the adverse effect on mental illness of safety compliance and safety participation behaviours as found in the study, efforts should be made by practitioners and management of companies in the Ghanaian mining industry to endeavour to mitigate the negative effect of mental illness on safety compliance and participation behaviours. The findings of the study further suggested the mechanism through which the negative impact of mental illness on safety behaviours could be lessened. The found safety climate as a good avenue that management can utilize to lessen the negative effect of mental illness on safety behaviours. The findings provide useful insights such as safety leadership, safety communication and safety training as important constructs in the workplace safety climate construct to enhance safety behaviours in an attempt to reduce workplace accidents, injuries and near misses.

Finally, the findings of the study have implications for policy particularly, how policymakers should consider incorporating mental health care into the primary health care delivery due to the fact that workers find it a bit difficult to walk into isolated mental health care to assess treatment for mental health challenges. Policymakers should also consider legislation that will oblige organizations to also integrate mental health care and absorb some of the cost of mental illness treatment. These measures will contribute greatly to reducing mental ill-health at the workplace and the general population at large.

5.4 Conclusions

Mental health has evolved as an important construct to influences mine workers safety compliance and safety participation behaviours. To reduce accidents, workplace injuries as well as near misses at the workplace, mines workers are admonished continually to comply with safety rules at all

times and participate fully in safety activities such as attendance to safety briefings before work commences each working day. Safety briefings are conducted daily before the commencement of the day's work with the primary aim of reminding mine workers of the need to take reasonable steps to ensure that the mine site is safe for all at all times. The mining industry which is driven by a target achieving environment expect all mine workers to achieve their daily targets amidst adhering to all safety requirement. This tends to put a lot of strain on these workers coupled with the need to attend to family issues that affect the mental wellbeing of mine workers. Consequently, the current study sought to examine the impact of mental health on mineworkers safety behaviour while assessing the moderating role of safety climate.

Extant literature underscores the importance of safety behaviours in minimizing workplace accidents, injuries and fatalities. Whereas the focus of mining companies have been on the physical aspects of health and safety in accidents prevention, concrete steps should be taken to assess the impact of the other aspects of health and safety on mineworkers safety behaviours to foster a better discussion of health and safety. Extant literature demonstrates that dimensions of mental health such as anxiety and depression have an impact on employee safety compliance and participation behaviours. More so, a good safety climate has been found to mitigate the impact of anxiety and depression on employee safety compliance and participation behaviours while a poor safety climate on the other hand buffers the impact of mental health on mineworkers safety behaviours. In effect, the researcher postulated that the various dimensions of mental health will significantly predict mine workers safety compliance and participation behaviours. Also, safety climate was hypothesized to moderate the relationship between the dimensions of mental health and mine workers safety behaviours. Empirically, the study found anxiety to be a significant predictor of mineworkers safety behaviours but safety participation. The study also found depression to be a

significant predictor of mineworkers safety compliance and participation behaviours. Taking into account that mineworkers that screened for anxiety and depression concomitantly withdraw from safety compliance and participation behaviours, management of mining companies are to invest in the mental health of their workers to improve their mental health conditions and get them to comply with safety requirements and participate in safety activities to reduce workplace accidents, injuries and fatalities.

The study also found safety climate to moderate the adverse effect of anxiety and depression on safety compliance and participation of Ghanaian mine workers. This signals the fact that though systems and procedures in the organization can worsen the anxiety and depression state of mine workers, a relatively good safety climate – mines workers perception of their organization's value for safety can lessen the negative impact of anxiety and depression on mineworkers safety behaviours. This further affirms the researcher's position that to ensure mentally healthier workers are determined to continually engage in safety compliance and participation behaviours to reduce workplace accidents, organizations must create a workplace that is safety conscious. Thus, concrete efforts should be made to create and maintain a good safety climate.

5.5 Recommendation

5.5.1 Recommendations for Practice and Policy

In line with the findings of the study, the researcher made the following recommendations

1. There is a need for mining companies in Ghana to start thinking about the development of industry-specific policies on mental health independent of the policies on health and safety primarily to foster an improvement in the mental health conditions of mineworkers. If the

development of entirely new policies that are industry inclined will take a relatively long period, the researcher recommends the review of current policies on health and safety to include a critical review of current mental health processes within their organizations.

2. Against the background that the mining industry is known for its male dominance, management of mining companies should develop employee's assistance programs in mental health that will seek to identify and address mental health challenges among their workers as they are less likely to report mental health problems. Work-related issues such as bullying, harassment, mass casualties and road traffic accidents tend to affect the aversion state of mine workers. Consequently, companies should develop assistance programs that will address the anxiety and depression levels of mine workers as the aforementioned events unfold.
3. Whilst efforts are being made to develop employee assistance programs to address work-related mental health challenges, the researcher recommends the all-encompassing scope of the assistance program to cover other non-work related issues that are likely to affect the mental health of mineworkers. For example mineworkers that have marital issues or facing divorce challenges or others that are bereaved need to be talked to. This will help in preventing such issues from affecting their anxiety and depression states.
4. The establishment of a mental health department comprising of industrial and/or organizational and clinical psychologists will be critical in ensuring the improvement in the mental health conditions of mineworkers. This will signal the organization's commitment to the mental health of their workers and the readily available professionals to talk whenever any mine worker is challenged mentally.

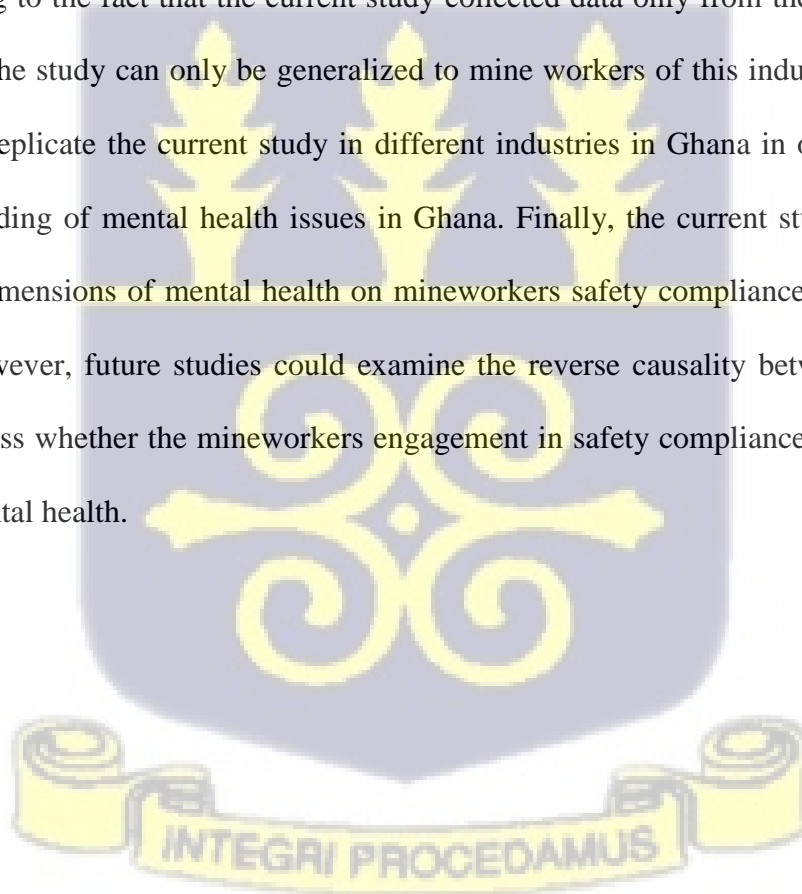
5. Depression was found as the larger influencer of mineworkers safety compliance and participation behaviours. Consequently, the researcher recommends that mining companies should pay critical attention to the cost of depression highlighted earlier in the study.
6. The creation of a good safety climate perceived through safety leadership, safety communication, safety training and safety commitment is vital in ensuring mine workers safety compliance and participation behaviours. The researcher recommends therefore that mining companies should intensify their safety communications activities in attempt to create a good safety climate to mitigate the adverse effect of anxiety and depression on mineworkers safety behaviours.
7. Finally, the researcher recommends a national dialogue on the whole concept of mental health in mining to discuss its prevalence in the country at large and mining companies in particular and puffer solutions to this menace.

5.5.2 Study Limitation and Direction for Further Studies

Using the cross-sectional survey research design, the current study collected data from mine workers of four mining companies at one point in time. This did not afford the researcher an opportunity to assess the changes in responses of research participants as a result of changes in time. Consequently, future research could collect data at different time periods (longitudinal) on the current study variables to assess the effect of time on the relationships between the study's constructs. Also, the study adopted two dimensions of mental health – anxiety and depression that limit the understanding of mental health on mineworkers safety compliance and participation behaviours. To broaden the understanding of the impact of mental health on mineworkers safety

behaviours, other dimensions of mental health such as positive affect, behavioural control and job security could be studied to examine their impact on safety compliance and participation.

Arguing from a positivist research paradigm and a quantitative research approach, the current study collected numeric data to establish the relationships between the dimensions of mental health and the dimensions of mineworkers safety behaviours. This made it impossible for the researcher to probe further to identify the underlying causes of these relationships. Consequently, a future researcher can replicate the current study using a mixed-method or a more detailed study using the qualitative approach to assess the underlying causes of the relationships between the research variables. Owing to the fact that the current study collected data only from the mining industry, the findings of the study can only be generalized to mine workers of this industry and so future research could replicate the current study in different industries in Ghana in order to provide a better understanding of mental health issues in Ghana. Finally, the current study examined the impact of the dimensions of mental health on mineworkers safety compliance and participation behaviours. However, future studies could examine the reverse causality between the research variables to assess whether the mineworkers engagement in safety compliance and participation affects their mental health.



REFERENCES

- Addo, S. A., & Dartey-Baah, K. (2019). Leadership in the safety sense : where does perceived organisational support fit? *Journal of Management Development*, 39(1), 50–57.
- Adler, A. B., Saboe, K. N., Anderson, J., Sipos, M. L., & Thomas, J. L. (2014). *Behavioral Health Leadership : New Directions in Occupational Mental Health*. 16(48), 1-7.
- Agyekum, K., Ghansah, F. A., & Tetteh, P. A. (2020). The role of project managers (PMs) in construction health and safety implementation in Ghana. *Journal of Engineering, Design and Technology* 17(16), 1-18. <https://doi.org/10.1108/JEDT-04-2020-0122>
- Akarsu, T. N., Foroudi, P., & Melewar, T. C. (2020). What makes Airbnb likeable? Exploring the nexus between service attractiveness, country image, perceived authenticity and experience from a social exchange theory perspective within an emerging economy context. *International Journal of Hospitality Management*, 91, 102635.
- Alroomi, A. S., & Mohamed, S. (2021). Predictors of mental health and fatigue among isolated oil and gas workers. *Safety and Reliability*, 1 (1)1–17.
- American Psychiatric Association. (2018). *Diagnostic and statistical manual of mental disorders (DSM-5®)* (5th ed.). Arlington, VA.: American Psychiatric Publishing.
- Amponsah-Tawiah, K., Boateng, A. K., & Tetteh, S. D. (2020). Safety climate and employees voluntary work behaviours : the moderating role of employees voice. *International Journal of Workplace Health Management*, 2(1), 41–62.
- Amponsah-Tawiah, K., Jain, A., Leka, S., Hollis, D., & Cox, T. (2013). Examining psychosocial and physical hazards in the Ghanaian mining industry and their implications for employees' safety experience. *Journal of Safety Research*, 45, 75–84. <https://doi.org/10.1016/j.jsr.2013.01.003>
- Amponsah-Tawiah, K., & Mensah, J. (2016). Occupational health and safety and organizational commitment: Evidence from the Ghanaian mining industry. *Safety and Health at Work*, 7(3), 225–230.
- Anwar, A. (2021). Impact of COVID-19 social media news on employee behavior : the mediating role of psychological well-being and depression. *Asian Education and Development Studies*, 1–16. <https://doi.org/10.1108/AEDS-07-2020-0159>
- Arshad, A., Rehman, A. U., Javaid, S., Ali, T. M., Sheikh, J. A., & Azeem, M. (2021). A Systematic Literature Review on Phishing and Anti-Phishing Techniques. *Pakistan Journal of Engineering and Technology*, 4(1), 163–168.
- Asare-Doku, W., Rich, J., Kelly, B., & James, C. (2020). Mental health interventions in the mining industry: a narrative review. *Mental Health Review Journal*, 25(2), 153–167. <https://doi.org/10.1108/MHRJ-10-2019-0039>

- Ashour, A., & Hassan, Z. (2020). A Conceptual Framework for Improving Safety Performance by Safety Management practices to Protect Jordanian Nurses During the Coronavirus Outbreak (COVID-19) in 2020. *International Journal of Multidisciplinary Sciences and Advanced Technology*, 1(2), 24–33.
- Auzoult, L., & Nguetsa, R. (2019). Attitude to safety rules and reflexivity as determinants of safety climate. *Journal of Safety Research*, 71, 95–102.
- Balsamo, M., Cataldi, F., Carlucci, L., & Fairfield, B. (2018). Assessment of anxiety in older adults: a review of self-report measures. *Clinical Interventions in Aging*, 13(19), 573-576.
- Barling, J., & Hutchinson, I. (2020). Commitment vs . Control-based Safety Practices , Safety Reputation , and Perceived Safety Climate. *Canadian Journal of Administrative Sciences*, 17(1), 76–84.
- Bazargan, M., & Amiri, M. (2018). The effectiveness of modular cognitive behavioral therapy on mathematical anxiety and assertiveness in students. *Journal of Fundamentals of Mental Health*, 20(6), 114-128.
- Bentler, P. M., & Bonett, D. G. (1980). Significance tests and goodness of fit in the analysis of covariance structures. *Psychological Bulletin*, 88(3), 588.
- Beseler, C. L., & Stallones, L. (2010). Safety Knowledge , Safety Behaviors , Depression , and Injuries in Colorado Farm Residents. *American Journal Of Industrial Medicine*, 53(September 2009), 47–54. <https://doi.org/10.1002/ajim.20779>.
- Beseler, C. L., Stallones, L., & Beseler, C. L. (2013). Structural Equation Modeling of Pesticide Poisoning , Depression , Safety , and Injury. *Journal of Agromedicine*, 18, 340–349. <https://doi.org/10.1080/1059924X.2013.826117>
- Biederman, J., Fried, R., Hammerness, P., Surman, C., Mehler, B., Petty, C. R., ... Meller, B. (2012). The effects of lisdexamfetamine dimesylate on the driving performance of young adults with ADHD: a randomized, double-blind, placebo-controlled study using a validated driving simulator paradigm. *Journal of Psychiatric Research*, 46(4), 484–491.
- Black, K. J., Munc, A., Sinclair, R. R., & Cheung, J. H. (2019). Stigma at work: The psychological costs and benefits of the pressure to work safely. *Journal of Safety Research*, 70, 181–191. <https://doi.org/10.1016/j.jsr.2019.07.007>
- Blakey, S. M., & Abramowitz, J. S. (2016). The effects of safety behaviors during exposure therapy for anxiety : Critical analysis from an inhibitory learning perspective. *Clinical Psychology Review*, 49, 1–15. <https://doi.org/10.1016/j.cpr.2016.07.002>
- Blau, P. M. (1964). Social exchange theory. *Retrieved September*, 3(2007), 62.
- BLS. (2018). *Number of fatal work injuries by employee status , 2003 – 17 Rate of fatal work injuries per 100 , 000 full-time equivalent workers by employee status , 2006 – 17.*
- Borman, W. C., & Motowidlo, S. M. (1993). Expanding the criterion domain to include elements

- of contextual performance. In N. Schmitt, W. C. Borman, & Associates (Eds.), *Personnel selection in organizations* ((Eds.), pp. 71–98). San Francisco: Jossey-Bass.
- Bowers, J., Lo, J., Miller, P., Mawren, D., & Jones, B. (2018). Psychological distress in remote mining and construction workers in Australia. *Medical Journal of Australia*, 208(9), 391–397.
- Bromet, E., Andrade, L. H., Hwang, I., Sampson, N. A., Alonso, J., De Girolamo, G., ... Iwata, N. (2011). Cross-national epidemiology of DSM-IV major depressive episode. *BMC Medicine*, 9(1), 1–16.
- Bronkhorst, B., Tummers, L., Steijn, B., & Vijverberg, D. (2014). A Systematic Review Of Studies In Health Care Organizations. *Health Care Management Review*, 6(4), 40–82.
- Calderwood, C., Bennett, A. A., Allison, S., Trougakos, J. P., & Dahling, J. J. (2018). Too anxious to help? Off-job affective rumination as a linking mechanism between work anxiety and helping. *Journal of Occupational and Organizational Psychology*, 91, 681–687. <https://doi.org/10.1111/joop.12220>
- Chang, K. C. (2021). The affecting tourism development attitudes based on the social exchange theory and the social network theory. *Asia Pacific Journal of Tourism Research*, 26(2), 167–182.
- Chen, M., Chen, L., Yan, X., Yu, Z., Fang, Y., & Yu, Y. (2018). Investigating the nonlinear effect of ego depletion on safety compliance : The moderating role of rumination. *Journal of Safety Research*, 67, 27–35. <https://doi.org/10.1016/j.jsr.2018.09.005>
- Chen, Y., Li, S., Xia, Q., & He, C. (2017). The Relationship between Job Demands and Employees ' Counterproductive Work Behaviors : The Mediating Effect of Psychological Detachment and Job Anxiety. *Frontiers in Psychology*, 8(October), 1–15.
- Cheng, B. H., & Mccarthy, J. M. (2018). Journal of Applied Psychology Understanding the Dark and Bright Sides of Anxiety : A Theory of Workplace Anxiety Understanding the Dark and Bright Sides of Anxiety : A Theory of Workplace Anxiety. *Journal of Applied Psychology*, 2(1), 1–24.
- Cheng, L., Guo, H., & Lin, H. (2020). The influence of leadership behavior on miners ' work safety behavior. *Safety Science*, 132(May 2019), 104986.
- Cheng, Y.-H. (2019). Railway safety climate: a study on organizational development. *International Journal of Occupational Safety and Ergonomics*, 25(2), 200–216. <https://doi.org/10.1080/10803548.2017.1361591>
- Chernyak-Hai, L., & Rabenu, E. (2018). The new era workplace relationships: Is social exchange theory still relevant? *Industrial and Organizational Psychology*, 11(3), 456–481.
- Cieri, H. De, & Lazarova, M. (2020). Human Resource Management Review “ Your health and safety is of utmost importance to us ”: A review of research on the occupational health and safety of international employees. *Human Resource Management Review*, 100790.

<https://doi.org/10.1016/j.hrmr.2020.100790>

- Ciocca, G., Pelligrini, F., Mollaioli, D., Limoncin, E., Sansone, A., Colonnello, E., ... Fontanesi, L. (2021). Hypersexual behavior and attachment styles in a non-clinical sample: The mediation role of depression and post-traumatic stress symptoms. *Journal of Affective Disorders*, 293(July), 399–405. <https://doi.org/10.1016/j.jad.2021.06.064>
- Clercq, D. De, Haq, I. U., & Azeem, M. U. (2018). Self-efficacy to spur job performance workplace incivility. *Management Decision*, 56(4), 891–907.
- Clercq, D. De, Ul, I., & Umer, M. (2017). Perceived threats of terrorism and job performance: The roles of job-related anxiety and religiousness. *Journal of Business Research*, 78(April), 23–32. <https://doi.org/10.1016/j.jbusres.2017.04.013>
- Connelly, L. M. (2020). Inclusion and exclusion criteria. *Medsurg Nursing*, 29(2), 116–125.
- Considine, R., Tynan, R., James, C., Wiggers, J., Lewin, T., Inder, K., ... Kelly, B. (2017). The Contribution of Individual, Social and Work Characteristics to Employee Mental Health in a Coal Mining Industry Population. *PLoS ONE*, 12(1), 1–15.
- Cook, K. S., Cheshire, C., & Gerbasi, A. (2020). Power, dependence, and social exchange theory. In *Contemporary social psychological theories* (pp. 166–193). Stanford University Press.
- Cook, K. S., Cheshire, C., Rice, E. R. W., & Nakagawa, S. (2013). Social exchange theory. In *Handbook of social psychology* (pp. 61–88). Dordrecht: Springer.
- Creswell, J. W. (2015). *Research design: Qualitative, quantitative, and mixed methods approaches* (4th ed.). California: Sage publications.
- Cropanzano, R., Anthony, E. L., Daniels, S. R., & Hall, A. V. (2017). Social exchange theory: A critical review with theoretical remedies. *Academy of Management Annals*, 11(1), 479–516.
- Cropanzano, R., & Mitchell, M. S. (2005). Social exchange theory: An interdisciplinary review. *Journal of Management*, 31(6), 874–900.
- Curcuruto, M., & Griffin, M. A. (2018). Prosocial and proactive “safety citizenship behaviour”(SCB): The mediating role of affective commitment and psychological ownership. *Safety Science*, 104, 29–38.
- Dale, A. M., Colvin, R., Barrera, M., Strickland, J. R., & Evanoff, B. A. (2020). The association between subcontractor safety management programs and worker perceived safety climate in commercial construction projects. *Journal of Safety Research*, 74, 279–288. <https://doi.org/10.1016/j.jsr.2020.06.010>
- Dartey-baah, K., & Addo, S. A. (2018). Charismatic and corrective leadership dimensions as antecedents of employee safety behaviours A structural model. *Leadership & Organization Development Journal*, 39(2), 186–201. <https://doi.org/10.1108/LODJ-08-2017-0240>
- Dartey-Baah, K., Quartey, S. H., & Adotey, A. (2020). Examining transformational and

- transactional leadership styles and safety citizenship behaviors in the power distribution sector : evidence from Ghana. *International Journal of Energy Sector Management*, 30(1), 1–18. <https://doi.org/10.1108/IJESM-07-2020-0008>
- DeArmond, S., Chen, P., & Moore, J. T. (2018). Leadership and safety : the role of goal commitment. *Journal of Organizational Effectiveness: People and Performanc*, 5(2), 182–198. <https://doi.org/10.1108/JOEPP-07-2017-0066>
- Dejoy, D. M., Smith, T. D., & Dyal, M. (2017). Safety climate and fi re fi ghting : Focus group result. *Journal of Safety Research*, 62, 107–116. <https://doi.org/10.1016/j.jsr.2017.06.011>
- DeVellis, R. F. (2003). *Scale development: Theory and application (2nd edn)*. Thousand Oaks, California. Sage.
- Dijkstra, T. K., & Henseler, J. (2015). Consistent partial least squares path modeling. *MIS Quarterly*, 39(2), 297–316.
- Douine, M., Mosnier, E., Le Hingrat, Q., Charpentier, C., Corlin, F., Hureau, L., ... Aucouturier, A.-L. (2018). Illegal gold miners in French Guiana: a neglected population with poor health. *BMC Public Health*, 18(1), 1–10.
- Easterby-Smith, M., Jaspersen, L. J., Thorpe, R., & Valizade, D. (2015). *Management and business research (5th ed.)*. London: Sage.
- Elhai, J. D., Yang, H., McKay, D., & Asmundson, G. J. G. (2020). COVID-19 anxiety symptoms associated with problematic smartphone use severity in Chinese adults. *Journal of Affective Disorders*, 274, 576–582.
- Enwereuzor, I. K., Adeyemi, B. A., & Onyishi, I. E. (2020). Trust in leader as a pathway between ethical leadership and safety compliance. *Leadership in Health Services*, 33(2), 201–219. <https://doi.org/10.1108/LHS-09-2019-0063>
- Etikan, I., Musa, S. A., & Alkassim, R. S. (2016). Comparison of convenience sampling and purposive sampling. *American Journal of Theoretical and Applied Statistics*, 5(1), 1–4.
- Evans, R., Chiu, K., Clark, D. M., Waite, P., & Leigh, E. (2021). Behaviour Research and Therapy Safety behaviours in social anxiety : An examination across adolescence. *Behaviour Research and Therapy*, 144(July), 103931.
- Fernández-muñiz, B., Montes-peón, J. M., & Vázquez-ordás, C. J. (2017). Journal of Loss Prevention in the Process Industries The role of safety leadership and working conditions in safety performance in process industries. *Journal of Loss Prevention in the Process Industries*, 50(November), 403–415. <https://doi.org/10.1016/j.jlp.2017.11.001>
- Fernández-Muñiz, B., Montes-peón, J. M., & Vázquez-ordás, C. J. (2014). Safety leadership , risk management and safety performance in Spanish firms. *Safety Science*, 70, 295–307. <https://doi.org/10.1016/j.ssci.2014.07.010>
- Fisch, C., & Block, J. (2018). *Six tips for your (systematic) literature review in business and*

management research (pp. 103–106). pp. 103–106. Springer.

- Ford, M. T., Cerasoli, C. P., Higgins, J. A., & Andrew, L. (2011). Relationships between psychological, physical, and behavioural health and work performance: A review and meta-analysis. *Work & Stress*, 25(3), 185–204.
- Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, 18(1), 39–50.
- Funayama, T., Furukawa, T. A., & Nakano, Y. (2013). disorder: Descriptive and correlational study. *Psychiatry and Clinical Neurosciences* 1–8. <https://doi.org/10.1111/pcn.12061>
- Galderisi, S., Andreas, H., Marianne, K., Julian, B., & Norman, S. (2017). A proposed new definition of mental health. *51(3)*, 407–411.
- Ghana Chamber of Mines. (2020). *The Performance of the Mining Industry in 2019*.
- Goldenhar, L. M., Schwatka, N., & Johnson, K. (2019). Leadership skills for strengthening jobsite safety climate. *Journal of Safety Research*, 70, 263–271.
- Grandey, A. A. (2003). When “the show must go on” surface acting and deep acting as determinants of emotional exhaustion and peer-rated service delivery. *Academy of Management Journal*, 46(1), 86–96.
- Griffin, M. A., & Hu, X. (2013). How leaders differentially motivate safety compliance and safety participation: The role of monitoring, inspiring, and learning. *Safety Science*, 60, 196–202. <https://doi.org/10.1016/j.ssci.2013.07.019>
- Griffin, M. A., & Neal, A. (2000). Perceptions of safety at work: a framework for linking safety climate to safety performance, knowledge, and motivation. *Journal of Occupational Health Psychology*, 5(3), 347–358.
- Hafeez, H., Abdullah, M. I., Zaheer, M. A., & Ahsan, Q. (2020). Organizational resilience process: integrated model of safety culture. *Organization Management Journal*, 4(8), 1541–6518.
- Hair Jr, J. F., Sarstedt, M., Hopkins, L., & Kuppelwieser, V. G. (2014). Partial least squares structural equation modeling (PLS-SEM): An emerging tool in business research. *European Business Review*, 26(4), 106–121.
- Hall, G. B., Dollard, M. F., Winefield, A. H., Dormann, C., & Bakker, A. B. (2013). Psychosocial safety climate buffers effects of job demands on depression and positive organizational behaviours. *Anxiety, Stress and Coping*, 26(4), 355–377.
- Han, H. (2018). Green indoor and outdoor environment as nature-based solution and its role in increasing customer/employee mental health, well-being, and loyalty. *Business Strategy and the Environment*, (September 2018), 629–641.
- Haslam, C., Atkinson, S., Brown, S. S., & Haslam, R. A. (2005). Anxiety and depression in the workplace: Effects on the individual and organisation (a focus group investigation). *Journal*

of Affective Disorders, 88(2), 209–215. <https://doi.org/10.1016/j.jad.2005.07.009>

Hastuti, R., & Timming, A. R. (2021). An inter-disciplinary review of the literature on mental illness disclosure in the workplace: implications for human resource management. *The International Journal of Human Resource Management*, 1(1), 1–37.

Haupt, T. C., & Pillay, K. (2016). Investigating the true costs of construction accidents. *Journal of Engineering, Design and Technology*, 14, 373–419.

Headey, B., Kelley, J., & Wearing, A. (1993). Dimensions of mental health: Life satisfaction, positive affect, anxiety and depression. *Social Indicators Research*, 29(1), 63–82.

Hennekam, S., Richard, S., & Grima, F. (2020). Coping with mental health conditions at work and its impact on self-perceived job performance. *Employee Relations: The International Journal*, 42(3), 626–645. <https://doi.org/10.1108/ER-05-2019-0211>

Henseler, J., Ringle, C. M., & Sarstedt, M. (2015). A new criterion for assessing discriminant validity in variance-based structural equation modeling. *Journal of the Academy of Marketing Science*, 43(1), 115–135.

Henseler, J., & Schuberth, F. (2020). Using confirmatory composite analysis to assess emergent variables in business research. *Journal of Business Research*, 120 issue number, 147–156.

Homans, G. C. (1958). Social behaviour as exchange. *American Journal of Sociology*, 63(2), 597–60.

Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal*, 6(1), 1–55.

Hu, X., Yan, H., Casey, T., & Wu, C. (2020). Food Safety in the Hospitality Sector. *International Journal of Hospitality Management*, 130, 102662. <https://doi.org/10.1016/j.ijhm.2020.102662>

Hu, X., Yeo, G., & Griffin, M. (2020). More to safety compliance than meets the eye: Differentiating deep compliance from surface compliance. *Safety Science*, 130(May 2020), 104852. <https://doi.org/10.1016/j.ssci.2020.104852>

Hulls, P. M., Richmond, R. C., Martin, R. M., & de Vocht, F. (2020). A systematic review protocol examining workplace interventions that aim to improve employee health and wellbeing in male-dominated industries. *Systematic Reviews*, 9(1), 1–7.

Hünefeld, L., Gerstenberg, S., & Hüffmeier, J. (2020). Job satisfaction and mental health of temporary agency workers in Europe: a systematic review and research agenda. *Work & Stress*, 34(1), 82–110.

ILO. (2014). *Database on Labor Statistics (ILO Laborsta)* (pp. 1–8). pp. 1–8. ILO Geneva.

ILO. (2017). *Ilostat–Ilo Database Of Labour Statistics* (pp. 1–7). pp. 1–7.

- International Council on Mining & Metals. (2020). Benchmarking Safety Data: Progress of ICMM company members (2018). Retrieved September 26, 2020, from <https://www.icmm.com/safety-data-2018>
- Jesson, J., Matheson, L., & Lacey, F. M. (2011). *Doing your literature review: Traditional and systematic techniques*. London: Sage.
- Jiang, Li, Yu, G., Li, Y., & Li, F. (2010). Perceived colleagues' safety knowledge / behaviour and safety performance : Safety climate as a moderator in a multilevel study. *Accident Analysis and Prevention*, 42(5), 1468–1476. <https://doi.org/10.1016/j.aap.2009.08.017>
- Jiang, Lixin, & Probst, T. M. (2016). Transformational and passive leadership as cross-level moderators of the relationships between safety knowledge, safety motivation, and safety participation. *Journal of Safety Research*, 57, 27–32.
- Kang, H. (2013). The prevention and handling of the missing data. *Korean Journal of Anesthesiology*, 64(5), 402-410.
- Kapp, E. A. (2012). The influence of supervisor leadership practices and perceived group safety climate on employee safety performance. *Safety Science*, 50(4), 1119–1124. <https://doi.org/10.1016/j.ssci.2011.11.011>
- Karanja, E., Zaveri, J., & Ahmed, A. (2013). How do MIS researchers handle missing data in survey-based research: A content analysis approach. *International Journal of Information Management*, 33(5), 734–751.
- Katz, D. E., Laposa, J. M., & Rector, N. A. (2020). Excessive reassurance seeking in depression versus obsessive-compulsive disorder : Cross-sectional and cognitive behavioural therapy treatment comparisons. *Journal of Anxiety Disorders*, 75(December 2019), 102-280.
- Kim, T., & Gausdal, A. H. (2017). Leading for safety : A weighted safety leadership model in shipping. *Reliability Engineering and System Safety*, 165(March), 458–466. <https://doi.org/10.1016/j.ress.2017.05.002>
- Kirk, A., Meyer, J. M., Whisman, M. A., Deacon, B. J., & Arch, J. J. (2019). Safety behaviors , experiential avoidance , and anxiety : A path analysis approach. *Journal of Anxiety Disorders*, 64(March), 9–15. <https://doi.org/10.1016/j.janxdis.2019.03.002>
- Knowles, K. A., & Olatunji, B. O. (2021). Anxiety and safety behavior usage during the COVID-19 pandemic : The prospective role of contamination fear. *Journal of Anxiety Disorders*, 77(September 2020), 102-323. <https://doi.org/10.1016/j.janxdis.2020.102323>
- Kock, N. (2018). Should bootstrapping be used in PLS-SEM? Toward stable P-Value calculation methods. *Journal of Applied Structural Equation Modeling*, 2(1), 1–12.
- Kothari, C. R. (2004). *Research methodology: Methods and techniques*. New Age International.
- Kouchaki, M., & Desai, S. D. (2015). Anxious , Threatened , and Also Unethical : How Anxiety Makes Individuals Feel Threatened and Commit Unethical Acts. *Journal of Applied*

Psychology, 100(2), 360–375.

- Kraus, S., Breier, M., & Dasí-Rodríguez, S. (2020). The art of crafting a systematic literature review in entrepreneurship research. *International Entrepreneurship and Management Journal*, 16(3), 1023–1042.
- Kvalheim, S. A., & Dahl, Ø. (2016). Safety compliance and safety climate : A repeated cross-sectional study in the oil and gas industry. *Journal of Safety Research*, 59, 33–41. <https://doi.org/10.1016/j.jsr.2016.10.006>
- Kyei, K. A., Oswald, J. W., Njoku, A. U., Kyei, J. B., & Vanderpuye, V. (2020). Anxiety and Depression among Breast Cancer Patients Undergoing Treatment in Ghana. *African Journal of Biomedical Research*, 23(2), 227–232.
- Lee, N., Kim, J., Kim, E., & Kwon, O. (2017). The influence of politeness behavior on user compliance with social robots in a healthcare service setting. *International Journal of Social Robotics*, 9(5), 727–743.
- Lee, Y., Lu, T., Chia, C., & Chang, G. (2019). A multilevel approach on empowering leadership and safety behavior in the medical industry : The mediating effects of knowledge sharing and safety climate. *Safety Science*, 117(February), 1–9.
- Lerner, D., Adler, D. A., Rogers, W. H., Chang, H., Lapitsky, L., Mclaughlin, T., & Reed, J. (2010). Work Performance of Employees With Depression : The Impact of Work Stressors. *American Journal of Health Promotion*, 24(3), 205–214. <https://doi.org/10.4278/ajhp.090313-QUAN-103>
- Lim, G. Y., Tam, W. W., Lu, Y., Ho, C. S., Zhang, M. W., & Ho, R. C. (2018). Prevalence of depression in the community from 30 countries between 1994 and 2014. *Scientific Reports*, 8(1), 1–10.
- Lingard, H., Zhang, R. P., & Oswald, D. (2019). Effect of leadership and communication practices on the safety climate and behaviour of construction workgroups. *Engineering, Construction and Architectural Management*, 26(6), 886–906. <https://doi.org/10.1108/ECAM-01-2018-0015>
- Liu, L., Wen, F., Xu, X., & Wang, L. (2015). *Effective resources for improving mental health among Chinese underground coal miners: Perceived organizational support and psychological capital*. 57, 58–68.
- Liu, S., Zhou, Y., Cheng, Y., & Zhu, Y. (2020). Multiple mediating effects in the relationship between employees' trust in organizational safety and safety participation behavior. *Safety Science*, 125, 104611. <https://doi.org/10.1016/j.ssci.2020.104611>
- Lu, C., & Yang, C. (2010). Safety leadership and safety behavior in container terminal operations. *Safety Science*, 48(2), 123–134. <https://doi.org/10.1016/j.ssci.2009.05.003>
- Lu, Y., Zhang, Z., Gao, S., Yan, H., Zhang, L., & Liu, J. (2020). The status of occupational burnout and its influence on the psychological health of factory workers and miners in Wulumuqi,

- China. *BioMed Research International*, 2020, 1–12.
- Lu, Y., Zhang, Z., Yan, H., Rui, B., & Liu, J. (2020). *Effects of Occupational Hazards on Job Stress and Mental Health of Factory Workers and Miners : A Propensity Score Analysis*. 20(20), 1-12.
- Lyu, S., Hon, C. K. H., Chan, A. P. C., Wong, F. K. W., & Javed, A. A. (2018). Relationships among safety climate, safety behavior, and safety outcomes for ethnic minority construction workers. *International Journal of Environmental Research and Public Health*, 15(3), 484.
- Manwell, L. A., Barbic, S. P., Roberts, K., Durisko, Z., Lee, C., Ware, E., & Mckenzie, K. (2015). *What is mental health? Evidence towards a new de fi nition from a mixed methods multidisciplinary international survey*. 5(1), 1–11. <https://doi.org/10.1136/bmjopen-2014-007079>
- Martínez-córcoles, M., Schöbel, M., Gracia, F. J., Tomás, I., & Peiró, J. M. (2012). Linking empowering leadership to safety participation in nuclear power plants : A structural equation model *Journal of Safety Research*, 43(3), 215–221.
- Mccarthy, J., Trougakos, J. P., & Cheng, B. H. (2015). Are Anxious Workers Less Productive Workers ? It Depends on the Quality of Social Exchange. *Journal of Applied Psychology*, August 10, 1–13.
- McHorney, C. A., & Ware, J. E. (1995). Construction and validation of an alternate form general mental health scale for the medical outcomes study short-form 36-item health survey. *Medical Care*, 33(1), 15–28. <https://doi.org/10.1097/00005650-199501000-00002>
- Mclean, K. N. (2012). Mental health and well-being in resident mine workers: Out of the fly-in-fly-out box. *Australian Journal of Rural Health*, 20(3), 126–130.
- Mcphee, D., Samnani, A., & Schlosser, F. (2019). A moderated-mediated model of youth safety. *Personal Review*. 48(7), 1866-1885. <https://doi.org/10.1108/PR-10-2018-0394>
- Mcternan, W. P., Dollard, M. F., Lamontagne, A. D., Mcternan, W. P., Dollard, M. F., & Lamontagne, A. D. (2013). Depression in the workplace : An economic cost analysis of depression-related productivity loss attributable to job strain and bullying. *Work & Stress*, 27(4), 321–338. <https://doi.org/10.1080/02678373.2013.846948>
- Mei, C., Chan, H., Ng, S. L., In, S., Wee, L. H., & Siau, C. S. (2021). Predictors of Psychological Distress and Mental Health Resource Utilization among Employees in Malaysia. *International Journal of Environmental Research & Public Health*, 18 (34), 1–15.
- Mental Health Act, 2012, Act 846. , Act 846 Ghana Publishing Company (2012).
- Miller, R. L., & Brewer, J. D. (2003). *The AZ of social research: a dictionary of key social science research concepts*. Sage.
- Milner, A., Scovelle, A. J., & King, T. (2018). *Treatment-seeking differences for mental health problems in male- and non-male- dominated occupations : evidence from the HILDA cohort*.

- Mitchell, M. S., Cropanzano, R. S., & Quisenberry, D. M. (2012). Social exchange theory, exchange resources, and interpersonal relationships: A modest resolution of theoretical difficulties. In *Handbook of social resource theory* (pp. 99–118). New York: Springer.
- Moscovitch, D. A., Rowa, K., Paulitzki, J. R., Ierullo, M. D., Chiang, B., Antony, M. M., & McCabe, R. E. (2013). Behaviour Research and Therapy Self-portrayal concerns and their relation to safety behaviors and negative affect in social anxiety disorder. *Behaviour Research and Therapy*, *51*(8), 476–486. <https://doi.org/10.1016/j.brat.2013.05.002>
- Moss, S. (2009). Expectation maximization—To manage missing data. *Age*, *7*, 1–10.
- Mullen, E. J., & Kelloway, E. K. (2009). Copyright © The British Psychological Society Safety leadership : A longitudinal study of the effects of transformational leadership on safety outcomes Copyright © The British Psychological Society. *Journal of Occupational and Organizational Psychology*, *82*(4), 253–272. <https://doi.org/10.1348/096317908X325313>
- Mullen, J., Fiset, J., & Rhéaume, A. (2018). *Destructive forms of leadership incivility on employee health and safety* *39*(8), 946-961. <https://doi.org/10.1108/LODJ-06-2018-0203>
- National, Institute, Of, Mental, & Health. (2018). *Major Depression Prevalence of Major Depressive Episode Among Adults Major Depressive Episode with Impairment Among Adults*. *25*, 1–8.
- Nauman, S., Malik, S., & Jalil, F. (2019). How Workplace Bullying Jeopardizes Employees ' Life Satisfaction : The Roles of Job Anxiety and Insomnia. *Frontiers in Psychology*, *10*(October), 1–13. <https://doi.org/10.3389/fpsyg.2019.02292>
- Neal, A., & Griffin, M. A. (2006). A study of the lagged relationships among safety climate, safety motivation, safety behavior, and accidents at the individual and group levels. *Journal of Applied Psychology*, *91*(4), 946–953.
- Ng, T. W. H., Sorensen, K. L., Zhang, Y., & Yim, F. H. K. (2019). Anger , anxiety , depression , and negative a ff ect : Convergent or divergent ? *Journal of Vocational Behavior*, *110*(May 2018), 186–202. <https://doi.org/10.1016/j.jvb.2018.11.014>
- Nielsen, M. B., Eid, J., Mearns, K., & Larsson, G. (2011). Authentic leadership and its relationship with risk perception and safety climate. *Leadership & Organization Development Journal*, *34*(4), 308–325. <https://doi.org/10.1108/LODJ-07-2011-0065>
- Oah, S., Na, R., & Moon, K. (2018). The In fl uence of Safety Climate , Safety Leadership , Workload , and Accident Experiences on Risk Perception : A Study of Korean Manufacturing Workers. *Safety and Health at Work*, *9*(4), 427–433.
- Ohrnberger, J., Fichera, E., & Sutton, M. (2017). The relationship between physical and mental health : A mediation analysis. *Social Science & Medicine*, *195*(November), 42–49. <https://doi.org/10.1016/j.socscimed.2017.11.008>
- Olaoluwa, S. A. (2021). Applying Cognitive Therapy for Depression and Anxiety in Mathematics Education for Students' Sustainable Performance. *Creative Education*, *12*(6), 1407–1418.

- Othman, A. A. E. (2012). A study of the causes and effects of contractors ' non-compliance with the health and safety regulations in the South African construction industry A study of the causes and effects of contractors ' non-compliance with the health and safety regulations in. *Architectural Engineering and Design Management*, 8(3), 180–191. <https://doi.org/10.1080/17452007.2012.683242>
- Öztuna, D., Elhan, A. H., & Tüccar, E. (2006). Investigation of four different normality tests in terms of type 1 error rate and power under different distributions. *Turkish Journal of Medical Sciences*, 36(3), 171–176.
- Paolillo, A., Silva, S. A., Carvalho, H., & Pasini, M. (2020). Exploring patterns of multiple climates and their effects on safety performance at the department level. *Journal of Safety Research*, 72, 47–60. <https://doi.org/10.1016/j.jsr.2019.12.009>
- Paolillo, A., Silva, S. A., & Pasini, M. (2016). Promoting safety participation through diversity and inclusion climates. *International Journal of Workplace Health Management*, 9(3), 308–327. <https://doi.org/10.1108/IJWHM-01-2015-0002>
- Park, Y. S., Konge, L., & Artino, A. R. (2020). The positivism paradigm of research. *Academic Medicine*, 95(5), 690–694.
- Parletta, N., Zarnowiecki, D., Cho, J., Wilson, A., Bogomolova, S., Villani, A., ... Meyer, B. (2018). A Mediterranean-style dietary intervention supplemented with fish oil improves diet quality and mental health in people with depression: A randomised controlled trial (HELFIMED). *Journal of the Australasian College of Nutritional and Environmental Medicine*, 37(1), 6–18.
- Patel, V. (2014). Why mental health matters to global health. *Transcultural Psychiatry*. 51(6), 777–789. <https://doi.org/10.1177/1363461514524473>
- Patel, V., Belkin, G. S., Chockalingam, A., Cooper, J., Saxena, S., & Unützer, J. (2013). Grand challenges: integrating mental health services into priority health care platforms. *PLoS Med*, 10(5), e1001448.
- Patino, C. M., & Ferreira, J. C. (2018). Inclusion and exclusion criteria in research studies: definitions and why they matter. *Jornal Brasileiro de Pneumologia*, 44(2), 84-98.
- Paul, J., & Criado, A. R. (2020). The art of writing literature review: What do we know and what do we need to know? *International Business Review*, 29(4), 101717.
- Petralia, M. C., Mazzon, E., Fagone, P., Basile, M. S., Lenzo, V., Quattropiani, M. C., ... Nicoletti, F. (2020). The cytokine network in the pathogenesis of major depressive disorder. Close to translation? *Autoimmunity Reviews*, 19(5), 102504.
- Poole, J. C., Dobson, K. S., & Pusch, D. (2017). Anxiety among adults with a history of childhood adversity: Psychological resilience moderates the indirect effect of emotion dysregulation. *Journal of Affective Disorders*, 217, 144–152.
- Prince, M., Patel, V., Saxena, S., Maj, M., Maselko, J., Phillips, M. R., & Rahman, A. (2007).

- Global Mental Health 1. *Lancet*, 370, 859–877. [https://doi.org/10.1016/S0140-6736\(07\)61238-0](https://doi.org/10.1016/S0140-6736(07)61238-0)
- Quartey, S. H. (2017). Examining employees' safety behaviours: an industry-level investigation from Ghana. *Personnel Review*, 46(8), 1915–1930. <https://doi.org/10.1108/PR-06-2016-0146>
- Rahi, S. (2017). Research design and methods: A systematic review of research paradigms, sampling issues and instruments development. *International Journal of Economics & Management Sciences*, 6(2), 1–5.
- Reader, T. W., Mearns, K., Lopes, C., & Kuha, J. (2017). Organizational support for the workforce and employee safety citizenship behaviors: A social exchange relationship. *Human Relations*, 70(3), 362–385.
- Redmond, M. V. (2015). Social exchange theory. In *English Technical Reports and White Papers*.
- Romero, M., Guédria, W., Panetto, H., & Barafort, B. (2020). Towards a characterisation of smart systems: A systematic literature review. *Computers in Industry*, 120, 103224.
- Saedi, A. M., Majid, A. A., & Isa, Z. (2020). Relationships between safety climate and safety participation in the petroleum industry: A structural equation modeling approach. *Safety Science*, 121(March 2018), 240–248. <https://doi.org/10.1016/j.ssci.2019.08.045>
- Salas, M. L., Quezada, S., Basagoitia, A., Fernandez, T., Herrera, R., Parra, M., ... Radon, K. (2015). Working conditions, workplace violence, and psychological distress in Andean miners: a cross-sectional study across three countries. *Annals of Global Health*, 81(4), 465–474.
- Salguero-Caparrós, F., Pardo-Ferreira, M. C., Martínez-Rojas, M., & Rubio-Romero, J. C. (2020). Management of legal compliance in occupational health and safety. A literature review. *Safety Science*, 121(February 2019), 111–118.
- Sankoh, O., Sevalie, S., & Weston, M. (2018). Mental health in Africa. *The Lancet Global Health*, 6(9), e954–e955. [https://doi.org/10.1016/S2214-109X\(18\)30303-6](https://doi.org/10.1016/S2214-109X(18)30303-6)
- Sarstedt, M., & Cheah, J.-H. (2019). *Partial least squares structural equation modeling using SmartPLS: a software review*. Springer.
- Sarstedt, M., Ringle, C. M., & Hair, J. F. (2014). PLS-SEM: Looking back and moving forward. *Long Range Planning*, 47(3), 132–137.
- Saunders, M, Lewis, P., & Thornhill, A. (2016). Research methods for business students, (no. Book, Whole). In Harlow, Essex: Pearson Education Limited.
- Saunders, Mark, Lewis, P., & Thornhill, A. (2011). *Research methods for business students* (5th ed.). New Delhi: Pearson education.
- Sayers, E., Thy, B., Rich, J., Rahman, M., Kelly, B., James, C., ... Thy, O. (2019). *Does Help Seeking Behavior Change Over Time Following a Workplace Mental Health Intervention in*

the Coal Mining Industry ? 61(6), e282-e290.

- Schwatka, N. V., & Rosecrance, J. C. (2016). Safety climate and safety behaviors in the construction industry : The importance of co-workers commitment to safety. *Work & Stress*, 54, 401–413. <https://doi.org/10.3233/WOR-162341>
- Shaffril, H. A. M., Samsuddin, S. F., & Samah, A. A. (2020). The ABC of systematic literature review: The basic methodological guidance for beginners. *Quality & Quantity*, 32(5), 1–28.
- Sharpley, C. F., Bitsika, V., Sarmukadam, K., & Agnew, L. L. (2019). Which kinds of work stress are related with which types of depression? Workplace satisfaction and subtypes of depression in rural Australians. *Archives of Depression and Anxiety*, 5(2), 034–041.
- Shin, D. P., Gwak, H. S., & Lee, D. E. (2015). Modeling the predictors of safety behavior in construction workers. *International Journal of Occupational Safety and Ergonomics*, 21(3), 298–311. <https://doi.org/10.1080/10803548.2015.1085164>
- Silverberg, J. I., Gelfand, J. M., Margolis, D. J., Boguniewicz, M., Fonacier, L., Grayson, M. H., ... Simpson, E. L. (2019). Symptoms and diagnosis of anxiety and depression in atopic dermatitis in US adults. *British Journal of Dermatology*, 181(3), 554–565.
- Simpson, K. B., & Sam, A. (2020). *Strategies for health and safety management in Ghana*. 18(2), 431–450. <https://doi.org/10.1108/JEDT-07-2019-0189>
- Sinclair, R. R., Martin, J. E., & Sears, L. E. (2010). Labor unions and safety climate : Perceived union safety values and retail employee safety outcomes. *Accident Analysis and Prevention*, 42(5), 1477–1487. <https://doi.org/10.1016/j.aap.2009.11.003>
- Singh, A., & Misra, S. C. (2020). A Dominance based Rough Set analysis for investigating employee perception of safety at workplace and safety compliance. *Safety Science*, 127(December 2018), 104702. <https://doi.org/10.1016/j.ssci.2020.104702>
- Smith, K. J., Peterson, M. D., O'Connell, N. E., Victor, C., Liverani, S., Anokye, N., & Ryan, J. M. (2019). Risk of depression and anxiety in adults with cerebral palsy. *JAMA Neurology*, 76(3), 294–300.
- Smith, T. D., & Dejoy, D. M. (2014). Safety climate , safety behaviors and line-of-duty injuries in the fire service. *International Journal of Emergency Services*, 3(1), 49–64. <https://doi.org/10.1108/IJES-04-2013-0010>
- Smith, T. D., Dejoy, D. M., Dyal, M., & Pu, Y. (2019). Multi-level safety climate associations with safety behaviors in the fire service. *Journal of Safety Research*, 69, 53–60. <https://doi.org/10.1016/j.jsr.2019.02.005>
- Smith, T. D., Eldridge, F., & Dejoy, D. M. (2016). Safety-specific transformational and passive leadership influences on firefighter safety climate perceptions and safety behavior outcomes. *SAFETY SCIENCE*, 86, 92–97. <https://doi.org/10.1016/j.ssci.2016.02.019>
- Sobh, R., & Perry, C. (2006). Research design and data analysis in realism research. *European*

Journal of Marketing 17(23), 426-439.

- Spell, C. S., & Arnold, T. J. (2007). A multi-level analysis of organizational justice climate, structure, and employee mental health. *Journal of Management*, 33(5), 724–751. <https://doi.org/10.1177/0149206307305560>
- Stoilkovska, B. B., Pančovska, V. Ž., & Mijoski, G. (2015). Relationship of safety climate perceptions and job satisfaction among employees in the construction industry: the moderating role of age. *International Journal of Occupational Safety and Ergonomics*, 21(4), 440–447. <https://doi.org/10.1080/10803548.2015.1096059>
- Street, T. D., Lacey, S. J., & Somoray, K. (2019). Employee stress, reduced productivity, and interest in a workplace health program: A case study from the Australian mining industry. *International Journal of Environmental Research and Public Health*, 16(1), 94–107.
- Subramaniam, C., Shamsudin, F. M., Zin, M. L. M., Ramalu, S. S., & Hassan, Z. (2016). Safety management practices and safety compliance in small medium enterprises. *Asia-Pacific Journal of Business Administration*, 8(3), 226–244. <https://doi.org/10.1108/APJBA-02-2016-0029>
- Suls, J., & Bunde, J. (2005). Anger, anxiety, and depression as risk factors for cardiovascular disease: the problems and implications of overlapping affective dispositions. *Psychological Bulletin*, 131(2), 260–300.
- Tabachnick, B. G., & Fidell, L. S. (1996). Using multivariate statistics. Harper Collins. *New York*.
- Tao, J., Yang, F., Qiu, D., & Reniers, G. (2020). Analysis of safety leadership using a science mapping approach. *Process Safety and Environmental Protection*, 140, 244–257. <https://doi.org/10.1016/j.psep.2020.04.031>
- Taylor, C. T., & Alden, L. E. (2010). Behaviour Research and Therapy Safety behaviors and judgmental biases in social anxiety disorder. *Behaviour Research and Therapy*, 48(3), 226–237. <https://doi.org/10.1016/j.brat.2009.11.005>
- Terluin*, B., Rhenen, W. Van, Schaufeli, W. B., & De Haan, M. (2004). The Four-Dimensional Symptom Questionnaire (4DSQ): measuring distress and other mental health problems in a working population. *Work & Stress*, 18(3), 187–207.
- Tharsika, K., & Pratheepkanth, P. (2020). A review of methodological choice: Research paradigm underpins. *3rd Research Conference on Business Studies (RCBS)*, 298–304. University of Jaffna.
- Thurston, E., & Glendon, A. I. (2018). Association of risk exposure, organizational identification, and empowerment, with safety participation, intention to quit, and absenteeism. *Safety Science*, 105(January 2017), 212–221. <https://doi.org/10.1016/j.ssci.2018.02.012>
- Timothy, J. L. (2020). Everything You Want to Know about Depression. *Medical Review*, Written by Valencia Higuera—Updated on February 11.

- Tong, R., Yang, X., Parker, T., Zhang, B., & Wang, Q. (2020). Journal of Loss Prevention in the Process Industries Exploration of relationships between safety performance and unsafe behavior in the Chinese oil industry. *Journal of Loss Prevention in the Process Industries*, 66(May), 104167. <https://doi.org/10.1016/j.jlp.2020.104167>
- Tsai, J. C.-A., & Kang, T.-C. (2019). Reciprocal intention in knowledge seeking: Examining social exchange theory in an online professional community. *International Journal of Information Management*, 48, 161–174.
- Twenge, J. M., & Joiner, T. E. (2020). US Census Bureau-assessed prevalence of anxiety and depressive symptoms in 2019 and during the 2020 COVID-19 pandemic. *Depression and Anxiety*, 37(10), 954–956.
- Tynan, R. J., Considine, R., Rich, J. L., Skehan, J., Wiggers, J., Lewin, T. J., ... Kelly, B. J. (2016). Help-seeking for mental health problems by employees in the Australian Mining Industry. *BMC Health Services Research*, 46, 1–12. <https://doi.org/10.1186/s12913-016-1755-1>
- Tynan, R. J., James, C., Considine, R., Skehan, J., Gullestrup, J., Lewin, T. J., ... Kelly, B. J. (2018). Feasibility and acceptability of strategies to address mental health and mental ill - health in the Australian coal mining industry. *International Journal of Mental Health Systems*, 12(66), 1–10. <https://doi.org/10.1186/s13033-018-0245-8>
- Van Wijk, E., & Harrison, T. (2013). Managing ethical problems in qualitative research involving vulnerable populations, using a pilot study. *International Journal of Qualitative Methods*, 12(1), 570–586.
- Vara, D. J., Marín, B., Ayora, C., & Giachetti, G. (2020). An empirical evaluation of the use of models to improve the understanding of safety compliance needs. *Information and Software Technology*, 126, 440–453. <https://doi.org/10.1016/j.infsof.2020.106351>
- Vatankhah, S. (2021). Journal of Air Transport Management Dose safety motivation mediate the effect of psychological contract of safety on flight attendants ' safety performance outcomes?: A social exchange perspective. *Journal of Air Transport Management*, 90(April 2020), 101945. <https://doi.org/10.1016/j.jairtraman.2020.101945>
- Walker, G. (2015). Ghana mental health Act 846 2012: a qualitative study of the challenges and priorities for implementation. *Ghana Medical Journal*, 49(4), 266.
- Walker, G. H., & Osei, A. (2017). Mental health law in Ghana. *BJPsych. International*, 14(2), 38–39. <https://doi.org/10.1192/s2056474000001768>
- Wang, H., Li, P., Zhang, Y., Zhang, C., Li, K., & Song, C. (2020). Cytokine changes in different types of depression: Specific or general? *Neurology, Psychiatry and Brain Research*, 36, 39–51.
- Wang, L., Law, K., Zhang, M. J., & Li, Y. (2018). It's Mine! Psychological Ownership of One's Job Explains Positive and Negative Workplace Outcomes of Job Engagement. *Journal of Applied Psychology*, (September), 1–18. <https://doi.org/10.1037/apl0000337>

- Wang, Y., & Gorenstein, C. (2014). Attitude and Impact of Perceived Depression in the Workplace. *International Journal of Environmental Research and Public Health*, *11*, 6021–6036. <https://doi.org/10.3390/ijerph110606021>
- Ward, C., & Berno, T. (2011). Beyond social exchange theory: Attitudes toward tourists. *Annals of Tourism Research*, *38*(4), 1556–1569.
- Weaver, M. D., Vetter, C., Rajaratnam, S. M. W., O'Brien, C. S., Qadri, S., Benca, R. M., ... Barger, L. K. (2018). Sleep disorders, depression and anxiety are associated with adverse safety outcomes in healthcare workers: A prospective cohort study. *Journal of Sleep Research*, *27*(6), 1–9. <https://doi.org/10.1111/jsr.12722>
- Wei, W., Guo, M., Ye, L., Liao, G., & Yang, Z. (2016). Work-family conflict and safety participation of high-speed railway drivers : Job satisfaction as a mediator. *Accident Analysis and Prevention*, *95*, 97–103. <https://doi.org/10.1016/j.aap.2016.06.022>
- WHO. (2018). Mental health : strengthening our response. Retrieved April 13, 2021, from Mental health : strengthening our response website: <https://www.who.int/news-room/fact-sheets/detail/mental-health-strengthening-our-response>
- Windapo, A., & Oladapo, A. (2012). Determinants Of Construction), 506 ¶ Compliance With Health And Safety. *Smith, S.D (Ed) Procs 28th Annual ARCOM Conference*, (September), 433–444.
- Woo, J., Kim, W., Hwang, T., & Frick, K. D. (2011). Impact of Depression on Work Productivity and Its Improvement after Outpatient Treatment with Antidepressants. *JVAL*, *14*(4), 475–482. <https://doi.org/10.1016/j.jval.2010.11.006>
- Wu, T., Chang, S., Shu, C., Chen, C., & Wang, C. (2011). Journal of Loss Prevention in the Process Industries Safety leadership and safety performance in petrochemical industries: The mediating role of safety climate. *Journal of Loss Prevention in the Process Industries*, *24*(6), 716–721. <https://doi.org/10.1016/j.jlp.2011.04.007>
- Wu, T., Chen, C., & Li, C. (2008). A correlation among safety leadership , safety climate and safety performance. *21*, 307–318. <https://doi.org/10.1016/j.jlp.2007.11.001>
- Xue, Y., Fan, Y., & Xie, X. (2020). Journal of Loss Prevention in the Process Industries Relation between senior managers ' safety leadership and safety behavior in the Chinese petrochemical industry. *Journal of Loss Prevention in the Process Industries*, *65*(August 2019), 104142. <https://doi.org/10.1016/j.jlp.2020.104142>
- Yaris, C., Ditchburn, G., Curtis, G. J., & Brook, L. (2020). Combining physical and psychosocial safety : A comprehensive workplace safety model. *Safety Science*, *132*(September), 104949. <https://doi.org/10.1016/j.ssci.2020.104949>
- Ye, X., Ren, S., Chadee, D., & Wang, Z. (2020). ‘ The canary in the coal mine ’ : A multi-level analysis of the role of hope in managing safety performance of underground miners. *Journal of Vocational Behavior*, *121*(August 2019), 103461. <https://doi.org/10.1016/j.jvb.2020.103461>

Yokozawa, K., Nguyen, H. A., & Tran, T. B. H. (2021). Role of personal anxiety in individual kaizen behaviour and performance: evidence from Japan. *International Journal of Operations & Production Management*, 41(6), 942–961. <https://doi.org/10.1108/IJOPM-09-2020-0670>

Zhang, H., Shi, Y., Zhou, Z. E., Ma, H., & Tang, H. (2018). Good people do bad things : How anxiety promotes unethical behavior through intuitive and automatic processing Good people do bad things : How anxiety promotes unethical behavior through intuitive and automatic processing. *Current Psychology*, 1–9. <https://doi.org/10.1007/s12144-018-9789-7>

Zohar, D. (2000). A group-level model of safety climate: testing the effect of group climate on microaccidents in manufacturing jobs. *Journal of Applied Psychology*, 85(4), 587–596.

Zuofa, T., & Ocheing, E. G. (2017). Senior Managers and Safety Leadership Role in Offshore Oil and Gas Construction Projects. *Procedia Engineering*, 196(June), 1011–1017. <https://doi.org/10.1016/j.proeng.2017.08.043>



SECTION B: MENTAL HEALTH

Please indicate your response to the following statements by circling an option from 1 (Never) to 5 (All of the time)

Never	Some of the time	Much of the time	Most of the time	All of the time
1	2	3	4	5

<i>Anxiety</i>						
1	My job has made me a very nervous person in the past few weeks	1	2	3	4	5
2	My job has made me felt tense in the past few weeks	1	2	3	4	5
3	My job has made me anxious or worried in the past few weeks	1	2	3	4	5
4	My job has made me felt restless, fidgety, or impatient	1	2	3	4	5
<i>Depression</i>						
1	My job has made me felt downhearted in the past few weeks	1	2	3	4	5
2	My job has made me to have very low spirits	1	2	3	4	5
3	My job has made me feel depressed in the past few weeks	1	2	3	4	5
4	My job has made me moody or brooded about things	1	2	3	4	5

SECTION C: EMPLOYEE SAFETY BEHAVIOURS

Please indicate your response to the following statements by circling an option from 1 (Strongly Disagree) to 5 (Strongly Agree)

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	2	3	4	5

<i>Safety Compliance</i>						
1	I use all the necessary safety equipment to do my job	1	2	3	4	5
2	I use the correct safety procedures for carrying out my job	1	2	3	4	5
3	I ensure the highest levels of safety when I carry out my job	1	2	3	4	5
4	I always comply with the safety standards and procedures	1	2	3	4	5
<i>Safety Participation</i>						
1	I attend safety meetings and briefings	1	2	3	4	5
2	I voluntarily perform tasks that help to improve workplace safety	1	2	3	4	5
3	I promote the safety program within the organization	1	2	3	4	5
4	I frequently discuss safety problems with my superiors	1	2	3	4	5

SECTION D: SAFETY CLIMATE

Please indicate your response to the following statements by circling an option from 1 (Completely disagree) to 5 (Completely agree)

Completely Disagree	Disagree	Neutral	Agree	Completely Agree
1	2	3	4	5

<i>Safety Climate</i>						
1	My supervisor says a good word whenever he sees a job done according to the safety rules.	1	2	3	4	5
2	My supervisor seriously considers any worker's suggestions for improving safety	1	2	3	4	5
3	My supervisor approaches workers during work to discuss safety issues.	1	2	3	4	5

4	My supervisor gets annoyed with any worker ignoring safety rules, even minor rules.	1	2	3	4	5
5	My supervisor watches more often when a worker has violated some safety rule.	1	2	3	4	5
6	As long as there is no accident, my supervisor doesn't care how the work is done	1	2	3	4	5
7	Whenever pressure builds up, my supervisor wants us to work faster, rather than by the rules	1	2	3	4	5
8	My supervisor pays less attention to safety problems than most other supervisors in this company	1	2	3	4	5
9	My supervisor only keeps track of major safety problems and overlooks routine problems	1	2	3	4	5
10	As long as work remains on schedule, my supervisor doesn't care how this has been achieved	1	2	3	4	5

THANK YOU ONCE AGAIN FOR YOUR TIME.