

**Occupational stress and its effects on job performance: A case of Koforidua
Polytechnic**

by

KNUST

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**A thesis submitted to the Institute of Distance Learning, Kwame
Nkrumah University of Science and Technology (KNUST) in partial fulfillment of the
requirements for the degree of**

**COMMONWEALTH EXECUTIVE MASTER'S OF BUSINESS
ADMINISTRATION**

Institute of Distance Learning, KNUST

SEPTEMBER, 2012

DECLARATION

I hereby declare that this submission is my own work towards the Executive Masters Of Business Administration and that, to the best of my knowledge, it contains no material previously published by another person nor material which has been accepted for the award of any other degree of the University, except where due acknowledgement has been made in the text.

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ABSTRACT

The study investigated and evaluated occupational stress and its effects on job performance among members of staff at Koforidua Polytechnic. The study sought to find out how work-related stress could affect the productivity of staff of Koforidua Polytechnic in the dispensation of quality tertiary education. In addition, it identified certain factors which contribute to occupational stress among staff of the Polytechnic. The systematic sampling technique was used to select 150 participants for the study. The results of this study revealed that workload was the major cause of occupational stress among staff of Koforidua Polytechnic. It was further observed that respondents, in order to relieve stress often walk around and visit other colleagues in their offices to discuss matters unrelated to work thereby affecting productivity at the Polytechnic. Health-wise, some members of staff of the Polytechnic had developed chronic back pain, an effect of long sitting hours at work. Management commitment to employee-related issues such as paying attention to workload conflict, supervisors recognition of outstanding output of staff and the introduction of proper stress management training programmes were perceived as significant steps which if embraced, were identified as major contributory factors that could contribute to improve productivity of staff and boost output of staff.

DEDICATION

I dedicate this work to my parents, Mr. Martins Kwasi Nnuro and Mrs. Janet Afi Gbeblewu Nnuro for their unconditional love and prayers in making my dream a reality.

To my siblings, Estella A. Kumiwaa, Friedrich K.Nnuro, Michael K. Nnuro, Belinda A. Nnuro and Maud A. Nnuro for being an endless source of love and support throughout this journey.

To my beautiful fiancée Amanda Aku Adabrah, who has always been a source of inspiration and support to me.



ACKNOWLEDGEMENT

First and foremost, I am grateful to Almighty God for his mercies and protection without which this dissertation could not have been possible.

I would like to extend my appreciation to Prof. Edward Badu the former Dean of the Institute of Distance Education, KNUST and the members of the thesis seminar committee, who kindly reviewed the synopsis of this research work. Special thanks are due to Mrs. Mary Abena Agyepong, Registrar of Koforidua Polytechnic for her support in diverse ways during my research.

I would like to express my gratitude to my supervisor, Mr. Isaac Sarfo Acheampong for his precious time, valuable insight and expert guidance over the past five months. His patience, encouragement and faith in my abilities have motivated me and allowed me to successfully complete this work.

Special thanks are also due to my study group members namely; Ken, Joyce, Desmond, Gyan, Caesar, Godfred and Daniel for their contributions, support and encouragement during my research. And finally my colleagues; Patience Kwakyewaa, Kennedy Prince Jnr., Prince Nti-Adjei, Rita Akorli, Florence Appiah, Adisah Gbene, Seth Appiah and Ransford Lartey who have been my constant inspiration which allowed me to persevere and accomplish my aim despite many difficulties and challenges. Without the support of all these people, this research work would not have been possible.

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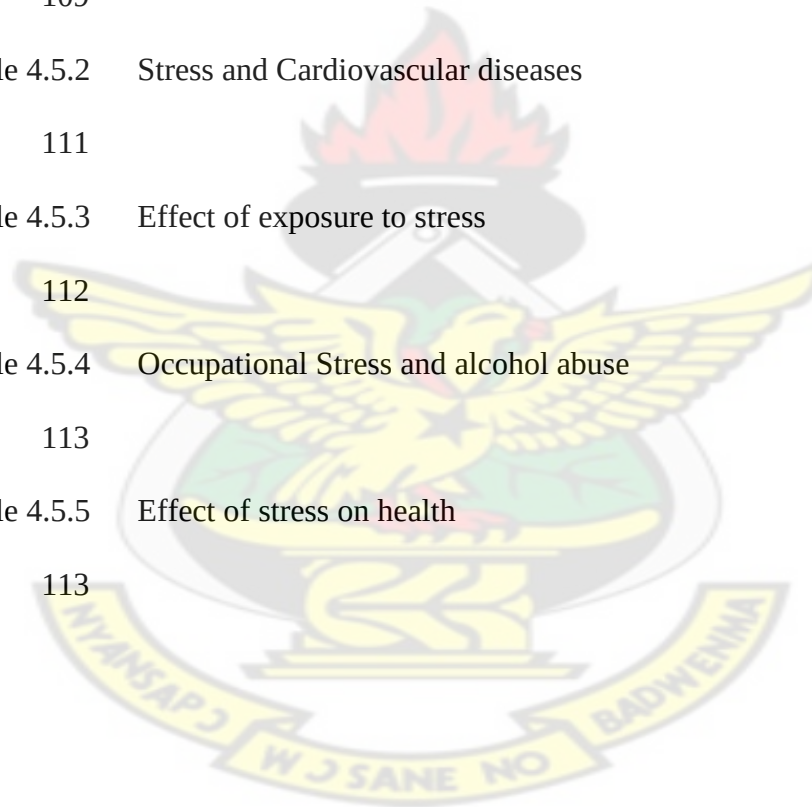
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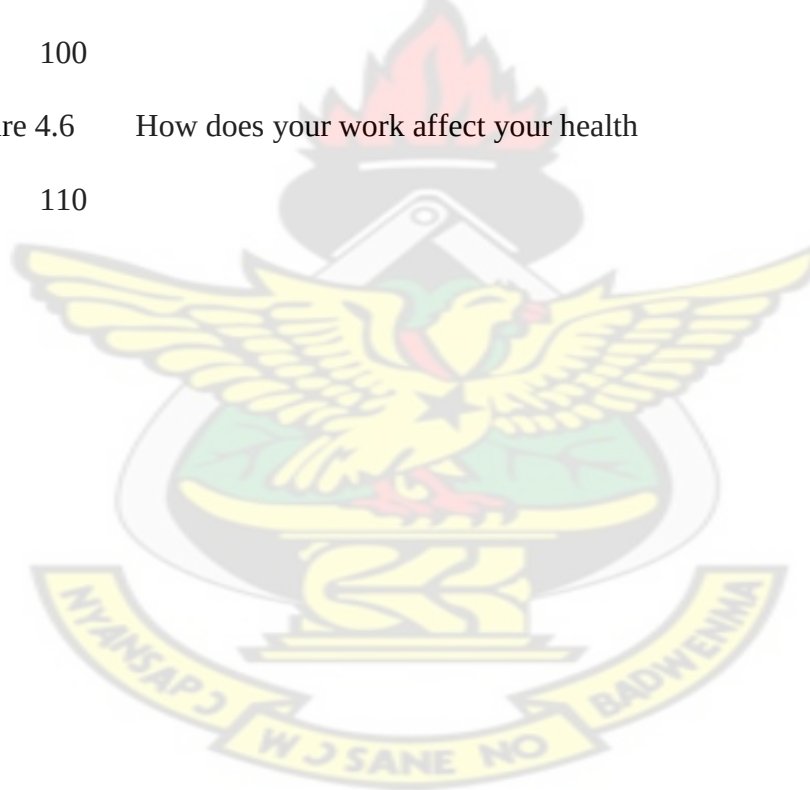
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CHAPTER ONE

INTRODUCTION

1.1 BACKGROUND STUDY

Occupational stress has been of great concern to employees and other stakeholders of organizations. Occupational stress researchers agree that stress is a serious problem in many organizations (Cooper and Cartwright, 1994; Varca, 1999; Ornelas and Kleiner 2003). The cost of occupational stress is very high in many organizations in recent times. For instance, the International Labour Organisation (ILO) reports that inefficiencies arising from occupational may cost up to 10 percent of a country's GNP (Midgley, 1996).

Occupational stress is defined as the perception of a discrepancy between environmental demands (stressors) and individual capacities to fill these demands (Topper, 2007; Vermut and Steensma, 2005; Ornels and Kleiner, 2003; Varca, 1999). Christo and Pienaar (2006) for example, argued that the causes of occupational stress include perceived loss of job, and security, sitting for long periods of time or heavy lifting, lack of safety, complexity of repetitiveness and lack of autonomy in the job.

In addition, occupational stress is caused by lack of resources and equipment; work schedules (such as working late or overtime and organizational climate are considered as contributors to employees stress. Occupational stress often shows high

dissatisfaction among the employees, job mobility, burnout, poor work performance and less effective interpersonal relations at work (Manshor, Rodrigue, and Chong, 2003). Johnson (2001) similarly argued that interventions like identifying or determining the signs of stress, identifying the possible causes for the signs and developing possible proposed solutions for each signs are required.

Therefore, this research will try to find out the effects of occupational stress on job performance and interventions that can be applied by Management and employees to manage stress effectively at Koforidua Polytechnic. To acquire a deeper understanding of the variable (occupational stress) we will first consider the broader topic of stress in general and then zero in on the variable within the context of Koforidua Polytechnic.

Sources of stress

According to Matthews G. (2001) stress can be experienced from four basic sources.

The Environment – the environment can bombard you with intense and competing demands to adjust. Examples of environmental stressors include weather, noise, crowding, pollution, traffic, unsafe environment, and substandard housing, and crime.

Social Stressors – we can experience multiple stressors arising from the demands of the different social role we occupy, such as parent, spouse, caregiver, and employee. Some examples of social stressors include deadlines, financial problems, job interviews, presentations, disagreements, presentations, disagreements demand for your time and attention loss of a loved one, divorce and co-parenting.

Physiological – situation and circumstances affecting our body can be experienced as physiological stressors. Examples of physiological stressors include rapid growth of adolescence, menopause, illness, aging, giving birth, accidents, lack of exercise, poor nutrition, and sleep disturbances.

Thoughts – your brain interprets and perceives situations as stressful, difficult, painful, or pleasant. Some situations in life are stress provoking, but it is our thought that determines whether they are a problem for us.

Types of stressors

Situations that are considered stress provoking are known as stressors. Stress is not always a bad thing. Stress is simply the body response to changes that create taxing demands. Many professionals suggest there is a difference between what we perceive as positive stress and distress, which refers to negative stress. In daily life, we often use the term “stress” to describe negative situations. This leads a person to believe that all stress is bad for you, which is not true. (Ornelas & Kleiner, 2003).

Positive stress has the following characteristics: Motivates, focuses energy, is short-term, is perceived as within our coping abilities, Feels exciting, Improves performance.

In contrast, **negative stress** has the following characteristics; causes anxiety or concern, can be short or long-term, is perceived as outside of our coping abilities, feels unpleasant, decreases performance, can lead to mental and physical problem. (Ornelas & Kleiner, 2003).

It is somewhat hard to categorize stressors into objective lists of those that cause positive stress and those that cause negative stress, because different people will

have perceptions and reactions to particular situations. However, by generalizing, we can compile a list of stressors that are typically experienced as negative or positive to most people, most of the time.

Examples of **negative personal** stressors can include: conflict in interpersonal relationships, bankruptcy/money problem, sleep problem, children's problem at school, legal problems, inadequate or substandard housing, excessive job demands, job insecurity, conflicts with team mates and supervisors, lack of training necessary to do a job, making presentation in front of colleagues or clients, unproductive and time consuming meetings, commuting and travel schedules (Ornelas & Kleiner, 2003).

Examples of **positive personal** stressors might include: receiving a promotion at work, starting a new job, marriage or commitment ceremony, buying a home, having a child, transfers, taking or planning a vacation, holiday season, retiring, taking educational classes or learning a new hobby (Ornelas & Kleiner, 2003).

Internal sources of stress and anxiety

Stressors are not always limited to situations where some external situation is creating a problem. Internal events such as feeling, thoughts, and habitual behaviors can also cause negative stress (Ornelas & Kleiner, 2003).

Common **internal sources of distress** include: fears (e.g., fear of flying, height, public speaking, chatting with strangers at a party), Repetitive thought patterns. Worrying about future events (e.g., waiting for medical test result or job restricting). Unrealistic or perfectionist expectations.

Habitual behavior patterns that can lead to stress include: over scheduling, failing to set and maintain healthy boundaries, failing to be assertive, procrastination and/or failing to plan ahead.

Cognitive Aspect of Stress and Anxiety

Anxiety is a feeling that we commonly experience when faced with stressful life events. Anxiety can be one of the most distressing emotions that people feel. It is sometimes called “fear or nervousness”. Common reactions to anxiety include: physical symptoms: sweaty palms, muscle tension, racing heart, flushed cheeks, light headedness (Koretz, 2000). Behaviors: Avoiding situations where experiencing anxiety might occur, Leaving situations when feelings of anxiety begins to occur, Trying to do things perfectly or trying to control events to prevent danger. Moods: nervous, irritable, anxious, and panicky.

When something happens to us we automatically evaluate the situation mentally. We decide if it is threatening to us, how we need to deal with the situation, and what skills we can use. If we decide that the demands of the situation outweigh the skills we have, then we label the situation as “stressful” and react with the classic “stress response”. If we decide that our coping skill outweigh the demands of the situation, then we don’t see it as stressful (Krausman, 2002).

Stress can come from any situation that makes you feel frustrated, angry, or anxious. Everyone sees situation differently and has different coping skills. For this reason, no two people will respond exactly the same way to a given situation.

Additionally, not all situations that are labeled “stressful” are negative. The birth of a child, being promoted at work or moving to a new home may not be perceived as threatening. However, we may feel that situations are “stressful” because we don’t feel fully prepared to deal with them.

Stress is a normal part of life. In small quantities, stress is good; it can motivate you and help you become more productive. However, too much stress, or a strong response to stress can be harmful. How we perceive a stress provoking event and how we react to it determines its impact on our health. We may be motivated and invigorated by the events in our lives, or we may see some as “stressful” and respond in a manner that may have a negative effect on our physical, mental, and social well-being.

If we always respond in a negative way, our health and happiness may suffer. By understanding ourselves and our reaction to stress-provoking situations, we can learn to handle stress more effectively. In the most accurate meaning, stress management is not about learning how to avoid or escape the pressures and turbulence of modern living; it is about learning to appreciate how the body reacts to these pressures, and about learning how to develop skills which enhance the body’s adjustment. To learn stress management is to learn about the mind-body connection and to the degree to which we can control our health in a positive sense.

Work stressors are the individual’s characteristics which are brought to the workplace rather than being a function of it, but they are important ingredients in

occupational stress. These characteristics include the worker's level of anxiety and neuroticism tolerance of ambiguity and Type A behaviors pattern (Matthews, 2002). In addition to the above are the sources of stress that come from outside the workplace and outside the worker. These extra-organizational sources of stress stem from family problems, life crises financial matters and environmental factors. All these mix up and here comes symptoms of occupational health problems that may develop into full blown disease. As complex as occupational stress may appear, it can be simplified by limiting stress at work, individual characteristics and extra-organizational sources of stress (Anderson, 2000).

In actual fact, different workplaces have different level of intrinsic job stressors. Different workers have different levels of anxiety and tolerances of ambiguity and different workers experience different amounts of family and financial problems. To assume that all of these ingredients can be disqualified is naïve.

One of the reasons that occupational stress has been receiving so much attention of late is that businesses or organizations are genuinely beginning to care about employee welfare. It is estimated by the International Labour Organization that stress on the job costs business in Europe over \$200 billion per year. These costs include salaries for sick days, costs of hospitalization and outpatient care and costs related to decreased productivity.

Researchers Robert Karasek and Colleagues (2002) studied job stress and found the most stressful jobs are those that allow for very little decision making that place at a high psychological demand on the worker. An example of psychological demands are having to work quickly and having a huge workload. Their study found that the most stressful jobs were electrical assembler, cahiers, electrical labourer and a cook while the least stressful was architect, dentist and therapist.

Occupational Stress occurs in a wide range of work circumstances but is often made worse when employees feel they have little support from supervisors and colleagues and where they have little control over work or how they can cope with its demands and pressures.

Work stress is recognized world-wide as a major challenge to workers' health and the healthiness of their organizations (ILO 1986; 1992). Workers who are stressed are also most likely to be unhealthy, poorly motivated, less productive and less effective at work and their organizations are less likely to be successful in a competitive market. Stress can be brought about by pressures at home and at work.

Organizations cannot usually protect their workers from stress arising outside of work, but they can protect them from stress that arises through work. Occupational stress can be a real problem to the organization as far as its workers are concerned. Good management and good work organizations are the best forms of stress prevention. If employees are already stressed, their managers should be aware of it and know how to help in order to get the best out of their employees. Poor work organization that is, the way we design jobs and worker systems and the way we manage them, can cause stress.

Excessive and otherwise unmanageable demands and pressures can be caused by poor work design, poor management and unsatisfactory working conditions. Similarly, these things can result in employees not receiving sufficient support from others or not having enough control over their work and its pressures.

Stress would affect different members of staff in different ways. The experience of work stress can cause unusual and dysfunctional behavior at work and contribute to poor physical and mental health. In extreme cases, long-term stress or traumatic events at work may lead to psychological problems and be conducive to psychiatric disorders resulting in the workers from being able to work again. Work stress could affect Koforidua Polytechnic by increasing absenteeism, decreasing commitment to work, increasing staff turn-over, impairing performance and productivity, increasing complaints from students, increasing mistakes and customers and may cause damage to the Polytechnic's image both among its workers and externally.

The experience of work stress is a challenge to the health and safety of workers and to the healthiness of their organizations. Employers should have a policy for the management of worker health and performance that makes reference to work stress. Work stress can be effectively managed by applying a risk management approach as is successfully done with other major health and safety problems. A risk management approach assesses the possible risks in the work environment that may cause particular existing hazards which could affect the performance of workers.

The cause of stress are hazards related to the design and management of work and working conditions and such hazards can be managed and their effects controlled in the same way as other hazards. To conclude, work stress or occupational stress is a

real challenge for workers and their employing organizations and their working environment, so do the kinds of stress problems that employees may face. It is important that the workplace is being continuously monitored for stress problems.

Further, it is not only important to identify stress problems with regards to job performance and to deal with them but to promote healthy work and reduce harmful aspects of work. Successful employers and managers provide leadership in dealing with the challenge of work stress.

Despite the realization that human resources play an important role in productivity, many people go through stress, which negatively affect their performance. Management does not seem to provide institutional support for people suffering from stress.

1.2 STATEMENT OF THE PROBLEM

The current turbulent environment in which some workers conduct their work requires that organizations examine their practices. Working at the tertiary level is an inherently stressful profession with long working hours, heavy workloads, difficult students and conflicting demands. The physical and psychology demands of workers at the tertiary level of education make them more vulnerable to high levels of stress. The effects of stress are evidenced as increased errors in memoranda, high medical bills, lateness to work, low productivity and increased sick leaves. Despite the extremely negative effects of occupational stress on the human body and work performance, many organizations, with Koforidua Polytechnic not being an exception has not put in any concrete measures to address these stress-related conditions that negatively affect

productivity. Furthermore, there has not been a conscious establishment of a linkage between occupational stress and its negative effect on productivity.

It is in the light of these problems that this research seeks to bring to the fore the implication of occupational stress on the overall performance of institutions.

1.3 OBJECTIVES OF THE STUDY

The objectives of this study are:

1. To examine the effects of stress on workers in the performance of their job.
2. To evaluate Management competencies for controlling and reducing stress at work.
3. To assess the support for those people who are suffering from stress.
4. To assess how work related stress can affect the health of workers.

1.4 RESEARCH QUESTIONS

Based on the objectives of the study, the specific research questions to which answers were sought are:

1. What factors contribute to low productivity among staff of Koforidua Polytechnic?
2. Are there any strategies which could be adopted to prevent or reduce stress among staff of Koforidua Polytechnic?
3. What can be done to help staff of Koforidua Polytechnic with stress related problems?
4. Does job stress have any effect on the health of Koforidua Polytechnic staff?

1.5 RELEVANCE OF THE STUDY

Stress Management is important to healthy functioning of organizations as it seeks to increase productivity since one can clearly focus on tasks, better memory, improved immune system and better blood pressure. In Ghana, occupational stress is not being given the attention it deserves and so very little has been done as far as assessing the role of stress on job performance within organizations. It is in the light of this that this study is deemed important, as it will:

- i. Create awareness among managers on the need to provide the needed platform to help staff deal with their stresses.
- ii. The study has the potential to stimulate, among scholars and students, an interest in the study of stress among workers in Ghana.

1.6 ORGANISATION OF THE STUDY

The entire study is divided into five (5) chapters. Chapter one gives a general introduction about the study, while chapter two focuses on some theoretical frameworks and reviews of related literature about the subject. The chapter three presents the methodology used in the data collection. Chapter four analyses, summarizes and presents the data for the study. The final chapter provides a summary of findings, conclusion and makes recommendation for the solution of the problem studied.

CHAPTER TWO

LITERATURE REVIEW

THEORETICAL FRAMEWORK AND LITERATURE REVIEW

1.0 INTRODUCTION

This chapter reviewed literature with respect to the study. Issues considered in this section would include occupational stress and performance, role of managers and stress control, stress management at workplace and stress and health.

2.1 THEORETICAL FRAMEWORK

Theories help us to understand underlying process and on that basis, choose an effective course of action According to Stoner and Freeman (2000), “theory is coherent group of assumption put forth to explain the relationship between two or more observable facts”. Valid theories enable us to predict what will happen under certain situations. It is a truism that no matter the degree of the grasp of a principle, the history and theories of any field help us to apply them to actual cases. The theories relevant in the study of occupational stress and its effects on job performance include the followings; stimulus-based, interactional, person-environment fit, role overload and role theory.

2.2 THEORETICAL APPROACHES TO STRESS

There are a wide variety of various definitions and theories pertaining to the dynamic construct of stress. In an attempt to organise all of these theories Ghadially and Kumar (1987) suggested that there were at least three distinct orientations, which were (a) stimulus-based, (b) response literature supports the idea that there are three

different theoretical approaches to the concept of stress (Richard and Krieshok, 1989; Ryan, 1996; Trivette, 1993).

2.2.1 Stimulus-Based

Kahn (1986) defines stimulus-based stress as “external forces or conditions that are hypothesized or demonstrated to have negative (painfully damaging, incapacitating) effects on the organization of interest” (P.42). Stimulus-based stress theorists believe that the factors in the environment exert an influence on an individual (Derogatis and coans, 1993; Larzarus and Folk man, 1986b, Meichenbaum, 1986). Essentially this model proposes that external stressors in the environment result in a stress reaction or stain (Cox, 1978).

In addition, different categories of stimulus stressors have been identified in terms of their ability to induce stress such as: (a) acute, time-limited stressors; (b) Chronic intermittent stressors; (c) stressors sequences; and (d) chronic stressors; (Derogatis and Coons, 1993).

2.2.2 Interactional

The interactional approach to stress incorporates both stimulus-based and response-based approaches (Cox, 1978; Richard and Krieshok, 1989). This theory has also been referred to as the stimulus-response interaction (Greenberg, 1999). The interactional approach stipulates that situational variable interact with personal variable from which stress result (Ryan, 1996).

Current research supports the theoretical construct set forth by the interactional approach. Fogerty et al. (1999) conducted four separate studies which analyzed

occupational stress, strain and coping through path analysis. Decker and Borgon (1993) also advocated for an intersectional approach for researchers interested in studying variables related to occupational stress, strain, and coping because they feel it “fully examines the individual’s unique psychological experience of work”. (p.477).

Cox and Mckay (1996) took the interactional approach to stress one step further and have proposed that there is another to this approach (Cox, 1978). This theory has been referred to as transactional (Greenberg, 1999). The Transactional approach incorporates the stimulus, response, cognitive appraisal of the stressors, coping style of the individual psychological defenses, and social milieu into account (Folkman and Lazarus, 1988 a, 1988b).

2.2.3 Role Theory

In order to fulfill expected service “over the last decade human service, agencies, in most western economies have undergone major organizational restructuring and redefinitions of professional rules” (Biggs et al; 1995).

One of the basic premises of the role theory is that various occupational roles that individuals engage in may be stressful regardless of their actual occupation, suggesting that stress found in various work roles may be stressful for all workers.

Osipow and Spokane (1987) described six work roles that they felt were stressful regardless of an individual’s actual vocational choice. These six roles are (a) role ambiguity (b) role insufficiency (c) role overload (d) role boundary (e) responsibility and (f) physical environment (Osipow and Spokane, 1987; Osipow, 1998).

2.2.4 Person-Environment Fit

A review of the literature suggests that researchers have attempted to find an explanation regarding the potential relationship that exists between stress, an individual, and the environment. It has been theorized that if there is not an accurate fit between the person and the environment, strain will occur (French, Caplan, and Harrison, 1982). More specifically, a person environment fit suggests that individual fit certain occupations based on the interaction of a multitude of variables. Theoretically, P-E Fit “predicts that the magnitude of strain experienced by an individual is proportional to the degree of misfit between the individual and their occupation” (Pitthess and Soden, 1999). Individuals “vary in their needs and abilities just as jobs vary in their incentives and demands” (French et al.; 1982). Lazarus and Folkman (1986b)

2.2.5 Role Overload

Role Overload (RO) “measures the extent to which job demands exceed resources (personal and workplace) and the extent to which the individual is able to accomplish workloads” (Osipow, 1998) Role overload can result in an employee “experiencing anger and frustration toward persons believed responsible for the overload in work” (Marini et al; 1995).

Decker and Borgen (1993) found that Role Overload for University of California workers was modestly correlated with stress. Trivette (1993) found that Role Overload scores for tertiary education workers were in the average range for both genders. However, Trivette (1993) found that lecturers who worked at two or more

schools had higher stress level. In addition working at two or more school settings was significantly correlated with higher Role Overload scores in comparison to one school. Aitken and Schloss (1994) found that for tertiary Educational staff working with machines, Role Overload was reported to be high due to the Physical environment.

2.3 REVIEW OF RELATED LITERATURE ON OCCUPATIONAL STRESS

2.3.1 OCCUPATIONAL STRESS AND PERFORMANCE

2.3.1.1 Effects of Stressors on Job Performance

There is significant inconsistency among researchers concerning the direct and indirect effects of various putative stressors. Direct stress effects are those incurred by the task load alone irrespective of any psychological stress that may also be generated. Accordingly, indirect stress effects are those that evolve out of psychological factors associated with the task load demands. There is a fine line that separates these two, and they can be indistinguishable at times. This fact has made their separation and measurement particularly difficult. There are several issues at the heart of the inconsistencies found in the literature. For example, is the application of some task demand (i.e. workload or time pressure) an application of stress?

Many would argue that it is, while others would contend the contrary. Proponents of the former typically offer one of two arguments. The first argument states that stress is a term that can be applied to any demand on a system. Therefore, any task that requires mental resources qualifies as a stressors-it place a demand on the system. This argument meets the criteria of early stress definitions (stimulus-based

approaches); however, it is no longer as accepted demands incur a psychological cost in addition to their direct effects. That is to say, these demands trigger a psychological response such as frustration, anxiety, or psychological discomfort. This response often contains both physiological and mental components that vie for resources. In this way, devoting them instead to secondary psychological processors. On the other hand, a compelling argument can be made that workload is a demand that does not require, not regularly incur, a secondary psychological cost. In applying the state definition of stress-the interaction between three perceptions: a demand, and the importance of being able to cope (McGrath, 1976), it's difficult to see how demand characteristics alone qualify as stressors. For example, in some circumstances time pressure and or workload would trigger anxiety or frustration that might further distract or interfere with performance. However, it is not clear that this would necessarily be so in most, let alone all, situations.

If we agree that subjective experience and specifically cognitive appraisal (a transactional model assumption) is elemental in defining stress, then one must assume it plays a significant role in answering questions about whether workload, time pressure, or other putative stressors carry both direct and indirect effects. Does this suggest that when a demand is deemed stressful or upsetting it is performance yet is viewed as stressful by the operator, does this indicate that it would be considerate a stressor? Reasonable arguments can be made to support both positions, and the research literature, in its current state, is a reflection of this fact. Although it can be argued that each "stressor" involves direct effects, each may also carry

indirect effects as well. For example, time pressure limits the time available to perform a given task.

This limit is a physical boundary that does not require any psychological explanation in understanding its direct effects on performance. However, this limitation often evokes a corresponding psychological reaction such as anxiety that has secondary or indirect effects on performance. The ability to separate these two dimensions has proved difficult for the research community.

The research that addresses various putative stressors discussed in the review (e.g., workload, time pressure, heat and cold, noise, and fatigue) rarely makes the distinction between these two dimensions, given the inherent difficulty in doing so. Therefore, discussions of these factors in this review comprise both direct and indirect effects, without distinguishing between them.

2.3.1.2 Effects of Workload on Job Performance

Several researchers have attempted to side-step the inter-relationship between direct and indirect effects by relying on descriptions of workload alone, ignoring potentially related psychological stress (Hancock & Desmond, 2001). In doing so, they have circumvented a direct discussion of stress and its role in performance degradation or enhancement. However, in leaving this issue unaddressed, these authors have left the reader to infer a stress effect in many instances correctly or not. The studies have not attempted to resolve this issue but to make the reader aware of it.

Andre (2001) defined workload as, "...a hypothetical construct that represents the cost incurred by a human operator to achieve a particular level of performance." (p. 377). Kahneman (1973) considered workload to be a primary source of resource depletion and defined it as "...the proportion of the capacity an operator spends on tasks performance." Kantowitz and Simsek (2001) defined it as "an intervening variable that modulates the tuning between the demands of the environment and the capabilities of the organism."

They indicated that this variable, being theoretical in nature, "... Cannot be directly observed but must be inferred from changes in performance." (p. 405). The central purpose of workload as a construct was provided by Gopher and Donchin (1986) who suggested that it was "...viewed from the perspective of some assigned tasks." Lastly, Wickens (2001) favored Moray's (1979) definition of mental workload; "...an inferred construct that mediates between task difficulty, operator skill, and observed performance." (pp.443) these definitions of workload are very similar to early conceptions of stress as interaction between demands and resources (the stimulus-based approach).

The most noticeable feature here is the absence of any explicit cognitive function such as appraisal. However, one shouldn't conclude that workload simply constitutes the demands of a given task. On the contrary, the dominant perspective in the field cited above provide ample evidence that workload is believed to be much more than that. Unfortunately, one researcher goes beyond the most elementary description of the term, infusion over its meaning rises rapidly.

In response to this confusion, Hilburn and Jorna (2001) differentiated between workload and task load. They suggested that task load should be defined as the demand imposed by the task itself, and they conceive of workload as the subjective experience of the task demand. Parasuraman and Hancock (2001) made a similar differentiation in their dynamic and adaptive model of workload: “Workload may be driven by the task load imposed on human operators from external environmental sources but not deterministically so, because workload is also mediated by the individual response of human operators to the load and their skills levels, task management strategies, and other personal characteristic.” (p.306).

The authors defined task load as what the work or tasks bring as environmental loads on the organism or system while workload concerns what is experienced by the organism or system as it attempts to adapt accordingly. These two sets of definitions illustrate the continued overlap between direct and indirect stress effects in the research literature.

Hendy, Farrell, and East (2001) presented an information processing model of operator stress (defined by time pressure) and performance. These authors posit that the underlying stressor that determines operator performance, error production, and judgments of workload is time pressure. In fact, according to Hendy et al. (2001) all factors affecting workload are reduced to this variable. These authors have proposed the following algorithm for the theoretical calculation of the relationship between any given task load and its corresponding time pressure: $\text{Task load} \div \text{processing rate} = \text{decision time}$ $\text{Decision time} \div \text{available} = \text{time pressure}$.

Hendy et al. suggest three possibilities by which human information processing can reduce information processing load mismatch. The first is a reduction in task load or the amount of information. The second is an increase in the time available to complete the task, and the third is an increase in channel capacity (regulating the rate and volume of information processing). Hendy et al. are certainly not alone in their alignment of time pressure and workload. O'Donnell and Eggemeier (1986) also drew a direct connection between workload and time pressure which they believed was likely to lead to load-shedding.

2.3.1.3 Measurement of Occupational Stress and Workload

Muscio (1920) stated that to define any phenomenon one must be able to measure it first. Thus a reliable and valid tool of measurement must exist a priori; however, it is difficult to create such a measure without knowing what you are trying to measure. This quandary has led many researchers to conclude that the pursuit of task-demand measurements is more feasible; however, others have decidedly tackled the amorphous construct of stress itself.

Gopher and Braune (1984) discussed the use of subjective measurements of workload. Their review of research in this area showed it to be consistently undecided. Some research demonstrated a strong relationship between subjective ratings and objective indices and others a very weak relationship.

For example, Shostak and Peterson (1990) failed to find any significant correlation between physiological arousal induced from mental arithmetic and self-reported feelings of anxiety while Zeier (1994) found significant correlation between

workload and cortical release. Krausman, Crowell, and Wilson (2002) reported finding physiological arousal measures that corresponded to both the perception of exertion and cognitive performance decrements.

In light of the inconsistent connection between objective and subjective measures, Stokes and Kite (2001) have cautioned against the presumption that physiological indicators are necessarily related to stress. Kantowitz and Casper (1988) suggested, “We may never be able to create a meaningful and valid scale for mental workload equivalent to kilocalories per minute in terms of its utility, generality, and formal measurement properties.” (p.164).

Back (2001) modeled physiological markers of workload (i.e. heart rate and respiration period) patterned after the work of Cacioppo and Tassinari (1990) who addressed the potential problems that exist in linking physiological and other data together in causal relationships. Based on their review, they conclude scientists in various fields desire to use physiology as a measurable index of the state of the organism.

However, they caution that when there is a relationship between a process or event and a concomitant physiological change, there are numerous possible causal explanations. Furthermore, underlying causal explanations of relationships are rarely presented. Rarer yet is the demonstration that physiological variation reliably predicts psychological variation.

These authors provided a framework to help establish such relationships. This framework constitutes from classes of psychophysiological relations, each of which is integrated into a multi-dimensional matrix consisting of configurable, temporal,

specific, and general forms of relational elements. A given relationship (e.g., pupillary dilation and workload) can be analyzed using this matrix. For example, if greater pupil dilation occurs under increasing workload, one could characterize the relations as concomitant and corollary according to Cacioppo and Tassinary's model. However, the relationship would be characterized differently if, for instance, pupil dilation did not consistently increase as workload increased, or if dilation increased differently between conditions or individuals. The authors' framework accommodates context-specific relationships across a number of dimensions in the hope of capturing the possible range of relations, including those considered to be unrelated elements to those that are causal in nature.

Hancock, Mechkati, and Robertson (1985) also explored various measurement methodologies of mental workload during which they stated, "... mental workload presumably affects the activity of the CNS [central nervous system], measures may variously reflect processes such as demand for increased energy, progressive degradation of the system, or homeostatic action of mechanisms. Designed to restore system equilibrium disturbed by such cognitive task requirements."

These authors defined mental workload as the result of CNS activity that is purposeful. Beatty (1982) found evidence that pupil dilations were closely related to changes in information processing, and presumable, increased resource mobilization (changes correlated with increases in task difficulty).

Hancock and colleagues (1985) suggest that there are two useful dimensions in considering measurements of mental workload. The first refers to the workload's practicality-how practical is the measure under working conditions. The second

dimension concerns spatial and systemic congruence-how proximal is the measurement to the site of the mental activity. In their analysis of various physiological measures, these authors investigated the research findings associated with the following covariates: auditory canal temperature, event related potentials, flicker fusion frequency, critical fusion frequency, galvanic skin response, electrocardiogram, heart rate variability, electromyography, muscle tension, electroencephalographic activity, eye/eyelid movement, papillary dilation, respiration analysis, and body fluid analysis. Of these measures, event related potentials were determined to have the greatest spatial congruence (They were the most proximal to the site of mental activity) and were relatively practical while heart rate variability was deemed to be the most practical with reasonable spatial congruence.

It should be noted that these authors did not attempt to independently validate these measures experimentally, not attempts to independently validate these measures experimentally, not demonstrate their relative predictive nature.

Brookhuis and de Waard (2001) suggested that there were three major categories of measurement information in the field on transportation human factors: task performance, subjective report, and physiological data. In their review of measurement tools they found the SWAT (subjective workload assessment technique) and the NASA-TLX (task load index) were the most commonly used self-report indices of mental workload.

Further, they indicated that electrocardiogram was the most commonly used physiologic data point (measuring heart rate and heart rate variability). In addition, they found that facial muscles as well as brain activity measures (electroencephalography) and blood assays of catechumens have emerged as reliable covariates of mental effort. According to the authors, this evidence supports the notion that such measures can serve as indices of mental effort during task performance.

Andre (2001) preferred the measurement of task demands as opposed to stress per se (side stepping the complication of the construct all together). He outlined various measures for workload.

2.3.1.4 The Effect of Occupational Stress on Attention

In previous section, attention and its role in resource allocation as well as it's selectively have already been partially described. In the following discussion, I will review various findings regarding the effects of stress and workload on attention.

In general, under stress, attention appears to channel or tunnel, reducing focus on peripheral information and tasks and centralizing focus on main task.

What determines a main task from a peripheral task appears to depend on whichever stimulus is perceived to be of greatest importance to the individual or that which is perceived as most salient. Threat-relevance is believed to be strongly associated with salience. Therefore, when environmental cues are threat-related, such stimuli are often considered to be most salient by the individual.

As one can imagine, this tunneling of attention can result in either enhanced performance or reduced performance, depending on the nature of the task and the situation. For instance, when peripheral cues are irrelevant to task completion the ability to tune them out is likely to improve performance. On the other hand, when these peripheral cues are related to the task and their incorporation would otherwise facilitate success on the task, performance suffers when they are unattended.

2.3.1.5 The Effect of Occupational Stress on Memory

The research literature concerning the effects of stress on memory consistency demonstrates that elements of working memory are impaired. Although the mechanisms behind these effects are poorly understood, it seems likely that encoding and maintenance processes are the most affected.

Some have concluded that this reflects a reduction in resource capacity. Resources may be eliminated in some way, the span of time in which they can be accessed may be reduced, or these resources may be drawn away as a result of resource showing (the absorption of resources by competing demands).

Furthermore, little is known about what stage in the process this depletion or occupation takes place. It may be that resources or capacity are reduced at several points in the process (i.e., encoding, rehearsal, or retrieval). Few, if any, studies have attempted to separate these dimension within memory processes while under stress conditions.

2.3.1.6 Effects of Occupational Stress on Memory Overload

Prior to a detailed discussion of the putative effects of various stressors on memory function and performance, a brief discussion of memory (particularly working memory) is appropriate. Memory has long been conceived of as a multi component system which includes a long term memory store and a short-term or working memory component.

Baddeley (1986) proposed a model of working memory that suggests individuals have a limited pool of working memory resources that are available to compete for various tasks. Thus, divided attention or dual-tasks draw from this pool, resulting in a reduction of resources to devote to any one task. Baddeley has posited a tripartite model of supervisory control over memory consisting of a central executive and two slave systems, an articulator loop and a visuospatial sketch pad (specializing in language and spatial material respectively).

While the central executive function is somewhat ill defined at this time. Baddeley has characterized it as..."an attention control system...." (p.486) the essential purpose of working memory appears to be the maintenance of a small subset of long term memory in a readily accessible state.

Baddeley's Working Memory

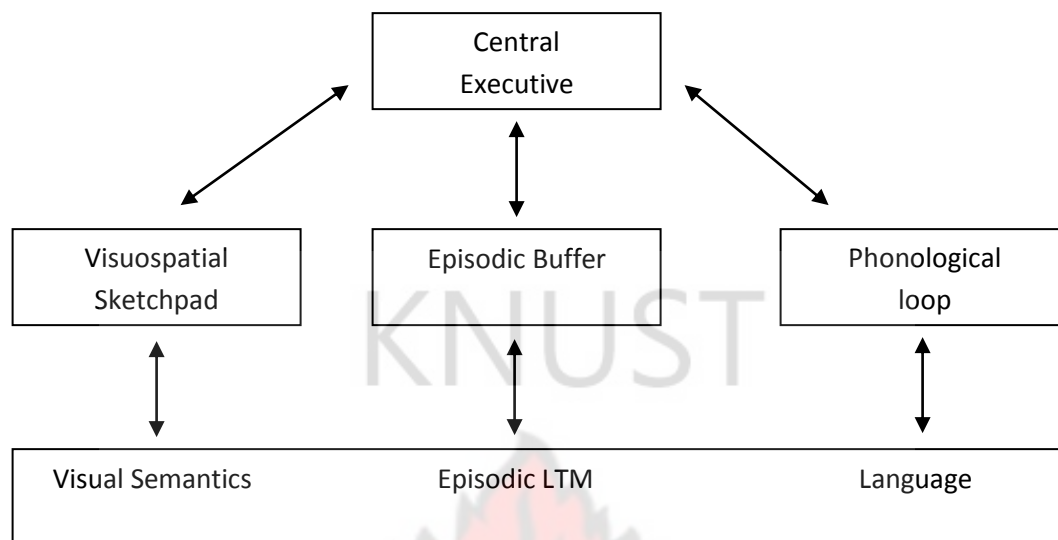


Figure 1: the figure above represents Baddeley's current model of working memory (Baddeley, 2002).

2.3.1.7 Effects of Occupational Stress on Memory and Anxiety

There are variety of tasks in which memory has been measured under stress. To be more precise, these investigations have typically addressed working memory, and unless otherwise specified in the text, the reader should consider general references to memory as references to working memory (much of the research contained in this review fails to make this distinction explicit).

Typically, long-term memory remains intact under stress; however, various elements of working memory are more vulnerable. Anxiety is perhaps the most common stress condition by which memory researchers have examined memory performance (Eysenck, 1979; 1985; Wachtel, 1968). Anxiety has been generated in a number of

ways but not frequently by way of math performance. The negative effects of this stressor on working memory are well established (Ashcraft, 2002; Ashcraft & Kirk, 2001; Eysenck, 1992; Eysenck, 1997).

Ashcraft and Kirk (2001) reported that individuals high in anxiety tend to be slower and more deliberate in their processing of various aspects of mathematical functions. For example, these individuals seem to have particular difficulty with the carry-over function (i.e., adding a column of numbers that sum greater than nine). Given the relationship between this function and working memory, researchers have conjectured that the additional anxiety present in highly anxious subjects likely draws away resources that could otherwise be used in working memory for activation and rehearsal (such as that needed for the carry operation).

Although it has been contended that high-math-anxious individuals may simply be less adept at math (deficits owed to ability and not anxiety per se), various investigations have provided evidence that math competence is not adequate to explain the phenomena Hembree, (1990). Instead, research has directed our understanding toward resource depletion models.

Specifically, it has been asserted that worry and intrusive cognitions compete for the limited pool of resources. This competition results in fewer resources available to the primary task, in this case mathematical calculation. Eysenck and Calvo (1992) have referred to this position as processing efficiency theory and have proposed that highly anxious individuals tend to demonstrate lower cognitive efficiency accordingly.

Ashcraft and Kirk (2001) examined the effect of math-related anxiety on the performance of various cognitive tasks, predicting that math anxiety would disrupt working memory, leading to degradation in mathematical and related performance. Specifically, these authors measured the degree to which subjects were math-anxious (using a self-report index – short Mathematics Anxiety Rating Scale) followed by a performance assessment on two measures of working memory (listening span and computational span).

Their results suggest that individuals scoring high on measures of math anxiety tend to perform worse on measures of working memory. While this was true across both measures (not necessarily limited to just computational tasks), highly anxious subjects were more likely to demonstrate deficits in computational scores than listening scores.

These findings led the researchers to conclude that working memory capacity was degraded by math anxiety. In a second experiment, they examined their hypothesis using an on-line task of mental addition varying in levels of difficulty under times conditions. Furthermore, these were paired with an additional task. The reason for examining dual-task was based on the assumption of resource competition. The authors suggested that error rates or decrements in response time should reflect capacity of working memory. Accordingly, they embedded their original addition task with a memory task requiring them to maintain two or six randomized letters in memory. Those subjects reporting the highest degrees of math-related anxiety scored worse than those reporting low to moderate levels of anxiety. Particular difficulty for math

anxious subjects was observed in performing carry operations (using the tens column in addition tasks). These deficits were not found with nonnumeric stimuli.

2.3.1.8 The Effects of Stress on Judgment and Decision Making

Judgment and decision making constitute distinct process and outcomes, and investigators differ in their characterization of these two concepts. It can be argued that decision making is the result of judgment-an action-based response. Several authors have attempted to describe and model the process of decision making (Hammond, 1980; Speed & Forsythe, 2002) while others have characterized its role in information processing (Deutsch & Deutsch, 1963; Deutsch & Pew, 2002; Keele, 1973) and as part of the larger cognitive architecture (Leiden, Laughery, Keller, French, Warwick, & Wood, 2001; Neufeld, 1999).

Regardless of how these two elements are ultimately defined, they are conceived of by most as related and interconnected. Furthermore, they are typically viewed as an end state culminating from the previous processes discussed (i.e., attention, memory, cognitive appraisal). Are the effects of stress on judgment and decisions more than simply the sum of lower level effects related to attention, memory, and cognitive appraisal? Whether they are a reflection of these previous decrements taken to their logical conclusion or whether they are also subject to further stress effects in their own right is unclear; however, it is clear that judgment and decision making are altered under stress conditions. The research in this area can be divided a number of ways.

In general, judgment and decision making under stress tend to become more rigid with fewer alternatives scanned (Broder, 2000; 2003; Dougherty & Hunter, 2003; Janis, Defares, & Grossman, 1983; Janis & Mann, 1977; Keinan, 1987; Streufert 1981; Walton & McKersie, 1965; Wright, 1974). Furthermore, there is evidence that individuals tend to rely on previous responses (typically when they are familiar and well-learned), regardless of previous response success (Lehner, Seyed-Solorforough, O'Connor, Sak, & Mullin, 1997).

Thus, in addition to experiencing greater rigidity, individuals may tend to persist with a method or problem-solving strategy even after it has ceased to be helpful (Cohen, 1952; Staw, Sandelands, & Dutton, 1981). For the sake of organization, the study had chosen to present findings about individuals first, following by research on teams and groups.

Consistent with previous sections, the general finding about individuals first, followed by research on teams and groups. Consisted with previous sections, the general findings are presented followed by more specific dimensions. Priors to a discussion of stress effects, a brief review of decision theory has been provided.

2.3.1.9 Effects of Stress on Individual Judgment and Decision Making

In general, individual judgment and decision making is degraded under stressful conditions. However, just what elements are degraded and in what ways are less clear and are a much more complex issue. It has already been argued that stress can lead to hyper vigilance, a state of disorganized and somewhat haphazard intentional

processing. Janis and Mann (1977) were the first to formalize these observations under their decision-conflict theory.

According to this theory, hyper vigilance results in a frantic search, rapid intentional shifting, and a reduction in the number and quality of alternatives considered. Ultimately, this state leads to degraded judgment and decision making several.

2.3.1.10 The Effects of Putative Stressors on Job Performance

Putative stressors such as workload (i.e., concurrent task management, task switching, time pressure), heat and cold, noise, and fatigue have already been discussed in part during previous sections (e.g., attention, memory). However, there are large bodies of literature that focus directly on each of these variables individually. In the preceding sections, I briefly review the search that supports major conclusions about each “stressor’s” role in affecting performance.

Portions of this review have been included in previous section as appropriate; however, additional research that addresses these stressors directly is also presented.

There is significant inconsistency among researchers concerning the direct and indirect effects of various putative stressors. Direct stress effects are those incurred by the task load alone irrespective of any psychological stress that may also be generated. Accordingly, indirect stress effects are those that evolve out of psychological factors associated with the task load demands. There is a fine line that separates these two, and they can be indistinguishable at times.

This fact has made their separation and measurement particularly difficult. There are several issues at the heart of the inconsistencies found in the literature. For example,

is the application of some task demand (i.e., workload or time pressure) an application of stress? Many would argue that it is while others would contend the contrary. Proponents of the former typically offer one of two arguments. The first argument states that stress is a term that can be applied to any demand on a system.

Therefore, any task that requires mental resources qualifies as a stressor-it place a demand on the system. This argument meets the criteria of early stress definitions (stimulus-based approaches); however, it is no longer as accepted given the widespread belief that stress is transactional in nature. The second argument proposes that demand incur a psychological cost in addition to their direct effects.

That is to say, their demands trigger a psychological response such as frustration, anxiety, or psychological discomfort. This response often contains both physiological and mental components that vie for resources. In this way, stress acts as a secondary workload factor drawing resources away from the primary demand, devoting them instead to secondary psychological processes.

On the other hand, a compelling argument can be made that workload is a demand that does not require, nor regularly incur, a secondary psychological cost. In applying the stated definition of stress-the interaction between three perception: a demand, an ability to cope with that demand, and the importance of being able to cope (McGrath, 1976), it's difficult to see how demand characteristics alone qualify as stressors.

For example, in some circumstances time pressure and/or workload would trigger anxiety or frustration that might further distract or interfere with performance; however, it is not clear that this would necessarily be so in most, let alone all, situations. If we agree that subjective experience and specifically cognitive appraisal

(a transactional model assumption) is elemental in defining stress, then one must assume it plays a significant role in answering questions about whether workload, time pressure, or other putative stressors carry both direct and indirect effects.

Does this suggest that when demands deemed stressful or upsetting it is necessarily a stressor, regardless of the objective outcome? If an increase in workload does not impair performance yet is viewed as stressful by the operator, does this indicate that it should be considered a stressor? Reasonable arguments can be made to support both positions, and the research literature, in its current state, is a reflection of this fact. As the reader has already observed, several researchers have attempted to side-step this issue by replying on descriptions of task load alone, ignoring the potential accompanying psychological stress. In doing so, they have circumvented a direct discussion of stress and its role in performance degradation or enhancement. However, in leaving this issue unaddressed, these authors have left the reader to infer a stress effect, correctly or not.

The study had not attempted to resolve this issue but to make the reader aware of it. At the end of this review I attempt to provide a conceptual framework that helps organize data and concepts that I hope provides more coherence than is apparent in the literature.

2.3.1.11 The Effects of Occupational Stress on Workload

Early views of stress treated the concept and the human organism in mechanistic terms (Cannon, 1932; Selye, 1950). Stress was frequently viewed as present when demands outweighed resources. The resulting “strain” on the system was seen as a

stress effect. Later theorists included a cognitive component to this definition yet stress was still conceived as an imbalance between environmental demands and the organism's capability to adequately respond to those demands (Lazarus, 1966).

This type of simplistic dichotomy lent itself to an interpretation of workload and other variables as "stressors." For instance, it has been established that increased work volume requires greater resources to sustain performance. According to earlier views of stress, this fact alone draws the parallel between the two concepts. Although there is far from universal acceptance of this connection, many in the research community today still consider factors such as workload, stress-related.

Although some have resisted the temptation to connect workload and stress, instead relying on descriptions of the task demands alone (Hancock & Desmond, 2001), this has proven difficult given the divergence among the research community. For example, Parasuraman and Hancock (2001) drew a distinction between workload and task load, asserting that task load was the environmental load on the organism while workload was the experience of that loading by the organism as it attempted to adapt accordingly.

These descriptions are reminiscent of the troubled distinction between direct and indirect stress effects. Readers are likely to be confused by the inconsistencies among researchers as one investigation's task loading is another's stressors. The following discussion of workload elements has been provided in light of the divergence that exists among researchers in this area.

The reader should note that this reviewer found little. If any discussion in previous reviews or in the primary literature that provide a validation account for the connection between putative stressors and psychological stress.

Most human interaction in the world involves dynamic and complex management of multiple tasks. This is certainly true of human-machine interactions. Thus, it is not insignificant that a large portion of the human performance literature has historically examined single putative stressors, isolated from their environments. Unfortunately, as valuable as such studies are to our collective understanding of various processes and their relationship, they fail to match the character of the world we live in. because of this, research that examines multitask performance is of particular interest.

Much of this research literature has already been reviewed under previous sections of attention and memory; however, studies directly related to concurrent task management not previously addressed are reviewed below.

In general, concurrently task management results in degraded performance on either the primary or secondary task (Hitch & Baddeley, 1976; Kahneman, 1975; Neisser & Becklan, 1975; Shafer, 1975). It should be noted that among studies in the experimental literature, discerning a primary from secondary task is somewhat arbitrary. Simply stated, within the limited resources model, multiple task divide available resources between themselves and under high workload or stress conditions, there tend to be insufficient resources to concurrently manage both tasks. Therefore, one, if not both tasks (having received less than optimal resource devotion), suffers, while real-world settings may in some circumstances afford

natural primary task and secondary tasks, often times there designations are merely a laboratory convenience more than a reflection of the naturalistic design.

The concept of capacity and the presumption of limited resources has been the most popular explanation as the intervening variable in dual-task performance decrements (Kahneman, 1973; Navon & Gopher, 1979; Norman & Bobrow, 1975). Similarly, earlier models of single-channel information processing (Kerr, 1973) have recently made way for the assertion of more complex system explanations.

For example, in contrast to Broadbent (1958) and Treisman's (1969) early selection theory which postulates a single-channel information processing bottleneck in structural theory (occurring at the point of perception), Wickens and Dixon (2002), based on their exploration of navigational flying tasks, proposed three theories of concurrent task demands, single channel, single resources, and multiple resource.

The authors found the most convincing support for a multiple-resource model. Wickens (1991) was one of the first to introduce a multiple resources model, choosing to illustrate the model using a concurrent tasks management example. This author suggested that three possible factors were engaged in concurrent task management performance outcomes. The first was confusion, which defined as a condition where similar tasks often interfere with performance while more distinct task degrade performance less often.

The secondary potential outcome he coined cooperation. The cooperation between task processes can be seen when high task similarity yields combined results (i.e. tracking a ball as you prepare to hit it with a racquet). Finally, he suggested that there can be competition between demands. Competition for task resources, specifically

resources allocation to one task versus another, results in diminishing resources from the other task(s) being managed. Wickens has argued that time sharing cooperation improves between tasks to the extent that they use separate versus shared resources.

The search reviewed here predominantly adheres to the notions of confusion and competition between concurrent tasks. Driskell, Mullen, Johnson, Hughes, and Batchelor (1992) performed a meta-analysis of studies investigating dual-task performance. They reported a relatively consistent finding (over a variety of stressors to include thermal, noise, time pressure, etc) that performance on the primary task tends to suffer when individuals attempts to accommodate a secondary task (a moderate effect size was noted).

The authors found that the more similar the two tasks, the greater the interference and the worse the primary task performance. Thus performance did not degrade to the same extend when attempting to manage dissimilar task. Boggs and Simon (1968) and Finkelman and Glass (1970) observed similar differential effects with exposure to noise. McLeod (1977) determined that performance on a tracking task was worse under conditions of high response similarity, when both response were manual as compared to conditions of low response similarity degradation.

Although very little research seems to have been conducted on concurrent task management under psychologically distressing conditions, it can be assumed that such stress would compromise the management of resources further, drawing them away from either or both tasks.

2.3.1.12 Effects of Time Pressure on Job Performance

Time pressure has been found to degrade performance across a variety of cognitive domains. The range of performance domain that have been found to suffer under time pressure include;: Judgment and decision making (Entin & Serfaty, 1990; Raby & Wickens, 1990; Rothstein & Markowitz, 1982; Sperandio, 1971; Stokes, Kemper, & Marsh, 1992; Walton & Mckersie, 1965; Zakay & Wooley, (1984), visual search behavior, vigilance and attention processes (Streufert & Streufert, 1981; Wickens, Stokes, Barnett, & Hyman, 1991; Weight, 1974), Memory recall strategies (Cambell & Austin, 2002), concession making and integrative agreements (Pruitt, 1981; Pruitt & Carnevale, 1982; Rubin & Brown, 1975; Walton & McKersie, 1965), and subject's self-rating of performance (Greenwood-Ericksen & Ganey, 2002).

In addition to a general drop in performance, time pressure and the corresponding sense of urgency experienced tends to result in strategy-shifting in teams (explicit to implicit rules and greater coordination between members), task-or or load-shedding (of which strategy-shifting may be seen as one specific example), tunneling of attention and visual scanning, and a speed or accuracy trade-off in performance.

Some have argued that time pressure is the central at the heart of all performance decrements and that any element that impinges on an operator's workload does so through this variable. Hendy, Farrell, and East's (2001) information processing model of operator stress is defined by time pressure. These authors posit that time

pressure is the underlying stressor that determines operator performance, error production and judgments of workload.

In fact, according to Hendy et al all factors affecting workload are reduced to this variable. Moreover, the authors suggest that the relationship between a given task load and its corresponding time pressure can be estimated by dividing the tasks load by the rate at which information (related to the load) can be processed. This equation results in a determination of the decision time needed to manage the load.

This figure is further divisible by the time availed to the operators to complete the operations in equations, which leaves a numerical function representing time pressure. The authors propose three possibilities by which human information processing can reduce load mismatch. The first is reduction in task load or the amount of information require to the processed.

The second is an increase in the time available to complete the task, and the third is an increase in channel capacity (regulating the rate and volume of information required to be processed. The second is an increase in the time available to complete the task, and the third to be processed. The second is an increase in the time available to compete the task, and the third is an increase in channel capacity (regulating the rate and volume of information processing). Hendy et al. are certainly not alone in their alignment of time pressure and workload.

O'Donnel and Eggemeier (1986) also drew a direct connection between these two variables. These authors have suggested that time pressure and workload are the operant conditions that lead to load-shedding. The previous discussion of shedding

strategies seems to further support this perspective (Raby & Wickens, 1990; Rothstein & Markowitz, 1982; Sperandio, 1971).

Wright (1974) found that time pressure contributed to a state of information overload whereby subjects simply did not have enough time to process information and were forced to simplify their decision task by reducing their visual scans and by considering fewer decision-related alternatives. Entin and Serfaty (1990) placed subjects under the dual workload conditions of time pressure and a secondary task.

The authors found that with difficult decision task subjects preferred seeking additional input from the easy-to-process opinion of a consultant erases raw data from a sensor probe. This was particularly the case as time pressure and workload increased. This pattern of performance further reflects the common use of resource economizing or shedding strategies through the employment of pre-processed information.

To what extent these “strategy-shifts” are motivated purely by anxiety and to what degree they reflect the physical limitation of time is unclear.

Lehner, Seyed-Solorforough, O’Connor, Sak, and Mullin (1997) also examined decision making performance under time pressure. They found that teams used less-effective decision strategies as time pressure increased. Specifically, they used strategies that were more familiar to them versus these that were better but more recently learned. This finding links what is known about our reliance on previous learning under stress and our preferential use of well-learned strategies regardless of their effectiveness.

These tendencies may be seen as adaptive in some instances as research has shown that well-learned and regularized knowledge sets tend to be resistant to the negative effects of workload and stress.

Using a gambling paradigm, Ben Zur and Breznitz (1981) found that subjects tended to make lower risk choices and spend more time viewing negative dimensions while under time pressure. This tendency to accentuate negative evidence present in their decision making task was also found by Wright (1974). Greenwood-Ericksen and Ganey (2002) explored the effect of time pressure on subjects' ratings of their own performance.

The authors found a tendency for individuals to rate themselves worse under time pressure than those not under this pressure (even when there was no difference in objective performance). Thus, not only does time pressure seem to draw some individuals toward an active processing of their negative circumstances; it may also cause them to view their abilities to manage these circumstances in negative ways.

Finally, several investigators have concluded that time pressure increases the level of cooperation between groups in negotiation because it facilitates concession making; however, it has been noted that this may also therefore with the development of interactive agreements due to forced cooperation (Pruitt, 1981; Pruitt & Carnevale, 1982 & Brown, 1975; Walton & McKersie, 1965).

Driskell, Mullen Johnson, Hughes, and Batchelor's (1992) meta-analysis of the effects of time pressure on performance revealed that time pressure has a negative effect on performance speed (across various cognitive domains) and accuracy (although the size of the effects is much larger for speed than accuracy). These

authors also determined that the effects of time pressure is mediated by the type of manipulation employed.

For example, continuous manipulations (shortening the length of the time available for the task) produced strong negative effects for both speed and accuracy, whereas categorical manipulations (stating that subjects should work as fast as possible from the beginning) created mild to moderate increases in speed and actual enhanced performance accuracy slightly. Logically, the magnitude under which an individual is pressured for the more impaired the accuracy for continuous manipulations. The authors found no effect of magnitude on categorical manipulations. Driskell et al. noted that urging an individual when pressured for time also affected their performance. For continuous manipulations, there were strong negative effects for both accuracy and speed of performance when urged.

The authors conclude that the effect of time pressure on performance appeared to be a function of the task like pattern recognition tasks. Vigilance tasks and reaction tasks were the most negatively affected in terms of performance accuracy while pattern recognition, reaction tasks, and to lesser degree cognitive tasks, were the most positively effected in terms of performance speed.

2.3.1.13 Effects of Thermal Stress (Heat and Cold) on Performance

Under thermal stress (heat and cold) various cognitive processes appear to be impaired and this impairment seems to be related to the severity of these three score. Cognitive impairments appear to be more prevalent under conditions of cold than those of heat.

Most of the research literature in this area has assessed psychomotor and or perceptual-motor tasks and to a much lesser extend complex cognitive tasks. Accordingly, impairment patterns have been clearly demonstrated among psychomotor skills (particularly fine motor skills under cold conditions), but there are mixed results when it comes to higher-order cognitive abilities.

The explanation for such decrements remains unclear but likely originates from several sources. From a biological or neural functioning perspective, thermal stress may lead to be breakdown in thermal regulation. On the other hand, the discomfort caused by thermal extremes may result in an information processing distraction that interferes with task-related performance (i.e., drawing resources and attention away from the task and to word the subjective experience).

Similarly, volitional changes in strategy may occur. For example, it has been suggested that the strategic allocation of resources across different task components may change. In such a case, the shift in resources allocation may accompany a goal shift toward emotion-focused coping-a result of concurrent management of the task demands and the subjective discomfort of the stressor.

The number of contexts in which thermal stressors have been shown to degrade performance is large and includes those in attentive processes (Callaway & Dembo, 1958; Pepler, 1958; Vasmatazidis, Schlegel, & Hancock, 2002), memory (Giesbecht, Arnett, Vela, & Ristow, 1993; Hocking, Silberstein, Lau, Stough, & Roberts, 2001), psychomotor and/or perceptual-motor tasks (Baddeley & Fleming, 1967; Enander, 1989; Gaydoo & Dusek, 1958; Hyde, Thomas, Schrot, & Taylor, 1997; Idzikowski &

Baddeley, 1983), problem solving (Fine, Cohen, & Crist, 1960), and under various training environments (Keinan, Friedland, & Sarig-Naor, 1990).

Attention processing has typically been examined using vigilance tasks. Pepler (1958) found that, under the stress of heat, vigilance decreased over time. Vasmatzidis, Schlegel, and Hancock (2002) found similar decrements in vigilance, visual tracking, and auditory discrimination tasks when participants were subjected to heat. Callaway and Dembo (1958) examination of cold demonstrated its effects on the judgment of sizes. Subjects were instructed to put their foot into a bucket of ice water simulating stressful conditions related to thermal discomfort.

The authors found that the subjects tended to judge the objects as larger than matched controls. Due to the fact that size judgments typically require the incorporating of peripheral cues such as elements in the foreground (shadow, texture, relative position of other objects, etc), the authors concluded that subject had not attended to these cues, focusing instead on the central object these judgment did not appear to be related to ophthalmic changes and Callaway and Dembo (1958) surmised that some physiological mechanism seemed to increase the selectivity of an individual's attention under the stress of cold.

Thermal stressors have also been employed in the study of working memory performance. These examinations have included both heat (Hocking, Silberstein, Lau, Stough, & Roberts, 2001) and cold (Giesbrecht, Arnett, Vela, & Bristow, 1993). Giesbrecht, Arnett, Vela, and Bristow (1993) found that after immersion in cold water, tasks requiring minimal cognitive demands, remained unaffected (auditory attention, Benton visual recognition, digit span forward); however, these

tasks deemed more cognitively challenging (digit span backward-requiring working memory, and the Stroop task) showed significantly degraded performance.

Slaven and Windle (1999) simulated conditions of a disabled submarine and found that under the stress of cold, there were no significant performance decrements (including measures of working memory). However, self-report measures suggested that decrements were perceived. These authors concluded that motivation and the presence of peers (shipmates) may have played a role in mitigating the effects of thermal stress.

Fine, Cohen, and Crist (1960) are one of the few to have studied problem-solving abilities under thermal stressors. They found that there was no difference in performance between 70 degrees and 95 degrees (Fahrenheit) on anagram tasks. Giovanni and Rim (1962) failed to find performance decrements in subjects responding to a dominoes task when heat and they found no difference in performance between heat extremes (77 and 109 degrees).

Grether (1973) examined finger tapping, response time, and vigilance behaviour. His investigation demonstrated that heat tended to improve performance up until a point after which performance decreased. His results suggested that decrements in this curvilinear relationship occurred reliably after temperatures rose past 85 degrees. Hancock and Vasmatazidis (1998) also found support for a derivation of the Yerkes-Dodson inverted performance curve in their review of the literature on heat and performance studies.

Performance on perceptual-motor tasks is perhaps the largest domain in which thermal stressors have been examined. Early investigations by Baddeley and his colleagues tended to lump the stress effects of cold with other anxieties in their evaluation of under-water diving performance (Baddeley, 1966; Baddeley & Fleming, 1967). Enander (1989) examined the thermal stresses of heat and cold on a test of manual dexterity and strength.

Although he acknowledged the presence of some direct physiological effects, “the temperature of the hands ...is clearly a limiting factor in the performance of manual tasks in the cold”, he stated “...performance on more complex cognitive tasks is the result of an integration of physiological reactions, physical and mental capabilities, and subjective assessments.” (p.28).

In his review of the research on the effects of cold, Enander reported that reductions in core body and muscle temperature result in decreases in strength and endurance (Bergh, 1980; Ramsay, 1983) as well as tactile sensitivity at 8-10 degrees Celsius and manual dexterity at 12-15 degrees Celsius (Clark, 1961; Dusek, 1957). Fine motor movements and the manipulation of small objects have also been shown to be impaired when exposed to cold temperatures (Kiess & Lockhart, 1970; Vaughan, Higgins, & Funkhouser, 1968). Enander asserted that research has implicated the role of cognitive distraction in these effects at both cool (15.5 degrees Celsius) and cold (4.5 degrees Celsius) water temperatures (Vaughan, 1977).

Exposure to cold air has also resulted in an increase in errors on serial choice-reaction time tasks of varying complexities (Ellis, 1982; Ellis, Wilcock, & Zaman, 1985). Moreover, working memory and encoding processes (likely mediated through

attention) while long-term memory stores remain fairly resistant to such effects (Coleshaw, Van someren, Wolff, Davis, & Keatinge, 1983).

Ennander (1989) also reviewed the research on the effects of heat and found, “there is little initial effect on physical strength, but the gradual accumulation of heat in the body during longer and more intense exposures gradually builds up fatigue and a corresponding decrease in endurance” (p.29). Vigilance and sustained attention tasks have been the most common types of tasks tested under heat exposure.

The overall pattern of effects for heat is somewhat confusing and appears to depend on the constant (albeit hot), performance decrements are much less (except for extreme temperatures) than when temperature is variable or climbing.

There differential effects have also been noted by others. Driskell, Mullen, Johnson, Hughes, and Batchelor’s (1992) meta-analysis of the effects of thermal stress on performance indicate that heat does not significantly affect the speed of performance but does slightly degrade the accuracy of performance. However, these authors found cold temperature significantly affects both the speed of performance as well as the accuracy of performance (moderate effect sizes were found for both outcomes).

Driskell et al. also note that group size was a significant moderator of performance. While there was no effect of group size under heat conditions, there were significant differences in performance under cold conditions-the larger the groups, the less was the negative effect of the cold on performance. This finding resembles the “misery loves company” theory reported earlier and may reflect the role that motivation effort play in reducing the negative effects of thermal discomfort.

Ramsay (1983) postulated that the most significant effects of cold temperature on performance is the loss of manual dexterity of the hands. Gaydos and Dusek (1958) examined the effects of cold on manual dexterity and found that significant impairment occurred when hand skin temperature was below 53 degrees (Fahrenheit). Horvath and Freedman (1957) also investigated the effects of cold temperature on manual tasks (writing ability).

These authors observed men working at temperatures of 22 degrees for two weeks noting that significant decrements in manual task and writing ability occurred but that general mental and cognitive performance remained intact. Although conspicuously absent from the research literature, the need for a differentiation between direct and indirect effects is nowhere more necessary than it is here. Presumably, the effects of cold on fine motor control are largely a function of physiology and thermodynamics; however, research on human performance under thermal stress fails to address this issue adequately.

Hyde, Thomas, Schrot, and Taylor (1997) study the performance of naval special operations forces under real-world stressors. The specific domains in their investigation were predominantly perceptual-motor in nature and included: grip and arm strength, visual acuity, hand-eye coordination, physical endurance, and both fine and gross motor skills.

Hyde et al. (1997) examined these performance measures under several adverse conditions to include winter-warfare training and underwater diving operations. There was a general pattern of performance decrement that emerged. The exposure to cold, associated with the winter-warfare training, reduced fine motor skills and

hand strength. While reducing manual dexterity over time, exposure to cold and the elements in underwater diving impacted fine motor skills but not large muscle group performance.

These findings are consistent with previous investigations (Idzikowski & Baddeley, 1983). Overall, fine motor skills were more susceptible to disruption and degradation than gross motor skills.

Several researchers have investigated the role of motivation and effort in staving off the effects of thermal stress. As mentioned above, Slaven and Windle (1999) found few if any significant performance decrements using a disabled submarine simulation. They surmised that motivation may have played a role in instigating the effects of thermal stress. Razmjou and Kjellberg (1992) explored the effects of heart rate on a serial-choice reaction task. They found that heart rate increased the frequency of errors but did not impact reaction time.

The authors asserted that this finding was possibly offset by the allocation of additional effort (based on the self-report of their subjects). Razmjou (1996) subsequently provided a framework for the analysis of stress states. He examined two control processes, strategy and effort. Razmjou found that providing feedback to subjects regarding their performance resulted in improvements under the stress of heart rate. These findings taken together seem to suggest that appraisal, goal structure, and subsequent effort can, and often does, moderate the negative effects of some thermal stress conditions.

2.3.1.14 Effects of Noise on Job Performance

In general, exposure to noise tends to degrade performance, although the results are mixed, most studies find that intermittent noise is more disruptive to performance than continuous noise. However, definitive conclusions about decibel level at which performance decrements are shown are difficult to after exposure to between 90 and 100 dB of noise (Broadbent, 1954; Broadbent & Gregory, 1963; Broadbent & Gregory, 1965; Fornwalt, 1965) although cognitive impairments have been recorded under as low as 68 dB of noise (Weinstein, 1974). Most of these investigations have examined performance on task of sustained attention.

Driskell et al.'s (1992) meta-analysis into the effects of noise on performance suggests noise has negative effects on the accuracy of performance but that it does not generally have such an effect on the speed of performance. The size of this effect is reportedly mild to moderate. Driskell et al. also found that noise has a negative effect on the perceived stress level of individuals exposed to it (a strong effect size reported). These authors point out the various moderating factors involve n studying the effects of noise on performance.

These factors include the intensity of the noise studied, whether it is intermittent or continuous, its duration, mode of delivery, and of course the type of task being assessed. For example, although commonly reported in the literature, these authors found no significant different in effect between continuous and intermittent noise (across measures of distress, accuracy or speed).

There was a trend found that suggested that under continuous-noise conditions individuals tend to perform more slowly while the opposite is the case under conditions of intermittent noise. It should also be noted that individuals tend to habituate to continuous noise over time, resulting in gradually improved performance. This does not appear to be the case under intermittent noise conditions. They did note that there was greater self-reported distress as noise decibel level increase. Moreover, the accuracy of performance was also degraded somewhat as a function of increased noise intensity; however, performance speed appeared to be unrelated to decibel level.

These were no consistent relationship between the duration of noise and the performance decrement observed. Impairment in performance speed was noted when individuals were exposed to intermittent bursts of noise over time but not continuous noise. Individuals also tended to report experiencing less stress as noise endured even though their performance did not improve. This too seems to suggest that as the duration of noise increases, individuals habituate to the noise.

The authors theorized that this may result in the blocking of some environmental inputs in certain circumstances, which in turn may result in the filtering-out of some task-relevant information (leading to performance degradation).

Driskell et al. (1992) found small to moderate negative noise effects concerning performance accuracy on various cognitive, psychomotor, and working memory tasks. On the other hand, small to moderate positive effects were found on tasks of pattern recognition. The effect of noise on the speeded performance of these measures was negligible.

The authors provided a graded effect-rating based on the level of noise intensity. The results of their analyses suggest that mild distress typically does not occur until reaching over 80 dB of noise. Moderate distress tends to be reported when noise levels exceed 85 dB and not until noise is greater than 91 dB do individuals tend to report a large negative effect. In terms of objective performance, noise levels as small as 76 dB appear to be related to decreases in accuracy; however, to witness moderate-sized effects in most performance domains, noise intensity must reach around 145 dB.

2.3.1.15 Effect of Fatigue on Job Performance

Although it will come as no surprise, the research on fatigue and performance consistency indicates that fatigue tends to degrade performance. Furthermore the negative effects of fatigue increase as sleep is deprived for greater periods of time. Are these effects due to stress or the direct role fatigue plays? The answer is unclear.

This review has included fatigue as a putative stressor in light of the convention for doing so in the stress and performance literature; however, few, if any, studies, have definitively separated direct from indirect effects concerning fatigue. Before a further discussion of these effects, a brief review of the construct of fatigue is necessary.

Job and Dalziel (2001) reviewed the concept and conclude that researchers have long struggled with how to define and study fatigue. A quick review of previous investigations bears this out. For example, these are numerous operational redefinitions of fatigue and little consensus on how to bind the construct. Brown (1994) suggested that, “psychological fatigue is defined as a subjectively experience

disinclination to continue the task" (p.289). Cercarelli and Rayan (1996) indicated that, "fatigue involves a diminished capacity for work and possibly decrements in attention, perceptions, decision making, and skill performance. "perhaps must simply put, "fatigue may refer to feeling tired, sleepy, or exhausted." (NASA, 1996). Job and Dalziel (2001) posted the following definition of fatigue.

A state of an organism's, viscera, or central nervous system, in which prior physical activity and/or mental processing, in the absence of sufficient rest, results in insufficient cellular capacity or system wide energy to maintain the original level of activity and/or processing by using normal resources. (p.469).

Gawron, French, and Funke (2001) provide an overview discussion of fatigue, and these authors suggest that there are two types. They consider physical fatigue peripheral, "...a reduction in capacity to perform physical work as a function of preceding physical effort." On the other hand,, mental fatigue they contend is central, "...inferred from decrements in performance on tasks requiring alertness and the manipulation and retrieval of information stored in memory." (p.581). diamond and Hancock (2001) also identified two different types of fatigue but chose to classify them as passive and active.

These authors suggested that passive fatigue is that which resembles vigilance- resulting from passive monitoring of a given system with little if any active interaction with that system. As one might guess, active fatigue has been defined as that which results from the continuous or prolonged interaction with a system. Desmond and Hancock defined fatigues as, "a transition state between alertness and somnolence." (p.459).

Matthews and Desmond (2002) have observed that fatigue is typically thought of in relation to energetical concepts (i.e., effort, resources, activation). In an attempt to explain the effects of fatigue on performance, these authors noted that research points to three competing hypotheses. One hypothesis processes that fatigue removes resources in some direct way or perhaps indirectly diverts them toward coping strategies. Thus, performance falls off on task due to the depletion of resources.

This is consistent with the notion that more complex tasks are more sensitive to fatigue effects since these types of tasks are also likely to require greater resources to maintain. However, a second hypothesis suggests that fatigue is related to effort regulation. Several investigations have shows that individuals under fatigue states generate less effort than those not fatigued (Fairclough & Graham, (1999).

There is some indication that fatigue is a state of under-arousal which fails to actively mobilize the resources or effort required to achieve or sustain strong performance. This second situation reflects less of a resource insufficiency and more of an activation insufficiency. Finally, it has been suggested that a combination of these two hypotheses best explains fatigue's effects and the underlying mechanisms at work.

Confusion and disagreement over what defines fatigue has also led to difficulties in measuring fatigue. Several researchers have equated this difficulty to the one experienced with the concept of stressing general (Tepas & Price, 2001). Muscio's (1921) quandary was mentioned earlier and applied equally well to fatigue. If we are to define any phenomenon, we first need to be able to measure it.

However, it is difficult to create such a measure without knowing what you are trying to measure. This Driskell et al. also found that when tasks are self-paced, there is less negative effect on the speed of one's performance but found this is not the case when tasks are work-placed. The author's meta-analysis also had shown what the larger the group, the worse the speed of performance.

However, when examining self-reported distress and performance accuracy, the larger the group, the better the performance. This second finding regarding group size appear to support the "misery loves company" hypothesis presented previously, but only in terms of subjective ratings. Finally, based on established circadian pattern of performance the authors mapped diurnal rhythms with sleep-deprivation effect patterns. The results of this suggest that fatigue has its greatest negative effect when the rhythm is lowest (2-8 AM) and is least disruptive when the rhythm is highest (6-10 PM).

2.4 ROLE OF MANAGERS AND STRESS CONTROL

2.4.1 Task-and relationship-focused behavior

Research by Selzer and Number of (1988), and Sherdan and Vredenburg (1978) suggests that relationship-focused supervisory behaviours have a positive impact on employee well-being, but that the impact of leaders; initiating structure on employees' health appears to be more complex: high level of task-focused supervisory behavior can have a detrimental impact on employee well-being, but this negative impact may be reduced if the same supervisors also exhibit a range of more relationship-focused behaviours.

2.4.2 Impact of superior behavior on employees' physical health

There is also evidence that supervisor behavior can have an impact on important psycho physiological outcomes. For example, Wager, Feldman, Hussy (2003) found that employees who worked under two differently perceived supervisors in the same workplace on separate working days (where one supervisor was perceived as having a significantly more favorable supervisory interaction style than the other) showed significantly higher systolic and diastolic blood pressure on today's that the other) showed significantly higher systolic and diastolic blood pressure on the days that they worked under unfavourably perceived supervisor, compared to the days workings under the favourably perceived supervisors.

This study is also consistent with previous research that has identified links between problematic characteristic of work and an increased risk of cardiovascular disease (e.g, Bosma et al., 1998; Theorell & Karasek, 1996).

Interestingly, this study also indicated that working under a favourably perceived supervisor was associated with lower blood pressure readings than those observed in the home environment on non-work days, suggesting that some supervisors may help to promote one's physiological health.

2.4.3 Behaviours underpinning Supervisory Support

Social support has been one of the most frequently researched variables in the occupational stress literature. Although most research in this area indicates that support from various sources (e.g peer and supervisor) is helpful in reducing employee strain (e.g, Cohen & Eills, 1985; Dorman & Zapf, 1999; Fenalson &

Beehr, 1994; Ganster, Fusillier, & Mayes, 1986; LaRocco & Jones, 1978), it has generally employed fairly global measures.

Two studies however were reviewed that highlighted more specific activities or behaviours constituting supervisory support. Fenalson and Beehr (1994) assessed the relations between the frequency of three distinct forms of potentially supervisory communication (positive, negative, and non-job). The more traditional global measures of supervisory communication (positive, negative, and non-job), the mire traditional global measures of supervisory support and employee stain, Positive job-related supervisory communication was found to be the most beneficial in reducing employee strain, followed by no-job related communication.

Interestingly, higher levels of negative job-related communication were associated with increased employee strain (which implies that continually taking about problematic aspects of work does not constitute an active component of supervisory support); and the specific contents of supervisory communications explained more of the variance in employee strain than the traditional global measures of supervisory support. Stephens and Long, (2000) found that a greater frequency of non-job and positive job-related supervisory communication was related to lower psychological and strain.

2.4.4 Impact of Bullying Supervisory Behaviours

The concept of workplace bullying has, perhaps not surprisingly, received a fair amount of attention in the occupational stress literature (e.g Hotel et al.. 1999; Kivimaki et al, 2003;Quine, 1999; Rayner & Hoel, 1997), While bullying is

sometimes perpetrated by peers of the targeted employee, it is more common for the perpetrator to be a supervisor or manager of the targeted employee, it is more common for the perpetrator to be a supervisor or manager of the target (eg, Einarsen, 2000; O'Connell & Korabik, 2000; Quine, 1999).

A comprehensive review of the bullying literature conducted on behalf of the HSE by Beswick, Gore, and Palferman (2006) demonstrates that numerous studies have found significant associations between experiences of bullying and psychological strain (e.g) depression, anxiety, suicidal thoughts post-traumatic stress; low self-esteem); physical strain (e.g chronic fatigue, sleep difficulties, and stomach problems) and sickness absence. They also report that organizational antecedents of bullying may include a change of supervisor, autocratic management style, role conflict, and low job control. A review by Rayner and McIlvor (2006) highlighted the need to consider positive management behaviours in the bullying behavior' model rather than focus solely on negative behavioral indicators by Beswick et al.. (2006).

2.4.5 Transformational and transactional leader behavior

The majority of papers that have been published since the review in Yarker et al. (2007) have focused on the link between transformational, transactional and or laissez-faire leader behaviours and well-being. Hetland, Scandal & Johnsen (2007) examined the relationship between perceived leading style and employee burnout. Results indicated that having a supervisor who showed transformational leadership was related to lower cynicism and higher professional efficacy in employees.

Further passive avoidant leadership styles were found to be related to higher professional efficacy in employees. Interestingly, transactional leadership was not linked to any of the elements of burnout, leading the authors to include that negative leadership behaviours are more important for burnout than perception of positive leadership styles.

Bono, Foldes, Vinson & Muros (2007) investigated the impact of leader behavior on employee moods and emotions. It was found employees with transformational leaders experienced more optimism, happiness and enthusiasm in the day that those with leaders who didn't display transformational leadership behavior. Arnold, Turner, Barling, Kelloway & McKee (2007) reported results from two studies which revealed that the meaning that individuals ascribe to their work mediates the relationship between transformational leadership and positive well-being.

This suggests that being managed by someone who shows transformational leadership behaviour may increase perceptions of meaningfulness of work, which in turn has a positive impact on psychological well-being. This research adds to the range of positive mental health effects found to be associated with a transformational leadership style and takes an important step towards examining the potential mechanisms or mediators through which leadership style impacts on employee well-being.

Two studies link laissez-fair leadership and supervisory bullying behaviours. A study by Skogstad, Einarsen, Torsheim, Aasland & Hetland (2007) found that laissez faire leadership was positively correlated with role conflict and role ambiguity in

employees, and was also related to increased numbers of employees' conflicts. Further, through path modeling it was found that laissez-faire leadership was directly associated with employees' experience of bullying.

In a related study, Hauge, Skogstad, & Einarsen (2007) also found the link between laissez-faire leadership and bullying and that, where immediate supervisors avoided intervening in and managing the stressful situation, bullying was more likely to occur.

2.4.6 Other Supervisory Behaviours

Delve, Skapert, & Vilhelmsson (2007) conducted a longitudinal study, investigating the relationship between leadership strategies, workplace health promotion (WHP), and employees' long-term work attendance. Leaders' use of rewards, recognition and respect behaviours, was associated with higher work attendance by employees.

Interestingly, a higher work attendance was also found in units whose leaders viewed the organization (rather than individual) as responsible for the high rate of sick leave. Schaubroeck, Walumbra, Ganster & Kepes (2007) explored the impact of hostile supervisor behaviour on employee outcomes. In this context, the characteristic behaviours associated with a hostile leader were laying blame on others, providing negative feedback, a proclivity to argue and a low frustration threshold (Tepper, 2000).

This study found a negative relationship between supervisor hostility and employee well-being (anxiety, depression and somatic complaints). This relationship was found to be moderated by job enrichment, such that the impact of supervisor hostility

on well-being was reduced if the employee has an enriched job (defined as job scope).

2.5 STRESS MANAGEMENT AT THE WORKPLACE

Several studies have examined the effectiveness of stress management programs and found them to help reduce symptoms associated with stress (Bernier & Gaston, 1989; Saunders, Driskell, Johnston, & Salas, 1996; Zakowski, Hall, & Baum, 1992). Kagan, and Watson (1995) implemented a psychoeducational stress management program on emergency medical service workers over a three year period that include nine and 16 month follow ups. This rather extensive investigation demonstrated the positive effect of the program across a variety of domains to include measures of emotional health such as depression, anxiety, strain, depersonalization, and a sense of accomplishment as well as at least one measure of behavioral outcome – the number of commendation letters from customers doubled following the training.

Murphy (1996) also investigated the efficacy of stress management programs. Following his 20-year review, encompassing numerous programs, he concluded that stress management approaches that combined techniques were most effective. Humara (2002) also conducted a review of such programs (for sports performance) and found several common mechanisms across the programs evaluated. The results of his review indicate that programs that include the following concepts tend to be the most effective at improving performance and reducing anxiety: goal-setting, positive thinking, situation restructuring, relaxation, focused attention, and imagery and mental rehearsal.

Other researchers have examined various components within these programs as mechanism for stress reduction. Dandoy and Goldstein (1990) found that intellectualization statements resulted in positive coping. Specifically, these investigators showed that being exposed to statements that encouraged emotional detachment and analytical observation of explicit industrial accidents on videotape (i.e., table saw injury) lowered levels of physiological arousal in subjects and enhanced their recall of events. Shipley and Baranski (2002) investigated the effect of a visualization strategy (visuo-motor behavior rehearsal) on stressful police scenarios. Visuo-moto behavior rehearsal, like many other visualization techniques, requires individuals to imagine in vivid detail the perfect performance of some act, prior to engaging in the act. For example, using this strategy with a professional downhill skier would entail having him repeatedly practice a flawless run down the mountain. The protocol calls for as much details and imaginable reality as possible to enhance the visualized experience.

There are several theories as to why such techniques are effective. For example, some have posited that visualization can result in muscle contraction similar to that experienced in the actual performance of the act when the visualization is vivid and realistic.

Other researchers argue that visualization provides a relaxed setting in which to practice and problem-solve performance prior to the actual event. This may reduce both the novelty of the situation and anxiety or stress otherwise associated with the performance. In the case of Shipley and Baranski's investigation, officers who used visualization techniques reported experiencing less anxiety and improved their

performance in subsequent test scenarios. Caldwell (1997) determined that pilots were able to improve restfulness and restore their sleep patterns after using a self-administered relaxation therapy. He and his colleague have also shown that various pharmacological interventions, central nervous system stimulants can be incorporated into stress management procedures to improve performance, mood ratings, and physiologic measures alertness (Caldwell, 2001; Caldwell & Gilreath, 2002).

Dutke and Stober (2001) determined that the adverse effect of stress on performance was ameliorated to some degree after individual motivation improved (motivation instruction was provided). Katz and Epstein (1991) found that individuals high in constructive thinking (solution-focused problem solving attitudes) tended to be less physiologically aroused by stress (performing calculation and visual tracking task with threats to self-esteem) and more positive emotionally and cognitively than those low in constructive thinking who were also exposed to stress.

These authors concluded that the majority of stress one experiences is self-produced. Similarly, Ingledew, Hardy, and Cooper (1997) noted that as psychological stress increases, avoidance coping does as well. However, such strategies are less common in individuals with high internal strategies (i.e., cognitive reframing) and perceived social support. They found that strategies high in emotion-focused and problem-focused coping had the greatest positive effect. Such findings shed light on the cognitive appraisal mechanisms targeted in most stress management and inoculation programs taken collectively, these investigations suggest level instructor pilots demonstrated elevations only in growth hormone.

Student pilots were also found to have significantly higher pre-flight levels of these hormones as compared to their instructors. These findings seem to suggest that experienced pilots may incur physiological arousal during flight but not the emotional arousal of students. Additionally, they may lack the anticipatory arousal incurred by student pilots.

Critchley and Mathias (2003) found a physiological correlate among Air Traffic Controller and driver performance on measures of attention and reaction time. Moderate hypotension was associated with decrease in behavioral measures. The authors cite work using neuroimaging that has explored the relationship between arousal and regional brain activity.

They noted that previous finding indicate that blood pressure tends to increase after performing certain cognitive and motor task that are associated with stress and workload. These events coincide with anterior cingulate activity (located in the medial portion of the frontal lobe). Given research that has linked frontal lobe activity with attention and reaction time (Braver, Barch, Gray, Molfese, & Snyder, 2001) the authors speculate a relationship between hypotension and attentional control may implicate arousal-dependent processes as the underlying mechanism.

Matthews (2001) has suggested that neuroscience has taught us at least two important things about the relationship between mental resources and information processing. First, biologic agents such as drugs, hormones, neurotransmitters, and processes such as circadian rhythms clearly affect performance. Second, psychophysiological measures have provided information about performance and the human

stress response. However, he also outlined several shortcomings with biological models. For example, debate continues as to the identification of specific neural systems implicated in the mediation of biological stressors. There is very little information on real-world experiences and their neural response. Neuroscientists have failed to provide us with strong biological models of personality and individual difference factors, and finally, we still have many central unanswered questions concerning cognition and processing.

2.6 STRESS AND HEALTH

2.6.1 Effects of Occupational Stress and the Immune System

Given the intricacies of the human body and the rapid advance of scientific knowledge, we might consider ourselves dependent on highly trained medical specialists to contend with illness. Actually our bodies cope with most diseases on their own, through the functioning of the immune system. The immune system is the body's system of defense against disease. It combats disease in a number of ways (Jiang & Chess, 2006).

Your body is constantly engaged in search-and-destroy missions against invading microbes, even as you're reading this page. Millions of white blood cells, or *leukocytes*, are the immune system's foot soldiers in this microscopic warfare. Leukocytes systematically envelop and kill pathogens such as bacteria, viruses, and fungi, worn-out body cells, and cells that have become cancerous. Leukocytes recognize invading pathogens by their surface fragments, called *antigens*, literally *antibody generators*. Some leukocytes produce *antibodies*, specialized proteins that lock into position on an antigen, marking them for destruction by specialized "killer"

lymphocytes that act like commandos on a search-and-destroy mission (Greenwood, 2006; Kay, 2006).

Special “memory lymphocytes” (lymphocytes are a type of leukocyte) are held in reserve rather than marking foreign bodies for destruction or going to war against them. They can remain in the bloodstream for years and form the basis for a quick immune response to an invader the second time around.

Although occasional stress may not impair our health, chronic or repetitive stress can eventually weaken the body’s immune system (Epstein, 2003; Kemeny, 2003). A weakened immune system increases our susceptibility to many illnesses, including the common cold and the flu, and may increase the risk of developing chronic diseases, including cancer. Psychological stressors can dampen the response of the immune system, especially when the stress is intense or prolonged (Segerstrom & Miller, 2004).

Even relatively brief periods of stress, such as final exam time, can weaken the immune system, although these effects are more limited than those associated with chronic or prolonged stress. The kinds of life stressors that can take a toll on the immune system and leave us more vulnerable to disease include marital conflict, divorce, and chronic unemployment (e.g., Kiecolt-Glaser et al., 2002). Traumatic stress, the war within. White blood cells, shown here (colored purple) attacking and engulfing a pathogen, form the major part of the body’s system of defense against bacteria, viruses, and other invading organisms.

2.6.2 Effects Work Stress on Cardiovascular Disease

Your cardiovascular system, the network that connects your heart and blood vessels, is your highway of life. Unfortunately, there are accidents along this highway in the form of **cardiovascular disease** (CVD, or heart and artery disease). CVD is the leading cause of death in the United States, claiming about 1 million lives annually and accounting for about 4 in 10 deaths, most often as the result of heart attacks or strokes (Hu & Willett, 2002; Nabel, 2003). *Coronary heart disease* (CHD) is the major form of cardiovascular disease, accounting for about 700,000 deaths annually, mostly from heart attacks. CVD is the leading cause of death for both men and women, claiming even more women's lives than breast cancer. In coronary heart disease, the flow of blood to the heart is insufficient to meet the heart's needs.

The underlying disease process in CHD is called *arteriosclerosis*, or "hardening of the arteries," a condition in which artery walls become thicker, harder, and less elastic, which makes it more difficult for blood to flow freely. The major underlying cause of arteriosclerosis is *atherosclerosis*, a process involving the buildup of fatty deposits along artery walls that leads to the formation of artery-clogging plaque. If a blood clot should form in an artery narrowed by plaque, it may nearly or completely block the flow of blood to the heart.

The result is a heart attack (also called a Stress, Psychological Factors, and Health *myocardial infarction*), a life-threatening event in which heart tissue dies due to a lack of oxygen-rich blood. When a blood clot blocks the supply of blood in an artery serving the brain, a *stroke* can occur, leading to death of brain tissue that can result in

loss of function controlled by that part of the brain, coma, or even death. The good news is that CHD is largely preventable (Nabel, 2003). How? By reducing the risk factors we can control. Some risk factors we can't control, such as age and family history. But a number of risk factors can be controlled through medical treatment or lifestyle changes—factors such as high blood cholesterol, hypertension (high blood pressure), smoking, overeating, heavy drinking, consuming a high-fat diet, and leading a sedentary lifestyle (e.g., Mendelsohn & Karas, 2005; Panagiotakos et al., 2005; Pickering, 2003).

Unfortunately, many of these factors remain uncontrolled. For example, only about one in four adults with hypertension take medications to control blood pressure (Chobanian, 2001; Hyman & Pavlik, 2001). Adopting healthier behaviors can have beneficial effects on the heart. For example, evidence shows that even seasoned couch potatoes can reduce their risk of cardiovascular disease by becoming more physically active (Blumenthal et al., 2005; Borjesson & Dahlof, 2005). Frequent emotional distress in the form of anger, anxiety, and depression can have damaging effects on the cardiovascular system (Frasure-Smith & Lespérance, 2005; Geipert, 2007; Orth-Gomér et al., 2000).

Researchers highlight the toxic effects of chronic anger on the heart. Occasional feelings of anger may not damage the heart in healthy people, but chronic anger—the type you see in people who seem angry all of the time—is linked to increased risk of CHD (Kiecolt-Glaser et al., 2002; Pressman, & Cohen, 2005; Rutledge & Hogan, 2002; Steptoe, Wardle, & Marmot, 2005). Anger is closely associated with

hostility—a personality trait characterized by quickness to anger and by tendencies to blame others and to perceive the world in negative terms. Hostility is a component of the type A behavior pattern (**TABP**), a style of behavior that characterizes people who are hard driving, ambitious, impatient, and highly competitive. Although earlier research had linked the Type A pattern to a higher risk of CHD, more recent research casts doubts on the relationship between this personality pattern and coronary risk (Geipert, 2007). However, we have more consistent evidence linking the trait of hostility, a component of the Type A pattern, to increased risks of heart disease and other negative health outcomes (Geipert, 2007; Mathews, 2005; Olson et al., 2006). Hostile people tend to have “short fuses” and are prone to get angry easily.

How might anger and other negative emotions contribute to heart disease? Although we can't be sure, investigators suspect that the stress hormones epinephrine and norepinephrine play significant roles (Januzzi & DeSanctis, 1999; Melani, 2001). Anxiety and anger trigger the release of these stress hormones by the adrenal glands. These hormones increase heart rate, breathing rate, and blood pressure, which results in pumping more oxygen rich blood to the muscles to enable them to prepare for defensive action— to either fight or flee—in the face of a threatening stressor. In people who frequently experience strong negative emotions such as anger or anxiety, the body may repeatedly pump out these stress hormones, eventually damaging the heart and blood vessels.

Evidence indicates that episodes of acute anger can actually trigger heart attacks and sudden cardiac death in some people with established heart disease (Clay, 2001a). We have also learned that people who are higher in hostility tend to have more

cardiovascular risk factors, such as obesity and smoking, than do less hostile people (Bunde & Suls, 2006). Anxiety and anger may also compromise the cardiovascular system by increasing blood levels of cholesterol, the fatty substance that clogs arteries and increases the risk of heart attacks (Suinn, 2001).

2.6.3 Effects of Work Stress on Headaches

Headaches are symptoms of many medical disorders. When they occur in the absence of other symptoms, however, they may be classified as stress-related. By far the most frequent kind of headache is the *tension headache*. Stress can lead to persistent contractions of the muscles of the scalp, face, neck, and shoulders, giving rise to periodic or chronic tension headaches. Such headaches develop gradually and are generally characterized by dull, steady pain on both sides of the head and feelings of pressure or tightness. Most other headaches, including the severe migraine headache, appear to involve changes in the blood flow to the brain (Durham, 2004; Linde et al., 2005). Migraine headaches affect more than 28 million Americans.

Typical migraines last for hours or days. They may occur as often as daily or as seldom as every other month. They are characterized by piercing or throbbing sensations on one side of the head only or centered behind an eye. They can be so intense that they seem intolerable. Sufferers may experience an *aura*, or cluster of warning sensations that precedes the attack. Auras are typified by perceptual distortions, such as flashing lights, bizarre images, or blind spots. Coping with the misery of brutal migraine attacks can take its toll, impairing the quality of life and leading to disturbances of sleep, mood, and thinking processes.

The underlying causes of headaches remain unclear and subject to continued study. One factor contributing to tension headaches may be increased sensitivity of the neural pathways that send pain signals to the brain from the face and head (Holroyd, 2002). Migraines headaches may involve an underlying central nervous system disorder involving nerves and blood vessels in the brain. The neurotransmitter serotonin is also implicated. Falling levels of serotonin may cause blood vessels in the brain to contract (narrow) and then dilate (expand). This stretching stimulates sensitized nerve endings that give rise to the throbbing, piercing **psychosomatic** pertaining to a physical disorder in which psychological factors play a causal or contributing role.

2.6.4 Effects of Work Stress on Cancer

The word *cancer* is arguably the most feared word in the English language, and rightly so: One of every four deaths in the United States is caused by cancer. Cancer claims about half a million lives in the United States annually, one every 90 seconds or so. Men have a one in two chance of developing cancer at some point in their lives; for women the odds are one in three. Yet there is good news to report: The cancer death rate has been inching downward in recent years, in large part due to better screening and treatment (Jemal et al., 2007).

Cancer involves the development of aberrant, or mutant, cells that form growths (tumors) that spread to healthy tissue. Cancerous cells can take root anywhere—the blood, the bones, lungs, digestive tract, and reproductive organs. When it is not contained early, cancer may *metastasize*, or establish colonies throughout the body,

leading to death. There are many causes of cancer, including genetic factors, exposure to cancer causing chemicals, and even exposure to some viruses (Godtfredsen, Prescott, & Osler, 2005; Samuels et al., 2004; Walsh et al., 2006). Unhealthy behavior patterns also contribute to the development of cancer, including dietary practices (high fat intake), heavy alcohol consumption, smoking, and excessive sun exposure (ultraviolet light causes skin cancer).

On the other hand, daily intake of fruits and vegetables may lower the risk of some forms of cancer. Death rates from cancer are lower in Japan than in the United States, where people ingest more fat, especially animal fat. The difference is not genetic or racial, however, because Japanese Americans whose fat intake approximates that of other Americans show similar death rates from cancer.

A weakened or compromised immune system may increase susceptibility to cancer. We have seen that psychological factors, such as exposure to stress, may affect the immune system. So it stands to reason that exposure to stress might increase a person's risk of developing cancer. However, evidence linking stress to cancer is inconclusive and requires further study (Delahanty & Baum, 2001; Dougall & Baum, 2001). On the other hand, we have learned that psychological interventions that focus on helping cancer patients cope with the disease, such as group support programs, can improve their psychological adjustment and well-being (Helgeson, 2005; Taylor et al., 2003). It remains to be seen whether psychological interventions actually increase the length of survival of patients suffering from cancer. Cancer patients may benefit from training programs that focus on developing coping skills, such as relaxation, stress management, and coping thoughts, to help relieve the stress

and pain of coping with cancer. Coping-skills training may also help cancer patients' deal with the unpleasant side effects of chemotherapy. Cues associated with chemotherapy, such as the hospital environment itself, may become conditioned stimuli that elicit nausea and vomiting even before the drugs are administered. Pairing relaxation, pleasant imagery, and attention distraction with these cues can help reduce nausea and vomiting associated with chemotherapy (Redd & Jacobsen, 2001).



CHAPTER THREE

METHODOLOGY

3.0 INTRODUCTION

This chapter presents the methodology used to carry out the study. It discusses the research setting, population, sample and sample determination, sampling technique, research design, research instruments, procedure for data collection and data analysis. The procedure for data collection and data analysis has been discussed.

3.1 RESEARCH SETTING

Koforidua Polytechnic was established in 1997 as a result of a government decision to start a Polytechnic in the Eastern region. It was therefore sited at the campus of the then Koforidua Technical Institute (KTI). The Polytechnic aims at providing tertiary education in the fields of manufacturing, commerce, science and technology, applied social sciences and arts.

Additionally, it aims at providing opportunities for development, research and publication of research findings. The mission of the Polytechnic is to provide career-focused education and training at the tertiary level with emphasis on hands-on experience and entrepreneurship development to produce middle-level management personnel through:

- The promotion of partnership with industry and other institutions. Creation of congenial and favourable teaching and learning environment.
- Provision of opportunities for practical research.
- Provision of expert services to meet societal needs.

- Diversification of sources of funding to support institutional activities.

Currently, the Polytechnic runs both Higher National Diploma (HND) in Accountancy, Marketing, Purchasing and Supply, Computer Science and Networking Management, Hospitality Management, Applied Mathematics, Mechanical Engineering, Electrical and Electronic Engineering, Renewable Energy Systems Engineering, Automotive Engineering and Building Technology Engineering and Non-HND programmes such as Diploma in Business Studies (Accountancy, Secretarial Studies, Purchasing and Supply, Computer Science and Marketing). The polytechnic has a student population of about 5,121 and 577 members of staff.

Koforidua Polytechnic occupies a total land space of 78.41 acres. The Polytechnic shares common boundaries with Capital View Hotel and Simpoa Meansa to the East, Osabene and Akwapim North District Assembly to the North, the main Koforidua – Accra road to the West, and New Juaben Senior High and SSNIT Flats at Adweso to the South.

3.2 POPULATION

Furlong et. al (2000) described the population of a research as the study of a large group of interest for which a research is relevant and applicable. The Management and staff of Koforidua Polytechnic constitute the target population for this research. All the departments of the Polytechnic comprising of academic and non-academic staff took part in the exercise.

3.3 SAMPLE AND SAMPLE DETERMINATION

The sample population is a subset of the entire population, and inferential statistics is to generalize from the sample to the population (Furlong et. al, 2000). A sample size of 150 respondents was used for the study. The sample size was determined using Yamane's (1967) simplified formula corrected to proportion to determine the sample size for the study. It is defined as;

$$n = \frac{N}{1 + N(e)^2}$$

N: - Total population

n: - Sample size

e:- Precision

$$\begin{aligned} n &= \frac{577}{1 + 577(0.05)^2} \\ &= 150 \end{aligned}$$

Table 3.3.1 Sample size drawn from both non-academic and academic

Type of customer	Population	Sample
Non-Academic	500	130
Academic	77	20
Total	577	150

3.4 SAMPLING TECHNIQUE

The systematic sampling method was used to select participants for the study. The systematic sampling technique is a way of selecting respondents which determines how to select members of a population that will be studied. By this method, every "nth" member is selected from the total population for inclusion in the sample population. The respondents were selected from a starting member of a group example non academic and then the means was repeated in other groups to select the other respondents. This technique is more efficient because it improves accuracy of estimates.

3.5 PROCEDURE OF DATA COLLECTION

The register of staff members was collected was obtained from the human resource department. The first fourth name was selected and then the difference of four was used an interval to select the rest of the respondents. Copies of the questionnaire were personally handed to respondents at their offices. After some minutes the researcher went back and collected the answered questionnaires because the respondents may forget to fill in the questionnaire or misplace them entirely.

The questions were thoroughly explained to the respondents after copies of the questionnaire were handed to them. The purpose was to help the respondents understand the relevance of the research and provide their independent views on the questionnaire items given them. To have a valid and a reliable data, the researcher ensured that the questionnaires were well prepared which allowed error minimization.

The questionnaire had close-ended questions which respondents were asked to tick the appropriate answer. Some of the questions were open-ended which offered respondents the opportunity to express their views freely.

3.6 RESEARCH INSTRUMENTS

Open and closed-ended questionnaires were designed for the respondents. The questionnaires were divided into various sections to capture the critical areas spelt out in the objectives for the study.

The questionnaires were administered personally and the contents explained to some staff who requested to be guided. A total of one hundred and fifty (150) questionnaires were sent out and were distributed to both administrative and academic staff of the Polytechnic. In addition, interviews were conducted to help clarify and gain a deeper understanding of some of the responses of respondents. The response rate was 91% of the total questionnaires administered. Structured interview guides were used to gather further information from respondents. The researcher also undertook direct observation of work processes and procedures within the institution.

3.7 RESEARCH DESIGN

Research design according to Cooper and Schindler (2001) is a plan that promotes systematic management of data collection. Design and methodology dictate what is needed to answer your research questions. The study adopts the cross-sectional survey method as its research strategy. As noted by Yin (1994), survey is a systematic method for gathering information from a sample of individuals for the

purposes of describing the attributes of the larger population of which the individuals are members.

The cross-sectional was chosen because it studied the research problem at a point in time and not within a longer time frame (longitudinal). This method is considered useful because the problem of study cannot be directly observed. Thus, the effect of occupational stress on job performance among staff of Koforidua Polytechnic cannot be directly observed.

3.8 DATA ANALYSIS

Analysis is a research technique for making replicable and valid references from data to their context. The researcher searches for structures and patterned regularities in the text and makes inferences on the basis of the regularities (Krippendor K. 1990).

The Statistical Package for Social Sciences (SPSS) was used to analyse the data collected. Tables and other statistical inferences were made from the data gathered. Representations like charts, pie charts etc was used to ensure easy and quick interpretation of data. Responses were also expressed in percentages. Data from the completed questionnaire was checked for consistency. The items in the questionnaire were grouped based on the responses given by the respondents and coded for easy usage of the Statistical Package for Social Sciences (SPSS). This method was used because it is the best instrument to identify, compare, describe and reach a conclusion.

The data was analysed in consonance with the set objectives of the study as indicated below:

- ❖ To examine the effects of stress on workers in the performance of their job.
- ❖ To evaluate Management competencies for controlling and reducing stress at work.
- ❖ To assess the support for those people who are suffering from stress.
- ❖ To assess how work related stress can affect the health of workers.



CHAPTER FOUR

DATA ANALYSIS AND DISCUSSION OF RESULTS

4.0 INTRODUCTION

This chapter presents an analysis of data collected. It considered the selected responses to the objectives of the study as well as the various research questions presented at the early stages of the research and also some relevant variables considered in the study.

4.1 DEMOGRAPHIC ANALYSIS

Table 4.1.1 Gender of Respondents

Response	Frequency	Percent
Male	79	57.7
Female	58	42.3
Total	137	100.0

Source: Field survey, 2012

The table above shows that 79 (57.7%) of the respondents were males with the remaining 58 (42.3%) being females. This result is not surprising as there are more males workers in the Polytechnic than females.

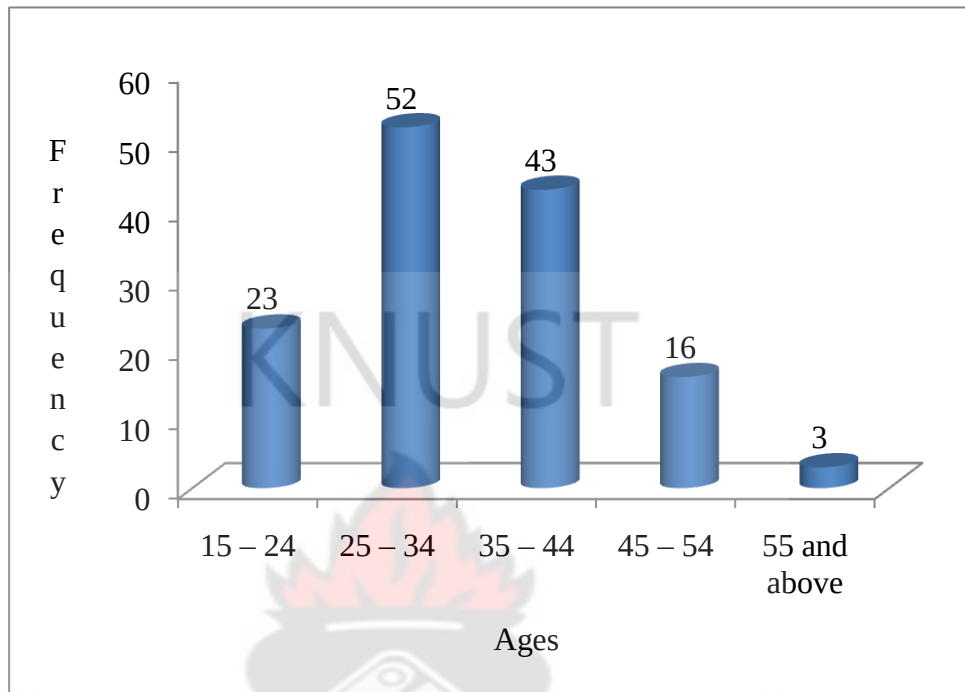


Figure 4.1.2 Ages of Respondents

Source: Field survey, 2012

The figure above which shows the age distribution of the respondents indicates that 23 (16.8%) and 52 (38.0%) of the respondents respectively fell in the 15 – 24 and 25 – 34 age brackets. 43 (31.4%) and 16 (11.7%) respectively fell in the 35 – 44 and 45 – 54 age brackets. The remaining 3 (2.2%) fell in the 55 years and above age bracket. From the above it can be inferred that majority of the respondents are below the age of forty – five (45) years, thus Koforidua Polytechnic has a youthful work force.

Table 4.1.3 Level of Education of Respondents

Response	Frequency	Percent
MSLC/JHS	2	1.5
O'Level/SSSCE/WASSCE	9	6.6
A' Level	3	2.2
Diploma	24	17.5
1 st Degree	78	56.9
Masters Degree	21	15.3
Total	137	100.0

Source: Field survey, 2012

The table above reports that 78 (56.9%) and 21 (15.3%) of the respondents had a first degree and a masters degree as their highest level of education. 24 (17.5%) and 3 (2.2%) of them respectively had a diploma and A' Level. It can be said that the cleaners and the clerks are those having at most a WASSCE or O' Level.

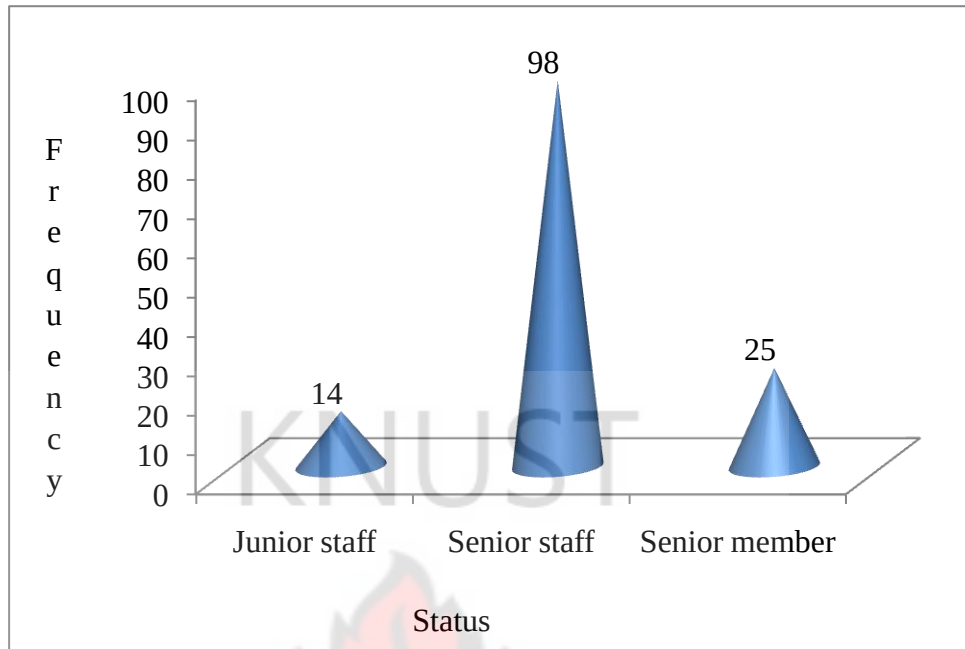


Figure 4.1.4 Status of respondents

Source: Field survey, 2012

The figure above shows that 14 (10.2) and 98 (71.5%) of the respondents respectively were junior staff and senior staff. The remaining 25 (18.2%) were senior members.

Table 4.1.5 Marital Status of Respondents

Response	Frequency	Percent
Single	65	47.4
Married	72	52.6
Total	137	100.0

Source: Field survey, 2012

The table above shows that 72 (52.6%) were married men and women while the remaining 65 (47.4%) were single.

The researcher in his bid to find out whether respondents have heard about occupational stress asked, have you heard about occupational stress? Their response is presented below.

4.2 OCCUPATIONAL STRESS AND JOB PERFORMANCE

Table 4.2.1 Have you heard about occupational stress?

Response	Frequency	Percent
Yes	135	98.5
No	2	1.5
Total	137	100.0

Source: Field survey, 2012

It can be seen from the table above that as many as 135(98.5%) of the respondents responded in the affirmative with the remaining 2 (1.5%) responding in the negative. It can be inferred from the above that the respondents will be the rightful people to answer the subsequent questions. Respondents were then asked the medium through which they head the occupational stress. Their response is presented below.

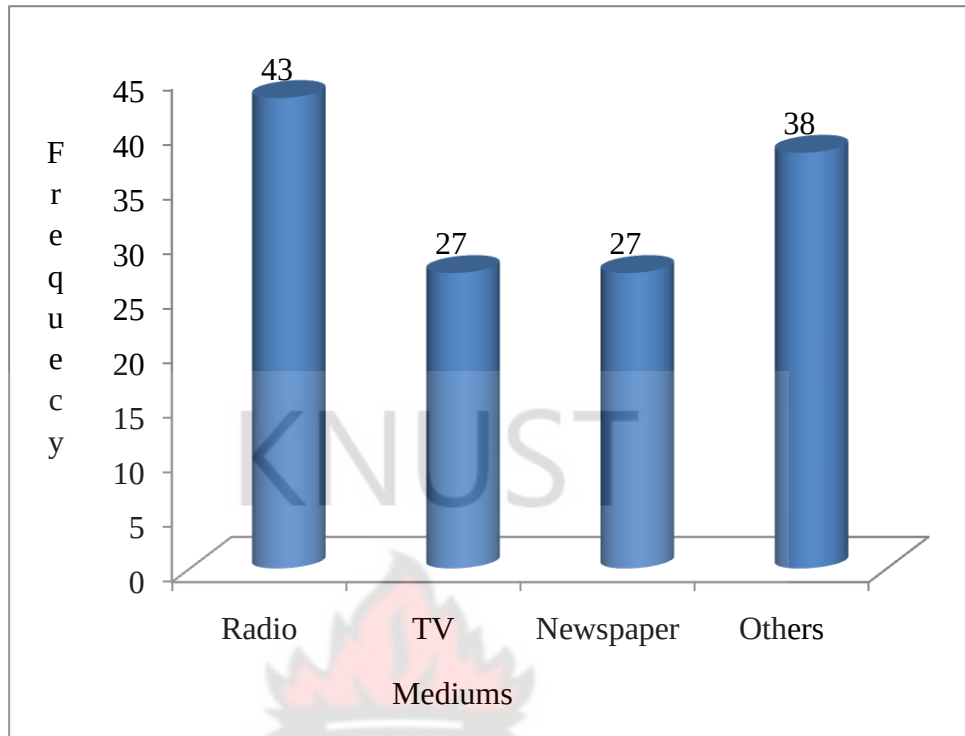


Figure 4.2.2 Which medium of communication did you hear it from?

Source: Field survey, 2012

The figure above shows that 43 (31.9%) and 27 (20.0%) of the respondents respectively mentioned radio and television. Another 27 (20.0%) mentioned newspapers. The remaining 38 (28.1%) mentioned that they read it from books and journals, heard about it at a seminar with some saying it is a combination of all the three above. Respondents were then asked what in their view constitute occupational stress. Their response is presented below.

Table 4.2.3 To you, what constitute Occupational Stress?

Response	Frequency	Percent
Workload	76	55.5
Role overload	28	20.4
Role ambiguity	29	21.2
Other	4	2.9
Total	137	100.0

Source: Field survey, 2012

Table 4.2.3 above indicates that 76 (55.5%) of the respondents mentioned workload as what constitute occupational stress. 29 (21.2%) and 28 (20.4%) of them respectively mentioned role ambiguity and role overload as what in their view constitute occupational stress. The remaining 4 (2.9%) mentioned bad superior and subordinate practices. From the above, it can be concluded that the major constituent of occupational stress is workload.

Table 4.2.4 What do you think are the signals of occupational stress?

Response	Frequency	Percent
Feeling anxious, irritable or depressed	68	26.7%
Apathy, Loss of interest in work	65	25.5%
Problems sleeping, fatigue	50	19.6%
Troubles concentrating	70	27.5%
Others	2	.8%
Total	255	100.0%

Source: Field survey, 2012

The table above shows that out of a total of 255 responses, 70 (27.5%) and 68 (26.7%) respectively went in favour of troubles concentrating and feeling anxious, irritable or depressed as the signals of occupational stress. 65 (25.5%) and 50 (19.6%) responses went in favour of apathy, loss of interest in work and problems sleeping, fatigue as signals of occupational stress.

Table 4.2.5 Have you ever experienced any of the signs of occupational stress?

Response	Frequency	Percent
Yes	115	83.9
No	14	10.2
Don't know	8	5.8
Total	137	100.0

Source: Field survey, 2012

The table above shows that as many as 115 (83.9%) responded in the affirmative when they were asked whether they had ever experienced any sign of occupational stress. 14 (10.2%) of them responded in the negative with the remaining 8 (5.8%) claiming they do not know. Respondents were then asked whether occupational stress can have any effect on ones performance at work.

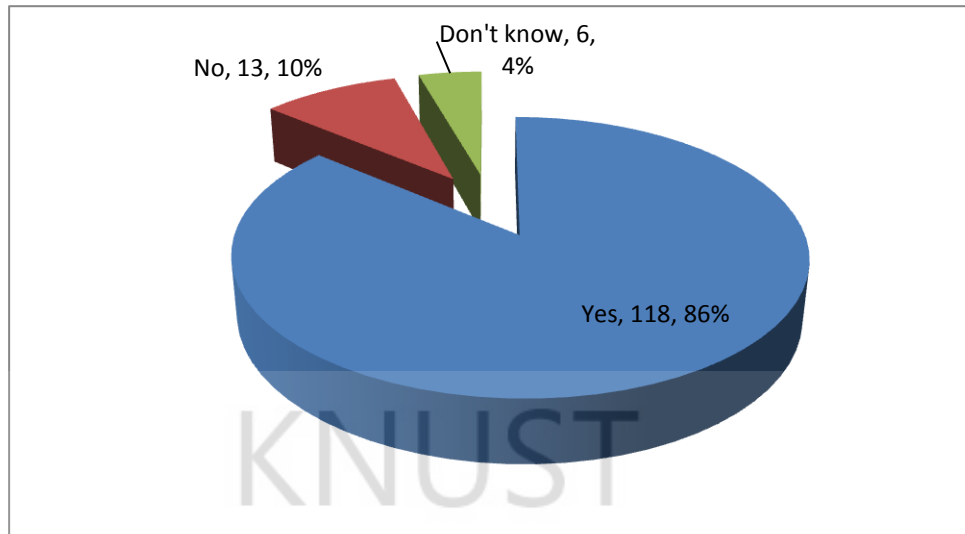


Figure 4.2.6 Does occupational stress has any effect on your performance?

Source: Field survey, 2012

The figure above reports once again that as many as 118 (86.1%) of the respondents were positive in their response that occupational stress can have an effect on ones performance. 13 (9.5%) responded in the negative with the remaining 6 (4.4%) claiming they have no idea. The table below shows the effects that respondents said stress has on them.

Table 4.2.7 What effects did it have on you?

Response	Frequency	Percent
Absenteeism	8	6.8
Reduced productivity	75	63.6
Low morale	29	24.6
Poor work relations	6	5.1
Total	118	100.0

Source: Field survey, 2012

Table 4.8 shows that 75 (63.6%) and 29 (24.6%) of the respondents respectively mentioned reduced productivity and low morale as the effect that they have experienced as a result of stress. 8 (6.8%) and 6 (5.1%) of them respectively also mentioned absenteeism and poor work relations as some effects that stress had on them.

4.3 CONTROL SCALE

Table 4.3.1 How much influence do you have over the availability of supplies and equipment you need to do your work?

Response	Frequency	Percent
Very much	23	16.8
Somewhat	24	17.5
A little	49	35.8
Not at all	41	29.9
Total	137	100.0

Source: Field survey, 2012

The table above shows that 23 (16.8%) and 24 (17.5%) of the respondents respectively claimed that they very much and somewhat have an influence on the availability of supplies and equipments that they need to work with. 49 (35.8%) of the respondents said they have little influence on the availability of supplies and equipments that they need to work with. The remaining 41 (29.9%) claimed they have no influence at all on the availability of supplies and equipments that they need to work with. An inference from the above is that about as about two – thirds of the respondents do not have the necessary influence over the supplies of equipment that they need to carry out their jobs judiciously. This has a effect on their work output which can easily be hamper their productivity. By extension it can be said that most

workers of Koforidua Polytechnic do not have the influence over the supplies of equipments that they need to carry out their day – to – day duties.

Table 4.3.2 How much influence do you have over the order in which you perform tasks at work?

Response	Frequency	Percent
Very much	33	24.1
Somewhat	33	24.1
A little	46	33.6
Not at all	25	18.2
Total	137	100.0

Source: Field survey, 2012

The table above which shows the distribution on the level of influence that the respondents have over the order in which they perform their task indicates that 33 (24.1%) persons each respectively claimed they have a very much and somewhat influence. 46 (33.6%) said they have a little influence with the remaining 25 (18.2%) claiming they have no influence at all. It can be inferred from the above table that most workers of the Polytechnic cannot work in a manner that would seek to relieve them of work-related stress. Thus little flexibility in the way

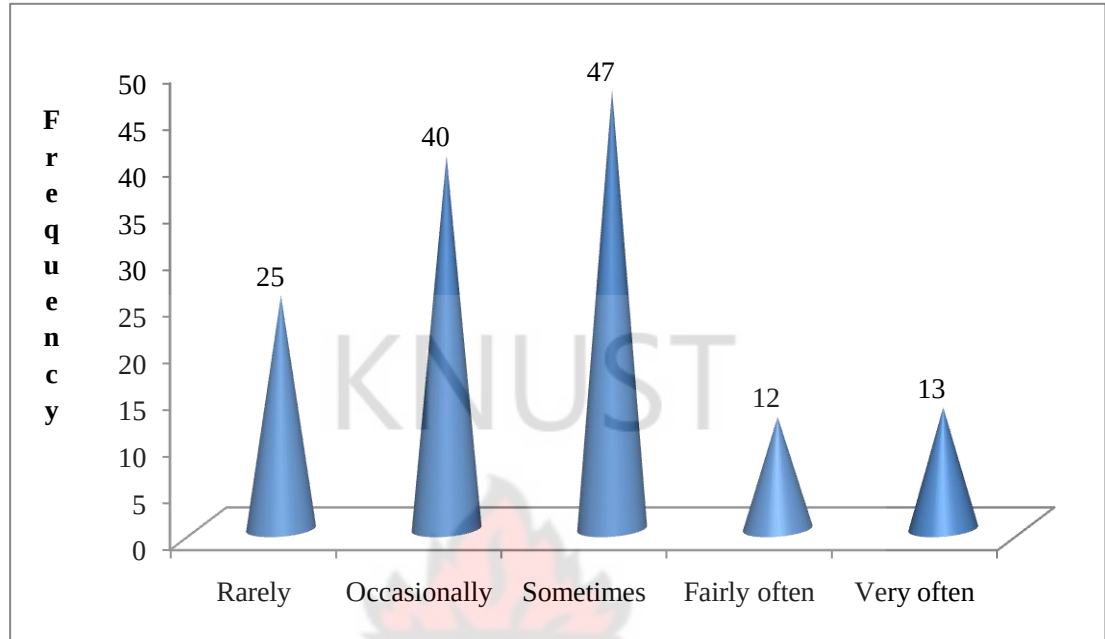


Figure 4.3.3: How often does your job leave you with little time to get things done?

Source: Field survey, 2012

The figure above shows that 25 (18.2%) and 40 (29.2%) of the respondents respectively said the kind of job that they do rarely and occasionally leave them with little time to get things done. Again 47 (34.3%) and 13 (8.8%) of them respectively claimed the nature of their job sometimes and fairly often leave them with little time to get things done. The remaining 13 (9.5%) claimed their job very often leave them with little time to get things done. From the above it can be said that quite a large proportion of the workers of the Polytechnic do not get enough time to get things done. It therefore means that they are always busy doing one thing or the other.

Table 4.3.4 Do you think occupational stress can be minimized?

Response	Frequency	Percent
Yes	133	97.1
No	4	2.9
Total	137	100.0

Source: Field survey, 2012

Table 4.11 shows that as many as 133 (97.1%) of the respondents were of the view that occupational stress can be minimized. The remaining 4 (2.9%) person believed that occupational stress cannot be minimized. An inference from the above is that occupational stress can be minimized. The response of respondents on how occupational stress be minimized is presented below.

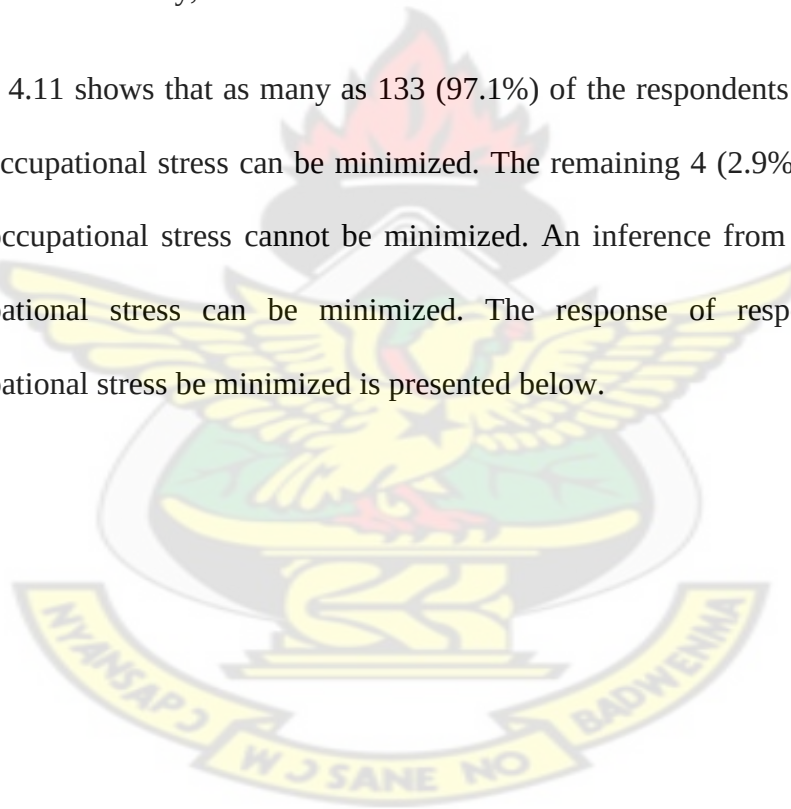


Table 4.3.5 How can occupational stress be minimized?

Response	Frequency	Purpose
Work redesign	34	25.6
Stress Mgt Training	71	53.3
Mgt Development	9	6.8
Organizational Devt	13	9.8
Early detection	6	4.5
Total	133	100.0

Source: Field survey, 2012

The table above reports that 34 (25.6%) and 71 (53.3%) of the respondents said occupational stress in their view respectively can be minimized through work re – designation and stress management training. 9 (6.8%) and 13 (9.8) of the respondents respectively mentioned management development and organizational development. The remaining 6 (4.5%) claimed the best way to use to minimized occupational stress is through early detection. An inference from the above is that the best way to minimized occupational stress is through stress management training.

4.4 SUPPORT SYSTEM

Table 4.4.1 How much does your immediate supervisor go out of his/her way to do things to make work life easier for you?

Response	Frequency	Percent
Very much	48	35.0
Somewhat	43	31.4
A little	40	29.2
Not at all	6	4.4
Total	137	100.0

Source: Field survey, 2012

Table 4.4.1 above shows that 48 (35.0%) and 43 (31.4%) of the respondents respectively said their immediate supervisors very much and somewhat make life easier for them at their work place. 40 (29.2%) claimed their bosses only allow them a little room to make life easier for them with the remaining 6 (4.4%) saying their superiors do not make life easier for them at all. From the above it can be concluded that to a larger extent the superiors of workers of Koforidua Polytechnic in their actions make life easier for their subordinates in their line of work.

Table 4.4.2 How much do other people at work go out of their way to do things to make work life easier for you?

Response	Frequency	Percent
Very much	20	14.6
Somewhat	62	45.3
A little	53	38.7
Not at all	2	1.5
Total	137	100.0

Source: Field survey, 2012

The table above reports that 20 (14.6%) and 62 (45.3%) of the respondents respectively claimed other colleagues in the Polytechnic very much and somewhat make life easier for them in the performance of their job. 53 (38.7%) of them said they receive a little support from their other colleagues in making their work easier with the remaining 2 (1.5%) saying their colleagues staff members do not make their work easier for them. An inference from the above is that once again to a larger extent workers receive support from colleague staff in the course of carrying out their job to make life easier for them.

Table 4.4.3 How much does your spouse, friends and relatives go out of their way to do things to make work life easier for you?

Response	Frequency	Percent
Very much	35	25.5
Somewhat	45	32.8
A little	41	29.9
Not at all	14	10.2
Don't have any such person	2	1.5
Total	137	100.0

Source: Field survey, 2012

Table 4.4.3 shows that 35 (25.5%) and 45 (32.8%) of the respondents respectively claimed that they receive very much and somewhat support from their friends, relatives and spouse in making their work easier. 41 (29.9%) said they receive little support from their spouse, friends and relatives in making their work easier with 14 (10.2%) claiming that they do not receive any support from anybody. The remaining 2 (1.5%) claimed they do not have any friend, spouse or relative to support them to make their work easier.

Table 4.4.4 How much do you think you can rely on your immediate supervisor or boss when things get tough at work?

Response	Frequency	Percent
Very much	26	19.0
Somewhat	36	26.3
A little	65	47.4
Not at all	10	7.3
Total	137	100.0

Source: Field survey, 2012

The table above indicates that 26 (19.0%) and 36 (26.3%) of the respondents respectively claimed that they can very much and somewhat rely on their immediate supervisors when things get tough in terms of carrying out their duties. 65 (47.5%) claimed they can rely on their bosses with only a little confidence when things get tough. 10(7.3%) of them said there is no way their supervisors can be relied upon when things get tough at their work. It can be concluded from the above that to an extent a worker of the Polytechnic can rely on their immediate supervisors when the going gets tough.

Table 4.4.5 How much do you think you can rely on other people at work when things get tough at work?

Response	Frequency	Percent
Very much	19	13.9
Somewhat	41	29.9
A little	67	48.9
Not at all	10	7.3
Total	137	100.0

Source: Field survey, 2012

Table 4.4.5 above which shows the distribution on how respondents believe they can rely on their other colleagues when things get tough reports that 19 (13.9%) and 41 (29.9%) of them respectively said they can very much and somewhat rely on colleague staff members. 67 (48.8%) said they can only have a little reliance on their colleagues staff whiles the remaining 10 (7.3) cannot rely on other colleagues staff when the going gets tough at the work place.

Table 4.4.6 How much do you think you can rely on spouse, friends and relatives when things get tough at work?

Response	Frequency	Percent
Very much	40	29.2
Somewhat	23	16.8
A little	44	32.1
Not at all	30	21.9
Total	137	100.0

Source: Field survey, 2012

Table 4.4.6 shows that 40 (29.2%) and 23 (16.8%) of the respondents respectively said they can very much and somewhat rely on their spouses, friends and relatives when things get tough at work. 44 (32.1%) said a little support can be received from spouses, friends and relatives when things get tough at work. 30 (21.9%) claimed there is no way their spouses, friends and relatives can be relied upon when things get tough at work.

4.5 OCCUPATIONAL STRESS AND HEALTH

Table 4.5.1 Do you think your work can affect your health?

Response	Frequency	Percent
Yes	122	89.1
No	15	10.9
Total	137	100.0

Source: Field survey, 2012

The table above shows that as many as 122 (89.1%) of the respondents say their work can affect their health. The remaining 15 (10.9%) were negative in this response to whether their work can affect their health. An inference from the above is that majority of the workers are undertaking stressful work schedule which affects their health. Respondents were then asked how the stress affects their health. Their response is presented below.

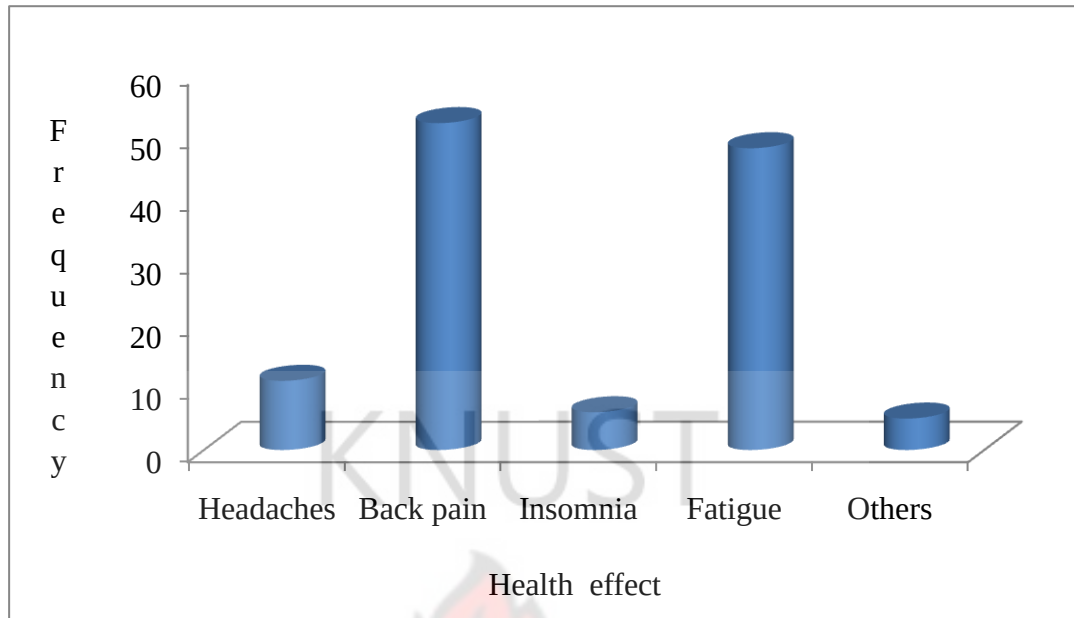


Figure 4.5.2: How does your work affect your health?

Source: Field survey, 2012

The figure above shows that 11 (9.0%) and 52 (42.6%) of the respondents respectively claimed they suffer headaches and back pain. 6 (4.9%) and 48 (39.3%) of them respectively claimed that the resultant effect of the stress that they go through caused them to suffer insomnia and fatigue. The remaining 5 (4.1%) mentioned migraine amongst others as the effect of stress on them. A conclusion from the above is that the two (2) main resultants effects on stress on the individuals are back pain and fatigue.

Table 4.5.3 Do you know that occupational stress can cause cardiovascular diseases as hypertension?

Response	Frequency	Percent
Yes	121	88.3
No	16	11.7
Total	137	100.0

Source: Field survey, 2012

Table 4.5.3 shows that 121 (88.3%) of the respondents claimed they were aware of that occupational stress can cause hypertension which is a cardiovascular disease. The remaining 16 (11.7%) said they did not know that stress can cause a cardiovascular disease such as hypertension. Respondents were further asked whether respondents were aware of the fact that exposure to stressors for a long time can cause chronic health problems such as immune system dysfunction. Their response is presented below.

Table 4.5.4 Did you know that exposure to stressors for a long time can cause chronic health problems such as immune system dysfunction?

Response	Frequency	Percent
Yes	96	70.1
No	41	29.9
Total	137	100.0

Source: Field survey, 2012

The table above shows that 96 (70.1%) of the respondents responded in the affirmative while the remaining 41 (29.9%) were negative about it. An inference from the above is that to a larger extent, respondents or the workers of the Polytechnic are aware that exposure to stressors for a long time can cause chronic health problems such as immune system dysfunction.

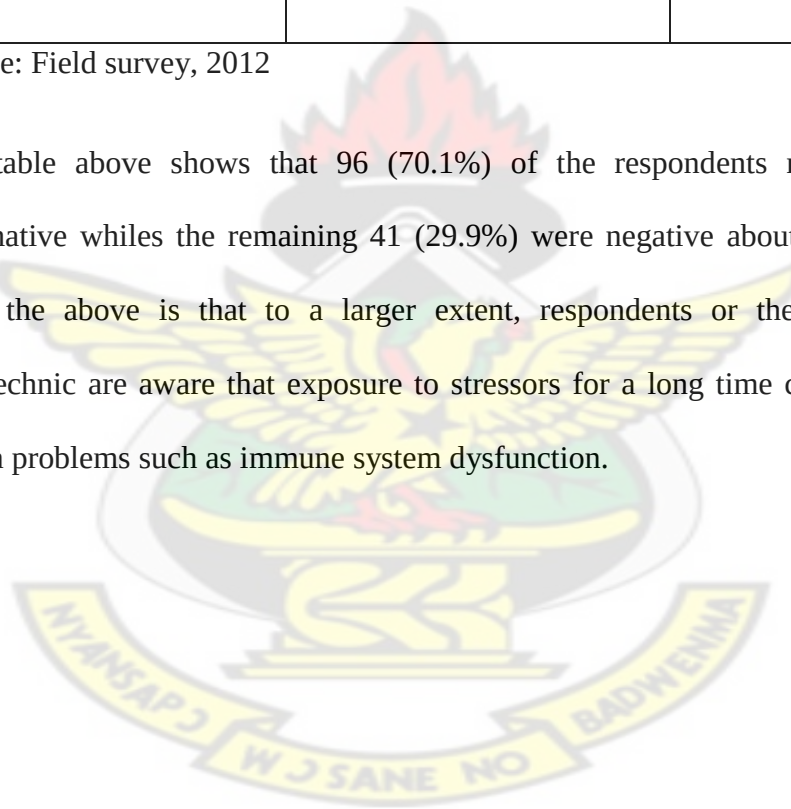


Table 4.5.5 Do you know that persons going through stress may resort to substance and alcohol abuse?

Response	Frequency	Percent
Yes	120	87.6
No	17	12.4
Total	137	100.0

Source: Field survey, 2012

Table 4.5.5 indicates that as many as 120 (87.6%) of the respondents were aware that persons going through stress are possible candidates for the use of substances and alcohol use. The remaining 17 (12.4%) responded in the negative when they were asked whether they were aware that that persons going through stress may resort to substance and alcohol abuse.

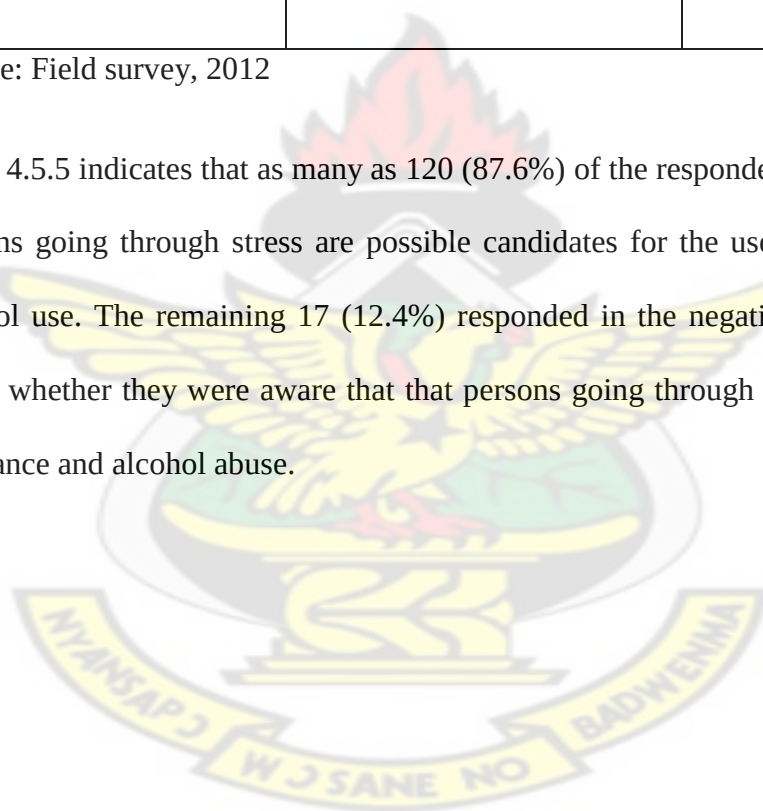


Table 4.5.6 How do you perceive that the cause of an illness in the past could be as a result of work stress?

Response	Frequency	Percent
Very high	8	5.8
High	50	36.5
Average	69	50.4
Low	2	1.5
Very low	8	5.8
Total	137	100.0

Source: Field survey, 2012

The table above shows that 8 (5.8%) and 50 (36.5%) of the respondents respectively were of the view that there is a very high and high possibility that an illness in their past can be as a result of work stress. 69 (50.4%) of them were of the view that averagely an illness of an individual currently can be as a result of past work stress. 2 (1.5%) and 8 (5.8%) of the remaining respondents were of the opinion that there is a low and very low possibility that an illness that an individual is currently going through can be as a result of their past work stress.

CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATIONS

5.0 INTRODUCTION

This chapter summarizes the entire study; the findings of the study, recommendations by the researcher, limitations encountered and directions for future research.

5.1 SUMMARY OF FINDINGS

The principal purpose of the study was to investigate occupational stress and its effects on job performance. The literature reinforced the need for the present study.

The study demonstrates support for the objectives of the study and further indicates an inverse relationship between occupational stress and job performance. The results agree with those of the studies conducted by Jamal M. (1984) Stress and Job Performance Controversy: an empirical assessment; 33:1-21 and Hsiow-Ling (2004) Work stress and Job Performance in the hi-tech industry: A closer view of vocational education. 3(1):147-50.

5.2 CONCLUSIONS

Based on the analyses of the data, the following conclusions were drawn:

The profile of the majority of respondents were males (57.7%) with the remaining (42.3%) being females. The age groups falls within the age range of 24-34 and majority of respondents fell below the age of forty-five (45) years.

Workload was identified as the major component of occupational stress to respondents as it chalked (55.5%). It was also realized that troubles concentrating on the job was a signal to respondents that they were under stress. It was noted that

(83.9%) had experienced some of the signs of stress and (86%) report that occupational stress has affected their performance. Finally, it was observed that (63.6%) of respondents experience reduced productivity as a result of occupational stress.

An overwhelming 97% of respondents were of the view that occupational stress can be minimized. They suggested that Stress management training (53.3%) should be instituted to help minimize the effects of work related stress as it will enhance productivity. Most respondents submitted that their jobs sometimes (34.3%) have to work under pressure.

Participants were satisfied with the support they receive from their immediate supervisors with a response rate of (35%) as a result of supervisors making life easier for them at their work places. On the contrary, it was revealed by a (47.4%) that members of staff in tough times receive minimum support from their supervisors. This is very critical in reducing job stress in times of troubles as such these are times when workers would need some form of support from their superiors to help manage some of their stressors.

An overwhelming (89.1%) of respondents were aware that job stress can affect their health negatively as most of the respondents observed that they could contract a cardiovascular disease as a result of job stress. It was noted that workers who experience job stress manifested in the form of back pain and fatigue which scored 42.6% and 39.3% respectively. Drawing from the consequences of the results, it could be concluded members of staff of Koforidua Polytechnic mainly experience back pain and fatigue which could grow in other health implications leading to low

output of those affected.

In summary, the results of the study indicate that there is a negative relationship between job stress and job performance. Those workers who had high level of job stress had low job performance. All the factors contributing to job stress affected all the categories of staff of Koforidua Polytechnic.

5.3 RECOMMENDATIONS

Based on the findings above the following recommendations have been made:

Koforidua Polytechnic has a working population which is youthful and therefore could be very competitive in the provision of quality tertiary education by adopting a well-designed, organized and managed work helps to maintain and promote individual well-being.

Since the job related stress from lack of support from supervisors in tough times and workload conflict was high among workers, the Polytechnic administration should pay attention to solve these issues. Lack of resources such as inadequate staff and lack of equipment must be advocated by the heads of the department or sections for the benefit of the staff.

Performance is hindered by stress because the individual faces signals of stress which affects their productivity. Therefore, increasing formal organizational communication with employees reduces stress by lessening the role ambiguity. Open communication has an advantage of resolving conflicts between supervisors and subordinates. Lack of effective communication could cause unresolved conflicts that increase stress level.

Support from supervisors and colleagues are a major factor in reducing stress. Supervisors need to recognize the good work and outstanding contributions of employees in challenging times to keep them motivated. Promoting a culture of support will set the example and it will make them realize that co-worker support is very important.

Correct stress management should be incorporated into the fabric of the Polytechnic administration to improve the health of workers and intrapersonal relationships. An individual needs to maintain good level of personal health. The prevention and management of workplace stress requires organizational level interventions, because it is often the organizations that create the stress. A culture of openness and understanding, rather than of criticism, is essential.

5.4 SUGGESTIONS FOR FURTHER STUDIES

Occupational stress is an integral part of life. Hence, further study can be undertaken to devise effective programmes to reduce work stress in which the present study remains inadequate. This study was limited to Koforidua Polytechnic. However, studies can be conducted to provide useful insight into the patterns of stress levels among various occupations. This study was based on occupational stress and its effects on job performance of Koforidua Polytechnic staff. Useful studies can be conducted by making similar comparisons among intra-professional groups such as that of elementary and high school teachers or between private and government employed professionals and employees.

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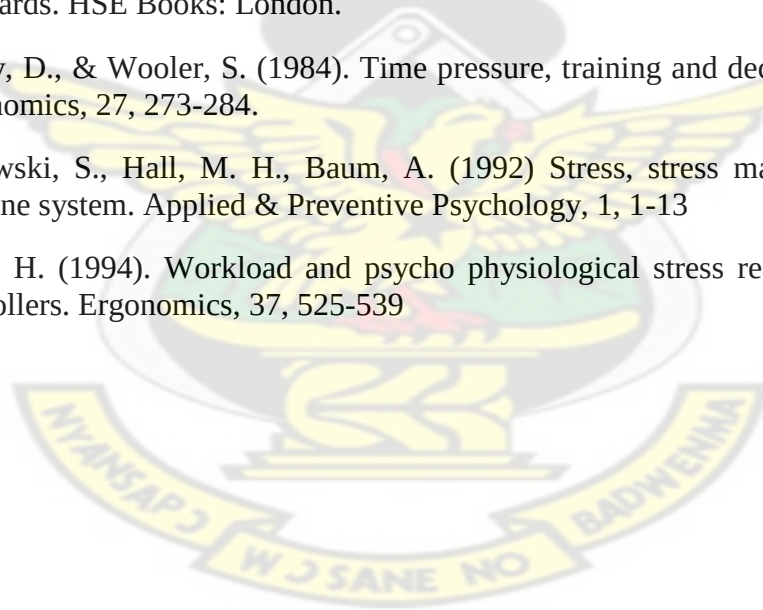
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KWAME NKRUMAH UNIVERSITY OF SCIENCE AND

TECHNOLOGY – KUMASI

COMMONWEALTH EXECUTIVE MASTERS OF BUSINESS ADMINISTRATION

QUESTIONNAIRE

This survey is to assess occupational stress and its effects on job performance. You have been randomly selected to take part in the research. I shall be grateful if you could spare a few minutes to answer the questions that follow. Please do not write your name. Be assured also that your identity would be fully protected.

HOW TO COMPLETE THE QUESTIONNAIRE

Once you have the questionnaire, please read the statements in each section and answer by ticking (✓) the response that best reflects your opinion.

- Do complete the questionnaire quickly- it should take about 10 minutes
- Do not spend too much time on each question- your immediate response is normally the most valuable.

Section 1: Personal Information on Respondents

1. Gender: Male [] Female []
2. How old are you? (i) 15 – 24 [] (ii) 25 – 34 [] (iii) 35 – 44 [] (iv) 45 – 54 []
(v) 55 and above []
3. Level of Education: (i) MSLC/JHS [] (ii) 'O' Level/SSSCE/WASSCE []
(iii) A' Level [] (iv) Diploma [] (v) Graduate []
(vi) Post Graduate [] (vii) None [] (viii) Other Specify
4. Position/Rank: (i) Academic Staff [] (ii) Administrative Staff []
5. Status: (i) Junior Staff [] (ii) Senior Staff [] (iii) Senior Member []
6. Marital Status: (i) Single [] (ii) Married []

Section 2: Stress and its Effects on Performance

7. Have you heard about occupational stress? (i) Yes [] (ii) No []
8. Which medium of communication did you hear it from?
(i) Radio [] (ii) TV [] (iii) News Papers []
(iv) Other(s) Specify.....
9. To you, what constitute Occupational Stress?
(i) Workload [] (ii) Role Overload [] (iii) Role Ambiguity []
(iv) Role Insufficiency [] (v) Other (s)
10. What do you think are the signals of occupational stress? You can provide multiple answers.
- (i) Feeling anxious, irritable or depressed []
- (ii) Apathy, Loss of interest in work []
- (iii) Problems sleeping, Fatigue []
- (iv) Trouble concentrating []
- (v) Other (s)
11. Have you ever experienced any of the signs of occupational stress?
(i) Yes [] (ii) No [] (iii) Don't know []
12. Does occupational stress have any effect on your performance?
(i) Yes [] (ii) No [] (iii) Don't know []
13. If you answered **yes** to the above what effects did it have on you?
(i) Absenteeism [] (ii) Reduced productivity [] (iii) Low morale []
(iv) Poor work relations (v) Other (s)

Section 3: Control Scale

14. How much influence do you have over the availability of supplies and equipment you need to do your work?
(i) Very Much [] (ii) Some-What [] (iii) A little [] (iv) Not At All []
(v) Don't Know []
15. How much influence do you have over the order in which you perform tasks at work?
(i) Very Much [] (ii) Some-What [] (iii) A little [] (iv) Not At All []
(v) Don't Know []
16. How often does your job leave you with little time to get things done?
(i) Rarely [] (ii) Occasionally [] (iii) Sometimes []
(iv) Fairly Often [] (v) Very Often []
17. Do you think occupational stress can be minimised? Yes [] No []
18. If you answered yes to the above, how?
(i) Work Redesign [] (ii) Stress Management Training []
(iii) Management Development [] (iv) Organisational Development []
(v) Early detection []
19. In what way(s) do you think occupational stress could be minimized?
(i)
(ii)
(iii)
(iv)

Section 4: Support System

How much does each of these people go out of their way to do things to make your work life easier for you?

20. Your immediate supervisor (boss)
(i) Very Much [] (ii) Some-What [] (iii) A Little []
(iv) Not At All [] (v) Don't have Any Such Person []
21. Other people at work
(i) Very Much [] (ii) Some-What [] (iii) A Little []
(iv) Not At All [] (v) Don't have Any Such Person []

22. Your spouse, friends and relatives
(i) Very Much [] (ii) Some-What [] (iii) A Little []
(iv) Not At All [] (v) Don't have Any Such Person []

How much can each of these people be relied on when things get tough at work?

23. Your immediate supervisor (boss)
(i) Very Much [] (ii) Some-What [] (iii) A Little []
(iv) Not At All [] (v) Don't have Any Such Person []
24. Other people at work
(i) Very Much [] (ii) Some-What [] (iii) A Little []
(iv) Not At All [] (v) Don't have Any Such Person []

25. Your spouse, friends and relatives
(i) Very Much [] (ii) Some-What [] (iii) A Little []
(iv) Not At All [] (v) Don't have Any Such Person []

Section 5: Stress and Health

26. Do you think your work can affect your health? (i) Yes [] (ii) No []
27. If you answered yes to the above how does your work affect your health?
(i) Headaches [] (ii) Back Pain [] (iii) Insomnia [] (iv) Fatigue []
(v) Other (s)
28. Do you know that occupational stress can cause cardiovascular diseases such as hypertension? (i) Yes [] (ii) No []
29. Did you know that exposure to stressors for a long time can cause chronic health problems such as immune system dysfunction? (i) Yes [] (ii) No []
30. Do you know that persons going through stress may resort to substance and alcohol abuse? (i) Yes [] (ii) No []
31. How do you perceive that the cause of an illness in the past could be as a result of work stress?
(i) Very high [] (ii) High [] (iii) Average [] (iv) Low [] (v) Very Low []

32. To what extent do you think occupational stress has had any effect on your health?
- (i)
 - (ii)
 - (iii)
 - (iv)

Thank you.

KNUST

