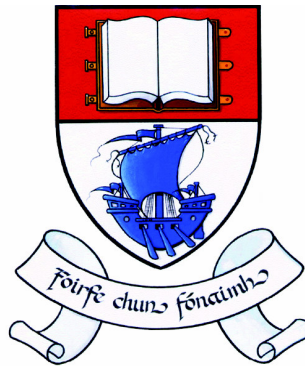


**An Empirical Analysis of the Interrelationship  
between Motivation and Stress in the Computing  
Industry**



**Waterford Institute of Technology**

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**Thesis submitted in fulfilment of the requirement  
for the Degree of Master of Arts by Research**

**Research Supervisor: Dr. Fiona Nutty**

**Submitted to Waterford Institute of Technology**

**October 2007**

## **Declaration**

I Maitiú Ó Cuirrín, declare that this thesis is submitted by me in partial fulfilment of the requirement for the degree of Master of Art is entirely my own work except where otherwise accredited. It has not at any time either whole or in part been submitted for any other educational award.

Signature: \_\_\_\_\_

Maitiú Ó Cuirrín

October, 2007.

## **Abstract**

Although a great body of literature exists on the concepts of motivation and stress, no such study has examined the interrelationship between them. The objectives of this thesis are thus, to investigate the factors that motivate/demotivate and cause stress among recently employed computing graduates, as well as examining the implications of these factors both individually and interdependently for both the computing graduate and their employing organisation.

An empirical quantitative approach of employee questionnaires (n=330) was used to assess the interrelationship between these concepts from the employees' perspective. Nine dimensions (job security, social relationships, fiscal equity, skill variety, autonomy, advancement, recognition, task identity and feedback) were created in order to assess, both motivation and stress. T Tests, Analysis of Variance (ANOVA) and Tukey's Honestly Significant Difference test (HSD) were undertaken to determine if any of the demographic variables were significantly related to either employee motivation or stress. A bivariate regression approach was utilised to assess the interrelationship between these concepts using the above nine dimensions. A semi-structured interview schedule was utilised to determine three managers' perceptions of whether these nine dimensions are a motivator/demotivator or a cause of stress for employees.

The employee results indicated that seven of the dimensions were significantly related (either positively or negatively) for the sources of motivation and the sources/levels of stress. The results also demonstrated that management were unaware of the factors that were a cause of motivation and stress for their computing subordinates.

Thus, employers by thwarting the motivation needs of their employees, inadvertently or otherwise, may find that their employees experience significant increases in stress, with resulting individual and organisational consequences. That is, the employing organisation faces increased expenditure and reduced productivity to counter their employees' higher stress levels and lowered motivation, while the employees' physiological, psychological and behavioural wellbeing suffers.

In conclusion employers and management need to be aware that any attempt at increasing motivation and decreasing stress should consider the impact of the interrelationship between the two variables, thus facilitating a more productive and satisfactory employment relationship for both the information technology graduate employee and employer.

## **Acknowledgements**

I would like to thank my supervisor Dr. Fiona Nutty for her guidance and encouragement and without whose enthusiasm I am sure I would not have embarked upon this research project.

I would also like to thank the following people for their invaluable contributions:

Dr. Jim Stack for his recommendations, proof reading and SPSS assistance,

Dr. Ben Nutty for his invaluable help with chapter three,

To all those who took the time to fill in the employee questionnaire and to

Thomas, Sinead and Maria for participating in the interview schedule.

I would also like to thank my family and friends for all their words of encouragement and support throughout this research.

Finally, and most importantly, I dedicate this thesis to my parents Thomas and Eileen who have always supported and encouraged me in my educational pursuits.

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# **Chapter One**

## **Research Rationale and Contributions**

### Introduction

The aims of this research study are to identify and describe the factors that motivate and demotivate recently employed computing graduates, and to examine the implications of these motivational and demotivational factors for both the computing graduates and their employing organisation. Similarly, the factors that create stress for recently employed computing graduates will be identified and described, as well as examining the implications of these stress factors for both the computing graduate and their organisation. Finally, the interrelationship between motivation and stress will be examined, as well as the consequences of this interrelationship for both parties to the employment relationship.

### Research Rationale and Contributions

Graduates are important members of the organisation. When entering their chosen profession for the first time, they bring with them knowledge of the latest practices in their field, and an enthusiasm to climb the corporate ladder quickly. Most reports however claim that this enthusiasm soon diminishes as graduates begin to realise their place within the company's echelons. Mortimer and Lorence (1979) studied male students from graduation up to ten years into their working lives. They found that work autonomy had positive effects on people oriented value – that is, a desire to work with people over objects – and on intrinsic occupational values – a desire to express one's abilities and skills and to be creative. Thus allowing individuals to realise their full abilities, particularly in the early stages of their career, is vital. The importance of task identity and task significance was reported in a study conducted on engineers, scientists and managers by Brousseau (1978). Their findings referred to the significance of the first year of employment for graduates and provided support to the idea of the "*critical first year*" proposed by Hall (1971). Hall stressed the importance of providing a job with autonomy and challenge in a graduate's first year

in order to sustain performance and commitment in later career. A graduate's experience of work is vital. It will in no doubt determine whether they will leave the organisation, as well as affecting their performance level and commitment, and help in the understanding of behaviours such as productivity, absenteeism and turnover.

Clearly the implications for organisations are significant, thus an understanding of the causes and consequences of motivation and stress in the first five years after graduation should help organisations better understand the needs of their graduates, thus enabling them to attract, retain and motivate their new employees. From the employer's perspective, identifying the factors that motivate and manage stress will enable the new employee to perform to the best of their ability and may help in increasing work related attitudes, such as job involvement, job satisfaction and organisational commitment.

### Motivation

The subject of motivation has generated considerable debate among theorists, with much focus placed on increasing the motivation of employees, with the aim of realising higher productivity. The Hawthorne studies are widely believed to have stimulated the interest in work motivation among organisational life scientists. Although a highly publicised topic, the intensity of discussion on the subject has somewhat fluctuated throughout its history, of which it could be argued that the development and implementation of ineluctable theories are to a certain extent accountable. That being said, the majority of motivation theories have in some way contributed to the arena of motivation research.

The lack of agreement on a singular definition for the concept of motivation among theorists can be seen in the immeasurable number of proposed definitions and accompanying theories. Pinder (1998) argued that the difficulty associated with defining motivation may be, in part, due to the "*many philosophical orientations towards the nature of human beings and about what can be known about people*" (Pinder, 1998, p. 11). In fact, Dewsbury (1978) has argued that the term defies definition. To illustrate the extent of proposed definitions, Kleinginna and

Kleinginna (1981) had, in the early eighties, identified approximately 140 attempts to define the term.

The definition adopted will be determined by the discipline of the researcher, the direction of the research and the research questions they ask. Locke and Latham (2004), however, stated that the term is not always clearly used. That is, they noted that both the Organisational Behaviour literature and Industrial/Organisational Psychology literature use the term when referring to either job satisfaction or the motivation to perform, even though satisfaction versus choice, effort and persistence are not the same phenomena, do not necessarily have the same causes or effects and may not affect one another. Locke and Latham (2004) stated that when new definitions of motivation are provided, they may be “*riddled with excess verbiage or nonessentials*,” thus the failure to define the term in a valid manner “*stifles cognitive clarity and, therefore, progress in the field of work motivation*” (Locke and Latham, 2004, p. 400).

Although definitional issues remain, some argue that a majority consensus (Morley, Moore, Hearty and Gunnigle, 1998; Pinder, 1998; Wiley, 1997) can be reached by agreeing that motivation is a set of processes that stimulate, guide and sustain human behaviour towards accomplishing some goal. Thus, motivation is not a fixed state, but rather a dynamic internal state resulting from the influence of personal and environmental factors. These changes in personal and social factors affect the motivation level of employees.

Two renowned definitions are those of Bartol and Martin (1998) who define motivation as the force that energises behaviour, gives direction to behaviour, and underlies the tendency to persist, and Greenberg and Baron (1997) who define motivation as the set of processes that arouse, direct and maintain human behaviour toward attaining some goal. Aside from slight differences, both of these definitions fall along similar lines. That is, the initial arousal or energising of behaviour toward attaining a particular goal, followed by the actions one undertakes in order to achieve the goal, and finally, the persistence of behaviour until the goal is attained.

Pinder (1998) has provided a definition of motivation that accommodates the different theoretical perspectives that have been brought to bear in the explanation of work motivation. He defined work motivation as “*a set of energetic forces that originate both within as well as beyond an individual’s being, to initiate work-related behaviour, and to determine its form, direction, intensity, and duration*” (Pinder, 1998, p. 11). Two noteworthy features of his definition warrant further discussion. Firstly, motivation is identified as an energising force, and it is this energising force that induces action in employees. Secondly, this energising force has implications, be it positive or negative, for the form, direction, intensity and duration of an employee’s behaviour; that is, it explains what it is employees are motivated to accomplish, how they go about achieving those accomplishments and when they will stop. As this definition is seen to address a variety of antecedent motivational aspects, it is this definition that will be adopted for the current research.

Work motivation is a highly complex phenomenon, and one that affects and is affected by a multitude of factors in the work milieu. Steers, Porter and Bigley (1996) stated that a comprehensive understanding of the ways in which an organisation operates requires that at least some attention be directed towards the question of why people behave as they do on the job. That is, an understanding of the determinants of employees’ behaviour in their work environment, and the ramifications of such behaviour for organisations is essential to understanding the ways in which organisations operate.

Thus, the concept of work motivation is used when attempting to determine the effects of variations in organisational factors, such as reward systems, and on important dependent variables, such as organisational performance. A comprehension of the concept of motivation is essential for such situations. For example, Steers *et al.* (1996) commented that motivation can be used to predict the effects of a change in financial rewards on an employee’s productivity level. It becomes evident that in the absence of motivation, this relationship would be difficult to specify.

This research will continue to investigate the motivation phenomenon, through a comprehensive review of historical and predominant theories. None are without

criticism, nor are they universally regarded as theoretical frameworks of motivation, yet they all make meaningful contributions to the understanding of the motivation process. Such are their contributions that Locke (1991, 1997) stated that each of the different theoretical orientations offer a unique perspective on the concept.

An extensive review of the motivation literature reveals a plethora of investigations on work related motivation, yet to date there remain few investigations of the concept of work motivation in the computing industry, while no research to date has been conducted on the relationship between motivation and stress in this crucial Irish industrial sector. This is a particularly glaring and fundamental gap in the knowledge base and this research aims to close this gap in the literature.

### Stress

Stress is an important concept in organisational settings, and one that has received considerable attention of late, with ever-increasing numbers of employees, at all levels in the organisation, reporting stress-related illnesses. The term stress appeared in the index of psychological abstracts in 1944 (Lazarus and Folkman, 1984). It derives from the Latin word *stringere*, which means to “draw tight” (Cox, 1978). Many argue (Cox, 1978; Furnham, 2006; LeFevre, Kolt, and Matheny, 2006) however that the term is elusive due to its poor definition. Pollock (1988) argued that the term, while in use throughout the nineteenth century, has come to prominence only in the last few decades. Newtown (1995) and Furnham (2006) however, disagree, believing that the term dates back to the sixteenth and seventeenth centuries. Despite the volume of research the topic has generated, to date no single definition has been agreed upon, yet the term is familiar to both non-professionals and professionals alike. In fact, as Dabney (1998) noted, the word stress has become an umbrella term to convey a universally understood meaning. However, when a far more precise definition of the term is required, definitional issues begin to arise. Thus, there remains no general consensus regarding the meaning of the term, with a tendency for definitions to reflect the bias of the particular researcher (Dabney, 1998).

Some researchers define the term as a dependent variable (response), while others define it as an independent variable (stimulus) (Cox, 1978). According to Nutty (2006), the broad application of the stress concept in medical, behavioural and social science research has compounded this confusion over its terminology. Like that of motivation, the definition of stress determines the direction of the research, thus some researchers have focused on the physiological changes produced by stress, while others have investigated the relationship between the individual and the environment. Dabney (1998) noted that in recent years the stress concept has evolved more into an approach that takes into account this relationship between the individual and his/her environment. Such approaches are referred to as “*interactive*” or “*transactional*.” Many researchers agree that stress should no longer be defined in terms of stimulus or response based models, but in terms of an interactional or transactional process which integrates stimulus and response definitions within an overall conceptual framework that acknowledges the dynamic linkages between all elements of the stress process. Yet it must be noted that empirical research often adopts definitions that emphasise a particular part of the stress process rather than the nature of the process itself. These models have become increasingly sophisticated, incorporating cognitive appraisal as an important element in the perception of stress.

In addition to the definitional problems associated with stress, LeFevre *et al.* (2006) noted that the terminology used in the reporting of stress research is both confusing and inconsistent. They believed that the terms “*stress*” and “*strain*” are now often used rather than the earlier terms “*stressor*” and “*strains*” to denote environmental forces and the individual’s responses. Adding to this confusion, LeFevre, Matheny and Kolt (2003) believe that a semantic shift has occurred, whereby stress has become synonymous with distress, thus leaving researchers destitute of any term to use for those responses to the pressures of life and work that are positive or adaptive.

The following definitions of stress reflect the different perspectives, such as the medical view defining stress as “*reactions of the animal body to forces of a deleterious nature, infections, and various abnormal states that tend to disturb homeostasis,*” the physics view of a “*resisting force set up in a body as a result of an externally applied force*” and finally the psychological view as “*a physical or psychological stimulus which, when impinging on an individual, produces strain or*

*disequilibrium.*” Newtown (1995), however, stated that defining stress should not merely be an exercise in semantics, but should capture the essence of the stress experience, rather than simply reflect rhetoric. Therefore, Nutty (2006) defined stress as “*a psychological state which is part of and reflects a wider process of interaction between individuals and their environment*” (Nutty, 2006, p. 22). As this definition of stress allows for the interaction of both the stimulus and response within the “stress” concept, it will be utilised as the definition of stress throughout the rest of this thesis. Although the definitional issues of stress remain, it is clear that consensus on a singular definition has not yet been reached, with Leventhal and Tomarken (1987) noting that more and more researchers are accepting that, at the general level, the term serves to label a vast research domain that explores the role of biographical, social and psychological variables in promoting susceptibility to physical or mental disorders.

Overwhelming evidence (Christenfeld and Black, 1977; Comstock and Slome, 1973; Estes, 1973; Head, Hill and Maguire, 1996; Jemmott and Locke, 1984; Mechanic and Greenley, 1976; Surtees and Ingham, 1980; Tyrrell, 1992; Westman and Eden, 1992) exists demonstrating that stress can adversely affect psychological well-being, physical and mental health and performance. Thus, a comprehensive review of the predominant models of stress is instrumental to understanding the stress process, and how it is that stress affects psychological well-being and mental health, as well as the performance of employees in organisational contexts.

### Aims and Objectives

The current investigation aims to determine the relationship between motivation and stress in the computing industry. Initial reports on this relationship suggest that motivation can be particularly difficult during times of high demand (Dabney, 1998). Although stress, in some circumstances, can motivate, for the most part if it is excessive or prolonged it is viewed as damaging and dysfunctional not only for the individual employee, but for the employing organisation as well. Specifically the research will set out:



- 1) To identify and describe the factors that motivate and demotivate recently employed computing graduates.
- 2) To examine the implications of these motivational and demotivational factors/levels for both the computing graduate and their employing organisation.
- 3) To identify and describe the factors that create stress among recently employed computing graduates.
- 4) To examine the implications of these stress factors/levels for both the computing graduate and their employing organisation.
- 5) To examine the interrelationships between motivation and stress for both parties to the employment relationship.
- 6) To examine the consequences of this interrelationship for both parties to the employment relationship.

This research will focus on identifying the factors that cause motivation and stress for computing graduates and the implications of these factors for both the computing graduates and their employing organisation. This research aims to fill a gap in the knowledge and given the lack of published information about the interrelationship between motivation and stress in the computing industry, the current investigation is seen as both exploratory as well as descriptive.

### Summary and Conclusion

In summary, no study so far has attempted to either quantitatively or qualitatively investigate the interrelationship between employee motivation and stress in the computing industry, it is therefore imperative that this research is carried out so that both employees and employers will have the benefit of a knowledge base that currently does not exist thus enabling them to construct an employment relationship which is seen as beneficial and desirable for both parties.

The next chapter reviews the literature relating to motivation by examining the motivation concept through critically discussing and evaluating seven of the most theoretically and historically important content and process theories of motivation.

## **Chapter Two**

### **Employee Motivation: A review of the theories**

#### Introduction

This chapter reviews the historical and theoretical development of the motivational concept as well as discussing the significance of both previous and contemporary theories of motivation. Motivation is a pivotal element in the treatment of organisational behaviour, and one that has received extensive empirical research attention. Many theories abound, from the classic “*hierarchy of needs*” theory proposed by Abraham Maslow (1943), to the network of expectancies and outcomes outlined by expectancy theorists. It is widely believed that the results of the Hawthorne studies initiated this interest in the concept of motivation. A plethora of theories followed from the publication of the Hawthorne studies, all of which provided contributions to the understanding of the process of motivation. These theories however failed to provide any universally recognised unified approach to the concept. Theorists such as Meyer, Becker and Vandenberghe (2004) have noted that each of these subsequent theories offered a unique angle on the motivation concept and when combined could provide a general motivation model. A theoretical divide between content and process theories can be noted in the motivational literature. Content theories of motivation focus on the importance of work itself, while the process theories focus on factors that determine employees’ persistence or willingness in work environments. A discussion of the concept of intrinsic and extrinsic motivation is provided before both the content and process theories of motivation, along with the significant theories in each approach, are discussed.

#### Computing Industry Defined

Given that the present study aims to examine the relationship between employee motivation and stress in the computing industry, it is essential that a definition of the computing industry is provided which will be in use throughout the present study. The computing industry is a collective term used to describe the whole range of

businesses involved in developing computer software, designing computer hardware and computer networking infrastructures, the manufacture of computer components and the provision of information technology services.

### Intrinsic/Extrinsic Motivation

Wiersma (1992) stated that the concept of intrinsic motivation, although not always easy to define in practice (Deyer and Parker, 1975), is embedded in many of the major theories of work motivation. Maslow (1943) wrote of the need to fulfil one's potentialities and called it self-actualisation, while Alderfer's (1972) growth needs describe a person's need to investigate, explore and master his or her environment. McClelland's (1961) achievement motivation theory also stressed the importance of an internal desire to succeed at challenging tasks and to seek responsibility. Similar themes can be found in the writings of Herzberg (1966). Wiersma (1992) noted that a common assumption amongst these theories is the individual's need to feel competent. One definition of intrinsic motivation frequently used in the literature states that a *"person is intrinsically motivated if he performs an activity for no apparent reward except the activity itself"* (Deci, 1972a).

There is however a widespread belief (Bateman and Crant, 2003; Deci, 1971) that extrinsic rewards undermine intrinsic motivation. Brief and Aldag (1977), taking into account the collective contributions of Koch (1956), de Charms (1968) and Deci (1971, 1972a, 1972b), defined extrinsic motivation as a *"cognitive state reflecting the extent to which the worker attributed the force of her task behaviours to having and/or expecting to receive or experience some extrinsic outcome"* (Brief and Aldag, 1977, p. 497). These extrinsically motivated behaviours can be achieved through the attainment of externally administered rewards, including pay, material possessions, prestige and positive evaluations from others (Bateman and Crant, 2003). Thus, through the behaviourist tradition of changing behaviour by manipulating extrinsic contingencies, motivation increases have been realised in work behaviours such as attendance, punctuality, cost reduction, work quality, productivity and customer service (Komaki, 1982).

The next section will discuss the content theories of employee motivation, along with four of the most pertinent theories of this approach.

### Content Theories

Content theories, as noted previously, focus on the importance of work itself, as well as the challenges, growth opportunities and responsibilities that work provides for employees. In essence, the theories deal with the content of motivation, that is, the specific needs that motivate and direct individuals, thus, these theories are more commonly referred to as “*Need*” theories. Content theorists focus primarily on an individual’s needs, believing that one’s needs are the most indispensable element of motivation. Content theories function on the basis that an individual will want to satisfy their needs, be it within or outside of their working environment. A person’s perception of a need is important; it will determine whether they exert sufficient energy to attain the need. It is important to define the term need as used within content theories. Pinder (1998), however, noted that there are problems obtaining such a definition. This is in part due to the assortment of uses the term has encapsulated over many years. Murray (1938, pp. 123-124) provided a definition for the term stating that it is “*a force which organizes perception, apperception, intellection, conation and action in such a way as to transform in a certain direction an existing unsatisfying situation.*” Although Murray further elaborated on this definition, this statement clarifies the term when examined in light of the motivation concept. Murray’s definition stated that a need cannot be directly assessed, it has no mass, and therefore one must infer its existence by indirect means, such as through observing an individual’s behaviour. Murray (1938, pp. 123-124) also added that a need could be “*weak or intense, momentary or enduring*” and would result in “*overt behaviour (or fantasy) which changes the initiating circumstance in such a way as to bring about an end situation which stills the organism.*”

Four of the most prominent content theories of work motivation will be discussed in this chapter. Included are Abraham Maslow’s (1943) Hierarchy of Needs theory and Clayton Alderfer’s (1966) Existence Relatedness Growth Needs (E.R.G.) theory, neither of which were developed explicitly for organisational settings, however the theories have been adapted and utilised in occupational settings. Maslow’s theory

was the first major theory of motivation applied to individuals in the work setting, while Alderfer's E.R.G. theory represented an important extension and refinement of Maslow's hierarchy of needs. Fredrick Herzberg's (1957) Motivator-Hygiene model, or as it is more commonly referred to as the Two-Factor Theory was among the first models of motivation developed specifically for work applications. The fourth content model of motivation discussed is that of David McClelland's (1953) Achievement Motivation theory. Steers, Porter and Bigley (1996) noted that McClelland's Achievement Motivation theory marked a departure from existing content theories, in that McClelland viewed needs as socially required attributes of an individual, rather than as innate psychological characteristics giving further impetus to research in the field.

### Hierarchy of Needs Theory

Abraham Maslow's (1943, 1954, 1968) Needs Hierarchy Theory is beyond doubt the most publicised theory of motivation. Maslow's theory has courted controversy since its inception, yet it remains a widely popularised theory of motivation among practitioners and academics alike. This popularity and widespread publication of the theory in any discussion of motivation all but compels one to include the theory in any discussion despite its numerous criticisms. Nevertheless the inclusion of Maslow's theory in the present review is primarily intended to help in the understanding of the importance of human needs in a work environment. Although the theory's notoriety does play a part in its inclusion, the numerous concerns raised surrounding the unquestioned acceptance of the theory warrants analysis. Maslow's theory postulates that there are five categories of human needs, arranged in hierarchical order. These needs range from the physiological needs, which are most vital for survival, to the self-actualisation need, which is the least important need for the survival of an organism.

Physiological needs are often referred to simply as needs. These needs can be either innate or learned, and it must be noted that they differ from drives in that they are linked to aspects of a person's psychological makeup as well as their physiological condition. The need concept is typically used in "*pull*" theories, that is, theories where a person is said to be pulled toward a desired outcome (Vroom & Deci, 1970).

The work of Murray (1938) presents the earliest comprehensive theory of human needs and served as a strong influence on Maslow. Murray identified twenty needs that human beings attempt to satisfy. Maslow (1943), using the term needs to refer to both physiological and psychological needs, refined Murray's list by proposing that there are five basic sets of needs. Maslow (1943) proposed that these human needs are inherent and are arranged in an ascending hierarchy of priority. Those needs, in order of potency are: (1) Physiological needs, (2) Safety needs, (3) Love needs, (4) Esteem Needs and (5) Self-Actualisation needs. An important element underlying this hierarchy is the assumption that lower-order needs must be satisfied before one can satisfy higher-order needs. That is, as physiological needs are satisfied they no longer dominate the organism, thus the next higher-order need (in this instance, safety) emerges and becomes active. *"At once other (and "higher") needs emerge and these, rather than physiological hungers, dominate the organism. And when these in turn are satisfied, again new (and still "higher") needs emerge and so on"* (Maslow, 1943, p. 375). This is what is meant by saying that the basic human needs are organised into a hierarchy of relative prepotency. An important implication from this is that gratification becomes an important concept, as is deprivation in motivation theory. Gratification of a need releases the organism from a lower-order need, thereby permitting the emergence of a higher-order need. The lower the need in the hierarchy, the greater its priority is. Although the ultimate goal is self-actualisation, it cannot be reached until each of the lower-order needs have been met. A lower order-need, when chronically gratified, no longer dominates the organism, or determines its behaviour. A satisfied need is no longer a want and may only emerge again to dominate the organism if that need has been thwarted. It is possible however for higher-order needs to emerge before a lower-order need is wholly satisfied. As Steers and Porter (1991) noted, Maslow estimated that the average working adult has satisfied 85% of their physiological needs, 70% of their safety needs, 50% of their love needs, 40% of their esteem needs and 10% of their self-actualisation needs. The level of satisfaction of any of these needs also varies from person to person, *"so some people never feel secure enough to want to enter a social group whilst others require quite minimal levels of security, and the same applies to all needs"* (Payne, 2000). Maslow distinguished his five categories by referring to some needs as deficiency needs and others as growth needs. *"Needs for safety, the feeling of belonging, love and respect (from others) are all clearly deficits"* (Maslow,

1955, p. 10). Wahba and Bridwell (1976) provided evidence in support of the existence of the deficiency and growth needs. Incorporated within the growth needs are those of self-respect, achievement and self-actualisation. Before examining the categories within the hierarchy more closely, it must be noted that there are preconditions, as noted by Maslow (1943) that are fundamental to basic need satisfaction. Such conditions include the freedom to speak, freedom to do what one wishes so long as no harm is done to others, freedom to express oneself, freedom to investigate and seek for information and the freedom to defend oneself. Thwarting of these conditions is reacted to with a response similar to that as if the basic needs were being thwarted.

The physiological needs are those needs regarded as the most concrete. These include the need for food, oxygen, activity, sleep, sex, protection from extreme temperatures and sensory stimulation. These physiological needs are concerned with the biological maintenance of the organism. For the majority of the inhabitants of developed countries, their physical environment provides sufficient satisfaction of their physiological needs. *“In most of the known societies, chronic extreme hunger of the emergency type is rare, rather than common”* (Maslow 1943, p. 374). Nevertheless, for those persons actively seeking satisfaction of their physiological needs, they become wholly dominated by it and all other needs may become non-existent or of secondary importance.

Homeostasis refers to the body’s automatic efforts to maintain a constant, normal state of the blood stream. All physiological needs cannot be identified as homeostatic. Such needs as sexual desire, sleepiness and maternal behaviour are examples of physiological needs demonstrated not to be homeostatic. Maslow pointed out that these drives are to be considered unusual rather than typical because they are isolable and localizable somatically. That is to say, they are relatively independent of each other, of other motivations and of the organism as a whole.

An unusual characteristic of the human organism when it is dominated by a certain need is that the whole philosophy of the future tends to change. According to Maslow (1970, p. 37), *“... for our chronically and extremely hungry man, Utopia can be defined simply as a place where there is plenty of food. He tends to think that, if*



*only he is guaranteed food for the rest of his life, he will be perfectly happy and will never want anything more... Such a man may fairly said to live by bread alone.”* Support of this statement is provided by Keys, Brozek, Henschel, Mickelsen and Taylor (1950) from semi-starvation experiments. Results showed that subjects, after a time, thought of little else but food and many of their normal activities and interests yielded to the constant hunger. Wolf (1958) referred to a number of studies showing the degree to which severe and prolonged thirst affected subjects, resulting in them thinking of little else but liquid, whereby they eventually surrendered their normal activities and interests to the constant thirst. A deficiency in the physiological needs would consume an individual, thus in situations where employees had high physiological needs, their productivity and other activities would effectively evaporate. Such a scenario however is unlikely to occur within organisations in western societies, as most employees would have these basic physiological needs met. Physiological needs and behaviours resulting from a particular need can also serve as channels for other needs. That is, a person who thinks he/she is hungry may actually be seeking gratification of the need more for comfort or dependence.

When the physiological needs have been satisfied, a new set of needs emerge, termed safety or security needs. All that has been said of the physiological needs are equally true for the safety needs, although to a lesser degree. These needs may equally utterly dominate the organism. Predictability of one's environment, certainty, order and structure are the motivating forces encapsulated by the safety needs. Similar to the physiological needs, the safety needs of most working adults in western societies have been satisfied. Thus, as Maslow suggested, the safety needs can be more readily observed in infants and children. Infants for example, if dropped suddenly will respond fearfully. *“One reason for the clearer appearance of the threat or danger reaction in infants, is that they do not inhibit this reaction at all, whereas adults in our society have been taught to inhibit it at all costs”* (Maslow, 1943, p. 376). Thus, experiences and education eventually neutralise such apparent dangers in infants. A child's need for safety can be seen in his/her preference for an undisrupted routine. According to Maslow, children perform more effectively under a family system that has at least a skeletal outline of rigidity and must be depended upon, not only for the present, but also into the future. When a child is confronted with new, challenging and unmanageable situations their safety need is aroused. Such situations include

being separated from parents for a short time, illness and death. Children prefer a safe, orderly, predictable and organised world that they can count on, and in the event of an unexpected situation, they rely on parents to protect them from harm. Therefore, the role of parents and the family dynamic are essential for ensuring that the child's safety needs are satisfied.

It is widely accepted that the safety needs of those in western societies are predominantly satisfied, therefore, Maslow examined neurotic or near-neurotic individuals in order to observe these needs directly in adults. Some neurotic adults are similar to children in their desire for safety. Such people behave as if a great catastrophe were imminent. The neurosis in which the search for safety takes its clearest form is in the obsessive-compulsive neurosis. These individuals try frantically to order and stabilise their world so that no unmanageable, unexpected or unfamiliar dangers will ever appear. Sherif and Cantril (1947) observed that in areas of catastrophe and other stresses, normal interests and values and acceptable behaviour are unable to withstand long periods of severe insecurity. They also noted the disintegration of social standards and controls in such environments. Although safety needs can be seen predominately in children and neurotic individuals, adults express safety needs in the desire for such things as a job with tenure and the desire for a savings account. Supporting evidence for employees' need for job tenure can be seen in studies carried out on temporary employees. Wheeler and Buckley (2001) reported temporary labour to be a widespread phenomenon in the workforce, and more so in the computing industry, while Sias, Kramer and Jenkins (1997) noted that temporary employees seek out opportunities to gain permanent entry into an organisation. Other broader aspects of one's attempt to seek safety and stability can be seen in the preference for the familiar and the known.

Individuals motivated at the social needs level in the hierarchy have satisfied both their physiological and safety needs. Group membership becomes a dominant goal for the individual and *"he will want to attain such a place more than anything else in the world and may even forget that once, when he was hungry, he sneered at love"* (Maslow, 1943, p. 381). The thwarting of these needs is more commonly found in cases of maladjustment and severe psychopathology. Love and affection, as well as

their possible expression in sexuality, are generally looked upon with ambivalence and are customarily hedged about with many restrictions.

Maslow believed that training groups (T-groups), personal growth groups and intentional communities are motivated by this need for social interaction, intimacy and belongingness. According to Maslow, the “*breakdown of traditional groupings, the scattering of families*” and social mobility are the key determinants of such groups. Maslow alleged that rebellious youth groups are motivated to some extent by the need for “*groupiness, for intimate contact, for real togetherness*” in the face of the common enemy. For Maslow, love was not synonymous with sex, but rather love involves a healthy, loving relationship between two people, which includes mutual respect, admiration and trust, and more importantly, the love needs involve both giving and receiving. Empirical support is provided by Dietch (1978), who attempted to determine the association between physiological health, involvement in a romantic relationship and the quality of love in a relationship. His results were consistent with Maslow’s theory of needs. The importance of social needs in an organisational setting should not be underestimated, particularly so for graduates, whose supervisor and colleagues are a vital source of social support. (Baruch and Winkelmann-Gleed, 2002; Swap, Leonard, Shields and Abrams, 2001).

Maslow divided the esteem needs into two subsidiary sets, consisting of self-respect and esteem from others. The former includes, among others, such things as the desire for strength, for achievement, for adequacy, for confidence in the face of the world and for independence and freedom. An individual needs to know that he or she is worthwhile, that is, that they are capable of mastering tasks or challenges in life. Included in the need for esteem from others is the desire for reputation or prestige, recognition, importance or appreciation. People need to be appreciated for what they do, they must experience feelings of worth, where their competence is recognised and valued by significant others. Maslow emphasised that the healthiest self-esteem is based on earned respect from others rather than on fame, status or adulation. Hence, there is a real psychological danger of founding one’s esteem needs on the opinions of others rather than on real ability, achievement and adequacy. Once a person relies exclusively upon the opinions of others for self-esteem, he or she is in serious psychological jeopardy.

Satisfaction of one's self-esteem needs engenders feelings of self-confidence, worth, strength and capability. Thwarting of the self-esteem needs produces feelings of inferiority, of weakness and of helplessness. These feelings in turn give rise to either basic discouragement or else compensatory or neurotic trends.

Self-esteem is noted by researchers as being one of the more important needs within organisational contexts. Miner (1992) argued that employees with positive self-esteem have higher self-perceived competence and self-image, whilst those with low self-esteem generate low performance, thus hindering creativity and organisational performance. Schein (1971) believed that knowledge of an individual's self-esteem would enable management to predict the work behaviour of employees more accurately, while Fox, Scott and Donohue (1993) reported that if employees perceived pay as improving their self-esteem, then their performance would increase significantly.

The term self-actualisation was first coined by Kurt Goldstein (1939), but was used by Maslow in a more specific and limited fashion. The concept of self-actualisation, according to Maslow, refers to peoples' desires for self-fulfilment, namely, the tendencies for them to become actualised in what they are potentially. Maslow (1943) phrased this as "*the desire to become more and more what one is, to become everything that one is capable of becoming.*" The form that these needs take varies from person to person. As Maslow noted, in one individual it may take the form of a desire to be an ideal mother, and for another it may be expressed athletically. The self-actualisation need however is not necessarily a creative urge, but will take this form in those who express creative capacities. "*A musician must make music, an artist must paint, a poet must write, if he is to be at peace with himself. What a man can be, he must be...This need we call self-actualisation*" (Maslow, 1954, p. 22). In addition to the creative characteristic, Maslow (1954) presented a list of fourteen other characteristics of the self-actualised person. These characteristics include among others, autonomy, problem centring, the acceptance of self and others, interpersonal relations and continued freshness of appreciation, that is, self-actualised individuals derive ecstasy, inspiration and strength from the basic experiences in life, even those encountered many times before.

It must be remembered that those individuals motivated at the self-actualisation level have satisfied their lower-level needs, thus as Maslow pointed out, it is from these individuals that one can expect creativeness. Maslow termed those satisfied at the self-actualisation level, “*satisfied people*,” however he accepted that self-actualised persons were the exception rather than the norm. As a result, there is very little empirical evidence available on self-actualised individuals. Some criticisms of the self-actualisation need must be noted. The first criticism is provided by Maslow, who stated that the entire model of self-actualisation rests on the assumption that the individual has a want to live (Hoffman, 1996). When life is not worthwhile then humanistic psychology is worth less. It only speaks to those who want to live and grow, fulfil themselves and move toward the ideal of perfection. Gratton (1981) attempted to validate Maslow’s hierarchy of needs. The results of her study showed that those individuals with an increased need for esteem and those with an increased need for self-actualisation were not necessarily similar and thus should not be treated the same. Gratton acknowledged that complex work is highly related to an increased need for self-actualisation. Contradicting Maslow’s lower and higher-order needs, Gratton (1981) concluded that it was somewhat an “*oversimplification*” to group the esteem and self-actualisation needs into higher-order needs. Similarly, she argued against the categorisation of physiological and safety needs into lower-order needs.

Based on the foregoing descriptions, one may be forgiven for concluding the hierarchy to be of a fixed order, however this is not so. Additionally, not all the need categories are entirely independent, as Maslow pointed out, “*there is usually such an overlapping that it is almost impossible to separate quite clearly and sharply any one drive from any other*” (Maslow, 1954, p. 71). Studies carried out by Payne (1970), Roberts, Walter and Miles (1971) and Herman and Hulin (1973) all show Maslow’s need categories as independent factors. Maslow’s assertion that a satisfied need is not a motive is the basis of a number of studies (Hall and Nougaim, 1968; Lawler and Suttle, 1972; Newman, 1948), which have tested the proposition that satisfaction of a need reduces the importance of that need. Research by Hall and Nougaim (1968) found little evidence that the increasing satisfaction of a need results in either the decreased strength of the need itself, or an increased strength of the next higher-order need.

There are a number of contradictions within Maslow's theory that must be noted. For example, within his book "*Motivation and Personality*" Maslow indicated that all people could reach self-actualisation, yet results from his own research indicated that only a limited number of well-known individuals demonstrate characteristics of the self-actualising person (Dimitrelis, 2003). As a further example, there are some people in whom self-esteem seems to be more important than love. This most common reversal in the hierarchy is usually due to the development of the notion that the person who is most likely to be loved is a strong or powerful person, one who inspires respect or fear and who is self-confident or aggressive. Another cause of reversal of the hierarchy can be seen when a need has been gratified for a long time, thus this need may become under-valued. An example can be seen in the man who is willing to give up his job rather than lose his self-respect and then starves for six months, may be prepared to take back his job even at the price of losing his self-respect (Vroom and Deci, 1970).

Maslow's (1943) need hierarchy theory has been widely accepted by theorists; however there exists little research evidence in support of it. Yet the theory has influenced the writings of many prominent researchers in the field of management and organisational behaviour (for example Argyris, 1964; Baumeister and Leary, 1995; Brown, 2002a; McGregor, 1960; O'Bryan and Pick, 1995; Rowan, 1998; Schein, 1965; Smith, 2003). Much of the research carried out on Maslow's theory however has been conducted in experimental settings or on animals. Maslow (1955, p. 5) stated "*it is unfortunate that we cannot ask a rat to give subjective reports. Fortunately however, we can ask the human being, and I see no reason in the world why we should refrain from doing so.*" However, Wahba and Bridwell (1976), who reviewed longitudinal studies carried out by Hall and Nougaim (1968) and Lawler and Suttle (1972), reported that there is little in the way of consistent support for Maslow's need classification as a whole. Additionally they found no supporting evidence to suggest that human needs are classified into five categories, or that these categories are structured in any hierarchy. They did however find evidence, as mentioned previously, for the existence of two types of needs, deficiency and growth needs.

Although there is little empirical support for Maslow's Need Hierarchy theory, it has been widely used in industrial settings by management and human resource departments, yet many studies (Hall and Nougaim, 1968; Lawler and Suttle, 1972) have shown that the needs of managers cannot be arranged in a hierarchy of prepotency. Thus the use of Maslow's theory in work settings would not be an accurate prediction of the needs of either management or frontline employees.

Aside from the significant lack of empirical support for Maslow's hierarchy, the theory has made a significant contribution to the concept of motivation by bringing to prominence the importance of the concept of needs in the work environment. It is evident that individuals have different needs and the identification of these needs by the theory has helped advance techniques for motivating employee behaviour. Wiley (1997) compared the results of four motivation studies carried out over a period of five decades. The results showed that employees' basic needs varied over this time-period. Those employees who participated in the survey in 1946 expressed a desire for appreciation for work done, while both surveys conducted in 1980 and 1986 demonstrated the concern of employees for more interesting work. The final survey in 1992 however, illustrated the needs for good wages and job security as the primary needs of employees. Wiley (1997) noted that the need for pay and job security reported in 1992 resulted from hostile takeovers, downsizing and numerous additional organisational restructuring moves. Nevertheless, it is the concept of needs, and needs alone that are of value from the theory, and not the suggestion that they are activated in the same constant order. Other need theories have been proposed, such as Alderfer's (1966) Existence Relatedness Growth Theory (E.R.G.), whose aim was to amend the problems associated with Maslow's theory. A comprehensive discussion of Alderfer's (1966) E.R.G. theory can be seen later.

Pinder (1998) regarded Maslow's theory as the most paradoxical of all current motivational theories, while acknowledging the theory's evident familiarity among practitioners and academics, he believed the theory to be misunderstood and oversimplified. Pinder (1998) also commented on the lack of empirical support of the theory. This lack of research support and low scientific validity and applicability of the theory remains today. Despite the criticisms of the theory, it remains one of the most widely publicised and acknowledged theories of motivation. Despite other

theorists having undertaken further work on the need hierarchy, it can be argued that Maslow's original definition of human needs has remained an integral part of these later theories.

### Achievement Motivation

Maslow's (1943) Hierarchy of Needs Theory came to prominence at approximately the same time as David McClelland and his associates (McClelland, Atkinson, Clark and Lowell, 1953) introduced their Achievement Motivation Theory. However, unlike Maslow's theory, McClelland *et al.*'s (1953) theory was more associated with organisational settings, thus it is believed the theory may relate more directly to how employees function in the organisational environment (Morley, Moore, Hearty and Gunnigle, 1998). The central focus of McClelland *et al.*'s work was to identify the motivational differences between individuals in order to determine which motivational patterns led to effective performance in the work environment. McClelland *et al.* (1953) initially identified three needs, the needs for achievement (*nAch*), power (*nPow*) and affiliation (*nAffil*). Other needs identified later in his career include the need for autonomy.

Although universally criticised, McClelland *et al.*'s model of motivation theory is included in the present study in order to demonstrate a method for measuring needs. This measurement tool, the Thematic Appreciation Test (T.A.T.), provided organisational behaviourists with a tool to measure the vague concepts of motivation and personality (Morley *et al.*, 1998). The theory also had implications for management personnel wishing to improve the motivation of their high achievers. These implications are discussed in further detail later.

The concept of achievement motivation is that of behaviour motivated by an individual's need to achieve. Murray (1938) was the first theorist to propose a theory of achievement motivation, defining the need to achieve as the desire "*to accomplish something difficult*" (Murray, 1938, p. 164). Thacker (1991) suggested that this definition states that an individual possessing a high level of *nAch* characteristically works independently of others and as quickly as possible. The Thematic Appreciation Test (T.A.T.) devised by Morgan and Murray (1935) provided



psychologists with a technique for measuring the internal needs of individuals. The T.A.T. was modified by the work of a number of researchers, including McClelland *et al.* in 1953.

The most thorough series of studies conducted by McClelland *et al.* (1953) concerned the need for achievement (*nAch*). They defined the need for achievement as “*the drive to excel, to achieve in relation to a set of standards, to strive to succeed.*” McClelland *et al.* identified three characteristics in those individuals termed “*high-need achievers.*” Firstly, those displaying a high-need in achievement report a strong desire for responsibility in performing tasks or finding a solution to a problem. As a result they tend to work alone, however, if a task necessitates working with others they tend to choose co-workers based on competence rather than friendship. Secondly, high need achievers tend to set somewhat more difficult tasks and take calculated risks. Finally, they have a strong desire for feedback based on their performance, regardless of whether it is high or low (Steers and Porter, 1991). In their research McClelland *et al.* found that people with a low desire for achievement sought monetary rewards, whereas high-need achievers use monetary rewards as maintenance factors, as they are already highly motivated. Dunnette (1967) and Porter and Lawler (1968) argued that pay can satisfy needs other than a need for material goods, they suggested that monetary rewards could satisfy any individual who seeks power, status, and achievement. Raudsepp (1980) pointed out that when a technical professional demands a certain level of pay, they seek the pay increments more for the recognition that they believe their qualification, performance and professional contribution entitles them. Lawler (1966) also noted that management placed importance on income due to its capacity for satisfying other needs. These studies, however, do not necessarily imply that pay is a vital motivator for high-achievers. A study by Veroff, Atkinson, Feld and Gurin (1960) supports the conviction that achievement is one of the predominant motives for managers. Veroff *et al.* (1960) also reported management scoring higher on projective measures of achievement motivation than those in non-managerial positions. McClelland and Burnham (1976), however, provided evidence against achievement motivation as an essential need in managerial positions. They reported that high need achievers focus primarily on personal improvements thus leading them to “*behave in special ways that do not necessarily lead to good management*” (McClelland and Burnham, 1976,

p. 100). Information Technology (I.T.) professionals in a study by Couger (1988) also rated achievement motivation as a primary motive. Buckley, Jonathon, Halbesleben, Wheeler and Stauffer (2002) commenting on this finding, acknowledged the necessity for improving I.T. jobs, for those in all levels within I.T. departments. Nevertheless, they accepted the conviction that management positions tend to include less trivial tasks than those of technical support staff, thus, much effort on the part of management and human resource departments is required to realise high levels of achievement motivation in support staff. McClelland *et al.* (1953) concluded that the need for achievement is learned at an early stage and greatly influenced by the parent structure. McClelland (1967) also believed that children could be trained to increase their *nAch* score if the family structure supported it, thus permitting them to retain a high need for achievement. Atkinson and Miller (1956) showed that a first born demonstrating a high *nAch* was as a result of achievement oriented parents who could set higher standards for one child than for several. Veroff *et al.* (1960) reported that men often have low *nAch* if the family structure is broken due to divorce, separation or death.

The need for affiliation (*nAffil*) which has received the least attention amongst the three needs from researchers was defined by McClelland *et al.* (1953) as “*the desire for friendly and close interpersonal relationships.*” Those with a high-need for affiliation desire approval and reassurance from others. As a result they tend to conform to the wishes of others when persuaded by those whom they hold in close friendship. Therefore, people high in need for affiliation are conscious of others’ emotions. They tend to work with others and have low absenteeism in comparison with those low in need for affiliation. In an industrial setting, creating a supportive work environment and providing positive feedback when performance is high assists in sustaining motivation for those high in need for affiliation. McClelland and Burnham (1976) suggested that managers cultivate environments where subordinates perceive a sense of “*team spirit*,” and pride themselves in being part of a particular team. Yet in the same study they reported that those who have a high need for affiliation do not make accomplished managers, as they create poor morale when they allow for exceptions amongst subordinates. A study carried out by Meyers (1992) on 1,800 information technology professionals shows that employees in this sector reported a high need for social interaction in their work setting. It must be

noted however that Meyer's (1992) study appears to be the exception rather than the rule. A study by Couger (1988) attempted to construct an archetypal profile of an I.T. professional using McClelland's (1987) theory of motivation. Couger reported I.T. professionals as having the lowest need for social interaction. Buckley *et al.* (2002) also reported similar findings to those of Couger. Those persons with a relatively low need for affiliation are generally regarded as introverts who are uncomfortable socialising with others apart from a few close friends and family members. They lack the motivation to sustain such relationships, thus in industrial settings they would lack the communication skills necessary for ensuring efficient and effective productivity.

The third and final need is the need for power (*nPow*), defined as the need to "*make others behave in a way that they would not have behaved otherwise*" (McClelland *et al.*, 1953). The characteristics of those with a high need for power include the desire to influence and direct others, to exercise control over others and a concern for sustaining leader-follower relations. Individuals high in *nPow* enjoy being in situations where they are in charge, preferring environments that are competitive and status-oriented. Prestige and the ability to influence others weigh more heavily with those high in *nPow* than increasing personal power. McClelland believed that the *nPow* could take on two forms, personal or social power. Those individuals high in personal power urge their subordinates to achieve pre-eminent performance, whilst those high in the need for social power concern themselves with organisational issues and how to resolve them in order to realise goals. Managers high in personal power stipulate to their subordinates that they be accountable to them in place of the organisation. Therefore, if the leader of such a group were to leave the organisation there would likely be a breakdown of team morale and direction. McClelland argued that the need for social power is the key determinant of managerial success, and those high in this need "*create a greater sense of responsibility... and, above all, a greater team spirit*" (McClelland and Burnham, 1976, p. 104). Leaders with high social power needs are often regarded as effective leaders who seek power merely to accomplish tasks. Such leaders believe power must be distributed equally and are reluctant to use power in a dictatorial fashion. Steers and Porter (1991) argued that a high *nPow* is more fundamental to managers of large organisations unlike for entrepreneurs, within whom a high *nAch* is seen as more instrumental to success.

Miner (1965) agreed with Steers and Porter (1991), believing that a high *nPow* was a requirement for successful management. McClelland and Burnham (1976) also accepted that a successful manager would have a “*greater need for power*” than a need to achieve, and this need for power would outweigh their desire to be liked by others. It must be remembered however that successful managers’ need for power is not oriented towards personal gain but that of the organisation they work for. Kipnis (1974) suggested that a high power need was a product of the hierarchical level a manager appeared to be on, thus the higher up the hierarchy a manager was, the higher their power motive. Yukl (1989) reviewed the results of McClelland’s theory (McClelland and Burnham, 1976) for predicting leadership success. Results showed that those with a low need for power might lack the assertiveness and self-confidence necessary for organising and directing groups.

Although personality-based approaches to motivation have been favoured more times than others over the last few decades, McClelland and his associates (e.g., McClelland and Winter, 1969) have remained strong advocates of this approach throughout their careers, stressing the effect of subconscious motives, particularly the achievement motive, as it has received the most research attention. They argued that these motives had to be measured using a projective test, the Thematic Appreciation Test (T.A.T.).

McClelland *et al.* (1953) set about devising a method for measuring the need for achievement. They borrowed heavily from Murray’s (1938) use of the T.A.T., modifying it slightly to avoid its pitfalls. The T.A.T. is intended to arouse the achievement motive in subjects by displaying to them a set of images. The subjects are then instructed to write a brief five-minute story after viewing each image and then the next image from the set is shown, and so on, until all the images from the set have been displayed individually. Essentially it is believed that these stories represent an example of what individuals think about or imagine during a state of heightened achievement motivation. These images represent a variety of situations centring on the work environment. An instrumental element of the T.A.T. is the instructions given to the subjects. It is believed these instructions arouse in subjects the desire to “*do well*,” to appear intelligent and demonstrate leadership qualities (McClelland, 1961). This motive to “*do well*” is believed to be aroused either

consciously or unconsciously. In order to obtain scores for individuals from the T.A.T., McClelland *et al.* (1953) counted the number of achievement-related ideas in each story. The final count could be taken as a representation of an individual's concern for achievement. McClelland *et al.* called this count the score for *n* Achievement. This method of measuring the achievement motive can also be applied to measure the two other needs identified by McClelland and his colleagues, namely the *n* Affiliation and the *n* Power. Bolton (1969) noted however that the method of measuring *n*Ach has practical shortcomings in industrial settings, adding that results produced from the T.A.T. tend to vary due to the difficulty of ensuring a continuous level of achievement arousal when the test is replicated in various work settings. Bolton reported that the T.A.T. is not a widely used method for measuring achievement motivation in industrial settings in Britain or Ireland.

Numerous studies (e.g., Kanter, 2001; Katz, 1998; Katz, 2005; Locke and Latham, 2004) abound regarding the need for achievement of computing professionals. Technical professionals are attracted to work environments that are stimulating and provide copious amounts of challenge for stimulation. Organisations which do not foster such environments run the risk of unmotivated employees and high staff turnover. It is clear that the latter is already of high concern for organisations in the present environment. Katz (2005) reported that technical professional, regardless of the degree of task difficulty, would strive to meet the demands of the job. Feedback plays a vital role in sustaining motivation, without which employees have no basis for trying to improve. Nevertheless, Katz (1998) reported that technical professionals only heard from their superiors on occasions where something was required of them.

Management personnel can utilise McClelland *et al.*'s (1953) theory in order to motivate their employees. The theory distinguishes between different needs and states that those with a high need for achievement will be motivated differently from those with a low need for achievement. The same can be said of individuals with either a low or high need for power or affiliation. McClelland's theory implies that if the needs for power, affiliation or achievement are acquired, then organisations can further develop these needs through environmental conditions that facilitate the emergence of those needs. Although heavily criticised, the T.A.T. measurement tool provided researchers with a method of measuring the intangible concept of

motivation. Morley *et al.* (1998) stated that most qualitative researchers believe that the language, imagery and storytelling people use are important indicators of the inner drives that direct and motivate people.

Cummins (1967) reported on a study conducted using the T.A.T. and concluded that the *nAch* and the *nPow* should be taken into consideration in any study of graduates in industry, as graduates would strive to obtain these needs. Although there have been some criticisms of McClelland's method for measuring achievement motivation, it is acknowledged that his approach has had a major influence in helping organisations to better match people with jobs, and for redesigning jobs for high achievers so as to maximise their motivating potential. Thus, in summary achievement motivation theory provides a plausible explanation for the motivation of some employees and has had widespread application within the workplace.

### Two-Factor Theory

An extensive review of hundreds of earlier studies on the causes, correlates and consequences of job attitudes led Frederick Herzberg and his associates (Herzberg, Mausner, Peterson and CapWolfwell, 1957) to develop the preliminary hypothesis that factors causing positive job attitudes (motivators) are different to those causing negative job attitudes (hygienes). This preliminary hypothesis resulted in Herzberg and his associates (Herzberg, Mausner and Snyderman, 1959) developing the first major theory with regard to the design of individual jobs (Garg, and Rastogi, 2005). Herzberg *et al.* (1959) focused on enriching jobs and making them challenging for individuals through the use of job enrichment schemes. Herzberg *et al.* (1959) believed that redesigning jobs to provide opportunity for growth, challenge, achievement and advancement would facilitate in motivating employees.

There are a number of reasons for including Herzberg's two-factor theory in the present discussion. Herzberg's theory has had a major impact on the concept of motivation and is regarded as one of the best known motivational theories among practitioners and managers alike. Many organisations, prompted by Herzberg's theory, have redefined the way employees perform their jobs in order to help increase motivation levels (Schultz and Schultz, 2006). Herzberg's approach has

gained considerable recognition among practitioners for differentiating between the impact of intrinsic and extrinsic factors on employee motivation. Pinder (1998) argued that the ensuing criticisms surrounding Herzberg's theory illustrated many of the difficulties involved in the advancement of new theories of work motivation. Although Maslow's (1943) needs hierarchy theory and McClelland *et al.*'s (1953) achievement motivation theory were largely concerned with laboratory-based findings, it was not until the introduction of Herzberg's theory that practitioners began to focus on addressing the issues within work environments.

Herzberg *et al.* (1957) developed one of the most popular, yet at the same time one of the most criticised theories of work motivation. Herzberg *et al.* (1957) found that the work related factors responsible for feelings of satisfaction and dissatisfaction were different. The variables producing satisfaction from a job are known as "*intrinsic factors*," or alternatively as "*job content factors, contents, satisfiers, motivators, or M-factors*" for short. Conversely, those variables producing dissatisfaction in one's work life are known as "*extrinsic factors, context factors, maintenance factors, dissatisfiers, hygies, or H-factors*." These H-Factors are external to the employee and therefore are beyond their control. When H-Factors are regarded as unfavourable, dissatisfaction results, however when they are favourable, then dissatisfaction may simply be reduced, but not necessarily eliminated. Herzberg's theory postulated that these intrinsic and extrinsic factors as the main sources of satisfaction and dissatisfaction. The motivators, or higher-order needs, are concerned with psychological growth while the hygies, or lower-order needs, are concerned with the avoidance of pain in the work environment (Aboulghassem, 1981). Motivational theories generally acknowledge the bipolarity assumption, that is, that satisfaction and dissatisfaction are at two opposite poles of a continuum running from satisfaction through neutral to dissatisfaction. These motivational theories assume that all behaviour is activated by an ungratified need(s) and that satisfaction of these need(s) results in a satisfied or neutral state. In contrast, Herzberg's two-factor theory adopts a uni-polar assumption, that is, the existence of two continua, one for satisfaction, running from satisfaction through to neutral and one for dissatisfaction, similarly running from dissatisfaction through to neutral (Lawler, 1973).

A further aspect of the two-factor theory is that of the “*critical incident technique*,” sometimes disparaged as the “*story-telling method*.” This methodological approach to studying motivation consists of semi-structured interviews with subjects asked to describe what job-related events occurred resulting in them feeling either exceptionally “*good*,” or exceptionally “*bad*” about their work related environment. This technique, as described by Herzberg is “*the principle procedure recommended as adequate to elicit the factors and to test the M-H theory*” (Herzberg *et al.*, 1959).

Positive job attitudes are a result of factors that satisfy a person’s need for self-actualisation in their work environment, thus these needs are similar to the concept of self-actualisation introduced in Maslow’s (1943) theory of needs. It is not however the conditions surrounding “*the doing of a job*” that lead to self-actualisation, as these conditions do not comprise such capacities. Such satisfaction can only be derived by the performance exhibited by a particular task. Before continuing, a distinction must be noted between those factors that define the job context and those job factors relating to “*the doing of a job*.” Although both factors serve as goals for employees, the nature of their motivating qualities are different. Factors relating to the job context meet a person’s need for avoiding unpleasant situations, whilst job factors related to “*the doing of a job*” reward an individual by contributing to the achievement of his/her aspirations. “*These effects on the individual can be conceptualised as actuating approach rather than avoidance behaviour*” (Herzberg *et al.*, 1959). Herzberg argued that the term motivation is most commonly used in reference to the actuating approach, thus terming the job factors, the “*motivators*.” Both the motivator and hygiene factors meet the needs of employees; however the former are those factors that bring about satisfaction. Herzberg *et al.* (1959) listed achievement, recognition for achievement, work itself, responsibility, advancement and the possibility for growth as the “*job content*” factors most central to job satisfaction. Satisfaction of the motivator needs can be achieved by stimulating, challenging and absorbing work. When these conditions are met, job satisfaction results and consequently employee motivation may be improved.

In a study carried out by Herzberg *et al.* (1959), they reported that the conditions surrounding a job resulted in employees experiencing feelings of unhappiness. Herzberg reported that these factors represented an “*unhealthy psychological work*



*environment*” for employees, thus terming them “*hygiene*” factors, as they act in a manner analogous to that of the principles of medical hygiene. That is to say, hygiene operates to eliminate health hazards from a person’s environment. It must be remembered however that hygiene is not a definitive cure but rather a preventative. This point has been summarised more expressively in an example given by Herzberg: “*modern garbage disposal, water purification, and air-pollution control do not cure diseases, but without them we should have many more diseases*” (Herzberg *et al.*, 1959). The hygiene needs are similar to Maslow’s (1943) physiological, safety and belongingness needs. Both Maslow and Herzberg agreed that lower-order needs must first be satisfied before one can be motivated by the next higher-order need. Bringing about improvements in the factors that contribute to job dissatisfaction facilitates the elimination of barriers blocking positive job attitudes. Herzberg *et al.* (1959) listed supervision-technical, interpersonal relations, physical working conditions, salary, benefits, job security, status, personal life, as well as company policy and administrative practices as “*job context*” factors. When the hygiene factors descend to a level below that of which the employee finds adequate then job dissatisfaction results. The inverse however cannot be said to hold true. Herzberg stated that when the job content is most favourable, then dissatisfaction will not necessarily occur, however a more important point to note is that “*neither will we get much in the way of positive attitudes*” (Herberg *et al.*, 1959, p. 113).

The hygiene factors fail to provide positive satisfactions for employees as these factors do not hold the capacity to furnish individuals with feelings of growth. This feeling of growth is dependent on the achievement of a task, which an individual must perceive to have meaning and imparts him/her with meaning (Herzberg, 1966). When the hygiene needs are not satisfied then the result is job dissatisfaction, however satisfaction of the hygiene needs, as mentioned previously, does not necessarily result in job satisfaction, but merely the absence of dissatisfaction. One approach to measuring organisational job dissatisfaction is by monitoring absenteeism, turnover and lowered productivity. Herzberg (1966) tested job dissatisfaction for both the motivator and hygiene factors. His results indicated that blue-collar workers place more emphasis on lower-order needs (hygiene factors) while white-collar workers place more significance on higher-order needs (motivator factors). Herzberg concluded that upon satisfaction of the motivator factors,

employees' performance would improve considerably. A study carried out by Yucelt (1982) on white and blue-collar workers illustrated the consequences of unfulfilled lower-level needs, contributing to a marked increase in absenteeism among blue-collar workers.

Herzberg's two-factor theory has motivational and performance implications for organisations. It assumes that performance is achieved when employees are utilised effectively (motivators) and treated well (hygienes). Job enrichment programs attempt to "*build the motivators into an individual's job*" (Herzberg, 1974). Job enlargement programs, as stated by Herzberg (1966), can fail if they are not implemented correctly. Herzberg (1966) argued against the approach of rotating assignments for new recruits, as "*two or three meaningless activities do not add up to a meaningful one,*" and that the exposure to a variety of assignments with little opportunity for mastering any one fails as a motivational system. The motivation-hygiene theory postulates that a job must allow for achievement opportunities, resulting in an employee gaining more knowledge about their work. Additionally, increasing employees' responsibilities suggests that they are undertaking a more complex task, whilst providing them with an understanding for various processes associated with the task. A task should allow for the possibility of growth, thus providing an employee with the opportunity to be creative, culminating in increased psychological growth. Providing advancement, even without a change in rank, would still present an employee with a higher-level task. Finally, providing employees with tasks that are of direct interest to them can increase their perception of self-worth and individuality (Herzberg, 1966).

Much criticism followed the introduction of Herzberg's (1957) two-factor theory. In response, Herzberg (1968) corroborated his theory by showing a combination of twelve individual investigations and a successful implementation of his theory in a large corporation. The theory has since been investigated in varying occupations, resulting in conflicting reports. There are two primary differences evident in Herzberg's research study with those of other studies, they are, occupational and environmental differences (Ruthankoon and Ogunlana, 2003). Meyers (1964) tested the motivation-hygiene theory on five occupations within a single organisation. The results of Meyer's investigation highlighted significant differences between the

factors he identified and those reported in Herzberg's study. Regarding same occupation, differing workplace, Herzberg's study on teachers and nurses (Herzberg, 1968) was used to validate his theory, yet when Smith (1983) and Nalepka (1985) carried out similar tests on nurses and teachers but in a different setting their results showed significant differences to those of Herzberg's study. These experiments provided support in favour of the prediction that the two-factor theory can be distorted if it is carried out in a unique setting.

Criticisms of Herzberg's theory are generally associated with the assumption that the motivator and hygiene factors are conceptually and operationally different (Dunnette, Campbell and Hakel, 1967). Burke (1966) argued that motivators and hygienics are neither uni-dimensional nor independent constructs. Job enlargement strategies have also been criticised. Mumford (1972) believed that a series of five or more "*dull and boring*" jobs offers few advantages to an employee. Friedmann (1961) however, reported on programs of job enlargement adopted by U.S. and U.K. firms, which shows that overall job satisfaction as well as intrinsic job satisfaction were higher in enlarged jobs compared to similar more restricted jobs.

Herzberg (1966) acknowledged that the motivation-hygiene theory is sometimes technique bound, that is, its results may be confirmed only if identical methods of investigation are employed. Although this criticism does not discredit the theory, it does question the likelihood that answers given by subjects may be over-determined. The motivation-hygiene theory also maintains the conviction that people prefer to blame the hygiene factors rather than the motivators for their unhappiness, simply to "*make them look good.*" However, as Herzberg noted, this idea is rather naïve, simply because the opposite is often true. Often, employees who wish to portray an image of "*looking good*" complain of a lack of responsibility, uninteresting work and limited possibilities for growth.

Motivation-hygiene theory when implemented successfully has far-reaching implications in organisational settings for motivating employees. For an organisation however, apparently the easiest route would be motivation through fear of hygiene deprivation rather than motivation through achievement and actualisation of goals (Herzberg, 1966). Herzberg (1966) stated, from job-attitude data, that after the first

year of a job, job dissatisfaction plummets to the lowest level experienced by employees throughout their working career. This data has implications for organisations wishing to maintain motivation consistently throughout the career of their employees. Therefore providing employees with interesting work beyond their first year is essential. The results of a study carried out on 1,800 analysts and programmers by Couger (1988) showed that the primary motivating factor for I.T. personnel is the work itself. Similarly, Raudsepp (1980) noted that opportunities for responsibility and autonomy rate as high factors for job satisfaction among experienced technical professionals.

Herzberg (1966) recognised that his theory inspired a great deal of research, be it in support of his hypothesis (Brockman, 1971; Whitset and Winslow, 1967) or otherwise (House and Wigdor, 1967; Vroom, 1964). Nevertheless, for the most part, research attempts on his theory have not been supportive. Maidani (1991) reported that the need for salary, recognition and responsibility have been shown to operate as both motivator factors and hygiene factors. Pinder (1998) commented on the storey-telling technique, criticising it for encouraging interviewees to link instances of satisfaction to their own personal accomplishments, whilst associating instances of negative feelings as factors beyond their personal control. This criticism critically challenged the validity of the theory. Morley *et al.* (1998) also acknowledged this criticism, yet they regarded the principles the theory proposed as still relevant in present day work settings, albeit in not as rigid a manner. Wolf (1970) and Schwab, Devitt and Cummings (1971) have argued that Herzberg's two-factor theory is a theory of job satisfaction rather than a motivational theory, however its implications for employees cannot be dismissed. Although Wiley (1997) and Wiersma (1992) regarded pay as an important motivator, based on the assumption that it was a form of feedback for individuals, controversy remains whether pay has any motivational qualities. The main contribution of Herzberg *et al.*'s (1957) theory is assuredly that of job enrichment. This aspect of the theory is the most utilised, with numerous studies (Garg and Rastogi, 2005; Love and Edwards, 2005; Morrison, Cordery, Girardi and Payne, 2005; Wiley, 1997) supporting the concept of job redesign utilising an enrichment process.

Herzberg's theory has been challenged by some (Wernimont, 1966), and re-formulated by others (Hackman and Oldham, 1976; Lindsay, Marks and Gorlow, 1967), yet his approach of identifying individuals' opinions followed by classification of factors appears to be a more successful method for studying graduates' careers than the more conventional attitude measurement approach. The belief however that his theory is technique bound casts doubt over any results obtained from implementing his approach, unless an identical method of investigation were simultaneously employed. Despite the comprehensive criticisms levelled against his model, Herzberg *et al.*'s (1957) motivation-hygiene theory has enhanced our understanding of motivation at work (Steers *et al.*, 1996), especially at the graduate entry level.

#### Existence Relatedness Growth Theory

One of the earliest empirical attempts to formulate and test an alternative to Maslow's (1943) hierarchy of needs theory was that of Clayton Alderfer's (1967, 1969) Existence Relatedness Growth Needs Theory (E.R.G.). Fundamentally, Alderfer's theory is an extension of Maslow's theory, in addition to incorporating the work of a number of earlier psychologists concerned with human motivation. Alderfer (1966) began to address issues within Maslow's (1943) hierarchy of needs theory, but it was not until his publication of two further studies, one in a manufacturing organisation (Alderfer, 1967) and one in a financial institution (Alderfer, 1969), did he interpret his findings as supportive of his E.R.G. theory (Graham and Balloun, 1973). Alderfer attempted to resolve the multitude of issues in Maslow's theory by aligning the needs hierarchy with empirical research (Robbins, 1998). Although Alderfer (1969) carried forward some of Maslow's key ideas, he condensed Maslow's hierarchy from five needs to three: Existence, Relatedness and Growth needs, which he coined E.R.G. theory. Although there are extensive similarities between the two theories, there are also some fundamental differences which need to be noted and discussed.

Although Maslow's theory was not designed specifically for the work environment, Alderfer's theory attempted to establish a conceptualisation of human needs that are relevant to organisational settings (Steers *et al.*, 1996). The focus of Alderfer's

theory on job-specific factors bestows the theory with a significant advantage over Maslow's (1943) needs hierarchy theory (Arnolds and Boshoff, 2002). Much confusion however surrounds some of these factors within the work setting. Alderfer's theory proposed that needs could be activated by either a "*need fulfilment progression*" or "*need frustration regression*." Essentially this entails that an individual who has a satisfied need moves to the next higher level or if an individual's need is consistently frustrated, they will retreat to a need that is already sufficiently satisfied (Morley *et al.*, 1998). This concept is a marked departure from that of Maslow's theory, and is discussed in greater detail later. Although Furnham (2005) noted that need theorists are not in agreement about the number of needs in existence, he added that Alderfer's theory is much less constrained by the hierarchical order of these needs than Maslow's theory.

Firstly, there are some points that need consideration. A distinction must be made between primary and secondary needs. Primary needs, as defined by Alderfer (1972), refer to "*innate tendencies which an organism possesses by the nature of being the creature that it is*." Existence, relatedness and growth needs are all primary needs, which are innate. In contrast, secondary needs "*refer to acquisition or learned tendencies to respond*." E.R.G. needs can be increased in strength through learning processes, however these learning processes by themselves cannot bring into existence E.R.G. needs. E.R.G. theory is not a theory explaining how people learn, but is a theory about the subjective states of satisfaction and desire.

Both Maslow and Alderfer agree that satisfaction of a need influences both its own importance and that of the next higher-order need. Maslow believed that satisfaction of a growth need leads to it becoming more, rather than less, important. Alderfer differed in this regard, arguing that a lack of satisfaction of a higher order need can lead to a lower order need becoming more important. A crucial difference between the theories is that Alderfer maintains that all the levels within the hierarchy are simultaneously active, thus unlike Maslow's theory, the concept of prepotency does not emerge in Alderfer's theory, therefore his theory is more yielding regarding the hierarchical structure of the needs than Maslow's theory is.

Maslow (1954, p. 71) acknowledged that the need categories within his hierarchy are not totally independent, indicating that there is an overlapping between drives and that an attempt to separate these drives would prove difficult. Alderfer's E.R.G. theory however makes provision for the interdependence between drives, "*at a purely conceptual level it is not quite clear where safety needs depart from physiological needs, on the one hand, and love needs on the other...A similar point may be made regarding esteem needs*" (Alderfer, 1969, p. 145). Thus Alderfer's existence needs encompass Maslow's physiological and safety needs, the relatedness needs include Maslow's social, and part of the safety and esteem needs. Finally, the growth needs represent Maslow's self-actualisation need and the internally based segment of the esteem need (Mitchell and Moudgill, 1976). E.R.G. theory assumes that these three categories of needs are active in all organisms. People possess some degree of each need, but the strength of each need differs between individuals and cultures.

The existence needs refer to all various forms of material and physiological factors necessary to sustain human existence. Thus, the existence needs are concerned with providing our basic material existence requirements. Such needs include: the working environment, pay, fringe benefits and physical working conditions. Both hunger and thirst are forms of a deficiency in existence needs. The basic characteristic of this group of needs is that they are divided among individuals, where one person's gain is another person's loss when resources are in short supply. An example of the deficiency need can be seen when two people are hungry, that is, the food eaten by one individual is no longer available to the other. More appropriate in this context are examples within organisational settings, such as when a decision is made that increases the pay level of an individual/group, then that decision may eliminate the possibility that another individual/group will receive additional pay increases. Satisfaction of the existence needs for an individual, or group, beyond the least amount, is dependent upon a comparison with a significant other/group in the same situation. This comparison however is not "*interpersonal*," in the sense that comparisons need not be between known significant others. On the other hand, the comparison for material commodities is simply among a quantity of commodities, this comparison does not necessarily add the additional dimension of knowing who the significant other is and whether they received smaller or larger amounts

(Alderfer, 1972). Satisfaction of the existence needs is based on ensuring that an individual receives sufficient and various material substances that he/she wants. When material resources are scarce, *“a person with high needs will be able to obtain a lower proportion of his desires than a person with low needs”* (Alderfer, 1972, p. 18). When there is no scarcity, all individuals alike will be able to satisfy their needs.

The relatedness needs include all socially oriented needs. These involve the relationship one has with significant others and the desire one has for maintaining these relationships. Significant others include family members, co-workers, superiors, subordinates, friends and enemies. Significant others may also include groups. An individual can be regarded as a significant other *“if he has sustained interaction with this person either by virtue of his own choice or because of the setting in which he is located”* (Alderfer, 1972, p. 10). Therefore, as in Maslow’s theory, the environment and thus the organisational context play an important role in E.R.G. theory.

A characteristic of the relatedness needs are that their satisfaction depends greatly on the processes of sharing and mutuality. Satisfaction of the relatedness needs does not necessarily mean that the outcome will always be a positive one for the individual or for both parties. The exchange or expression of anger and hostility in a relationship is equally as important as that of the exchange or expression of warmth and closeness. Thus, as Alderfer believed, *“the opposite of relatedness satisfaction is not necessarily anger, but it is a sense of distance or lack of connection”* (Alderfer, 1972, p. 11). Differences between existence and relatedness needs are more prevalent when there is a lack of resources to satisfy either need. For existence needs, when there is scarcity of material goods, then the individual who receives this material will be highly satisfied. Conversely, for relatedness needs, when there is a scarcity then both individuals will be affected in a comparable way. Therefore, as Alderfer noted, *“if a relationship is not working, both (or all) parties suffer”* (Alderfer, 1972, p. 11). That is not to say however that both parties suffer to the same degree, as one person over another may find the relationship more central. Satisfaction of the relatedness needs depends on a person establishing relationships with significant others in which they can share their feelings and thoughts. Most people are aware of the feelings and thoughts of others and thus, can increase their relatedness satisfaction simply by



being more empathic and sharing more of themselves with others. Individuals however vary in the amounts of relatedness satisfaction they can endure. A person high in relatedness needs may find it difficult to satisfy his/her relatedness needs, as significant others may perceive him/her as being overwhelming. Similarly, those persons low in relatedness needs may also find it difficult to satisfy their relatedness needs due to perceptions from significant others of not investing enough of themselves into the relationship.

Growth needs are those related to the development of human potential, that is, they are an intrinsic desire for personal development. This concept bears similarity to the concept of self-actualisation proposed by Maslow (1943), as Alderfer explains, “*a person experiences a greater sense of wholeness and fullness as a human being by satisfying growth needs. Thus, satisfaction of growth needs depends on a person finding the opportunities to be what he is most fully and to become what he can*” (Alderfer, 1972, p. 12). Satisfaction of the growth needs are determined by a person engaging in problems which call upon them to utilise their capacities to the fullest. Environmental conditions are a contributing factor to satisfaction of the growth needs. Growth satisfaction requires a proactive approach. An unresponsive environment however will do little in the way to help achieve satisfaction and can ultimately restrict satisfaction. Some environments foster little opportunity for stimulation or challenge, thus inhibiting satisfaction of these needs. A typical example of such an environment, as given by Alderfer (1972), is that of an assembly-line worker. Hackman and Lawler (1971) studied the job characteristics and needs of employees working in a public utility corporation. The results showed those employees high in growth needs valued autonomy and the ability to utilize their skills. Environments such as those of management positions offer high degrees of stimulation and autonomy, compared to positions lower in the organisational hierarchy.

Similar to Maslow’s hierarchy of needs, the existence, relatedness and growth needs are described as separate, distinct entities. These three needs can be ordered within the hierarchy according to their concreteness, beginning with the most concrete need and rising to the least concrete need. As the existence needs are predominantly material in nature, their absence and presence is more highly notable than other

needs, hence their classification as the more concrete of the three needs. The relatedness needs are less concrete than the existence needs. In this instance, their presence and absence is dependent on the relationship between two or more individuals, thus making them less tangible than existence needs. Finally, the growth needs are the least concrete of the three needs. Growth needs are dependent on the uniqueness of each person, thus the person alone can determine what their growth level is. This description is more clearly stated by Alderfer, explaining, “*the continuum from more to less concreteness is also a continuum from more to less verifiability and from less to more potential uncertainty for the person*” (Alderfer, 1972, p. 16).

The concept of satisfaction-progression played a key role in the structure of Maslow’s (1954) hierarchy of needs. When one need was satisfied another emerged in its place, however, one could not progress to the next level until the current need was fully satisfied. However in E.R.G. theory movement up the hierarchy does not necessarily mean that the current need has been completely satisfied. For example, Alderfer (1972) argued that movement from existence satisfaction to relatedness desires could be possible in a situation where a person would fear others less as competitors for scarce material if their existence needs were satisfied, thus, in such a scenario satisfaction of the relatedness needs would allow the individual to satisfy their existence needs. This example argues against the concept of satisfaction-progression in E.R.G. theory, clearly showing that one can move up and down the hierarchy. The concept of frustration-regression is seen extensively in E.R.G. theory. Frustration-regression is the tendency of individuals to want more concrete ends as a consequence of not being able to obtain more differentiated, less concrete ends. Thus, a person will seek out more material substances when their relatedness needs have not been satisfied, using these as a more concrete way of establishing connectedness with others. Similarly, one will seek relationships with significant others in an attempt to use them as an alternative source of stimulation when the growth needs have not been satisfied. Nevertheless, in none of the foregoing situations should it be assumed that substitution gratification would satisfy the original desire.

Alderfer (1972) distinguished four general ways in which Maslow's (1943) theory of human needs differs from E.R.G. theory. One of these differences can be seen in the need categorisation of each theory. Maslow's theory proposes five categories within the hierarchy. There appears however to be some ambiguity among this form of categorisation. For instance, it appears that safety needs overlap with physiological needs. As a result, Alderfer combines both physiological and safety needs together to create existence needs. These differences in categorisation between the theories can also be seen in Alderfer's relatedness needs and growth needs, both incorporating higher-order needs from Maslow's hierarchy, as mentioned previously. Maslow's need hierarchy follows a rigid, step-like progression. E.R.G. theory does not presume the existence of a rigid hierarchy in which a lower level need must be substantially gratified before one can move on. This absence of a strict hierarchy overcomes a criticism that Maslow (1943) himself noted, that is, that the creative urge can be seen not only in self-actualising individuals but also in those who may not necessarily have their lower-order needs satisfied. Maslow assumed that once a need has been satisfied that it no longer plays an active dominating role for the organism. E.R.G. theory however holds the view that a need can remain a motivator if it is to act as a substitute for some other need, which has not been completely satisfied. As well as dealing with how satisfaction affects desire, E.R.G. theory also deals with how chronic desires affect satisfaction. Maslow's theory however does not deal with the latter.

According to Ivancevich and Matteson (1999), E.R.G. theory has not attracted as much research attention as Maslow's theory, but it appears to be a reasonable modification of it. Robbins (1998) stated that E.R.G. theory is regarded as a more valid version of the need hierarchy. However, like Maslow's theory, E.R.G. is also a difficult theory to test. Franklin, Brozek and Keys (1948) carried out semi-starvation experiments on thirty-six voluntary male subjects. There was a constant desire for food, even after the subjects had eaten a bulky meal and when other intakes such as cigarettes, tea and coffee were substituted for food, the results showed that food deprivation leads to desires for materials that are "*non-hungry-reducing*" (Alderfer, 1972). Research on the effects of starvation and thirst by Wolf (1958) demonstrated that when people are hungry or thirsty they often can think of little else and as a result their social relationships deteriorate. Evidence in support of the relatedness

needs can be seen in a study carried out by Newman (1948) who examined the relevance of interpersonal needs in organisational settings. A questionnaire was sent to non-supervisory employees and supervisors. The results showed that those employees who experienced relationship problems with their supervisor or peers, or both, tended to place greater emphasis on the importance of relationships with their supervisor.

Recent research by Arnolds and Boshoff (2002) on E.R.G. theory examined the influence of need satisfaction on self-esteem and the influence of self-esteem on the performance intention of managers and frontline employees. Results from their study showed that esteem exerted a noteworthy influence on both management and frontline employees. Management are primarily motivated by growth needs, that is, higher-order needs. A challenging work environment with the capacity to provide for advancement, creativity and autonomy is the key motivator of job performance for management. Alternatively, frontline employees are primarily motivated by the satisfaction of relatedness needs from peers and existence needs, particularly monetary compensation. Nevertheless, Arnolds and Boshoff (2002) stated that remuneration and satisfaction with fringe benefits are “*hygiene factors that must be in place to prevent employee dissatisfaction,*” but they do not enhance the self-esteem of frontline employees. An earlier study by Arnolds and Boshoff (2000) into the causal relationships between various need satisfactions, as proposed by E.R.G. theory, and employee job performance, also showed similar findings. Again, relatedness needs were of importance to frontline employees, whilst growth needs were of greater importance to management.

Although there has been a lack of research conducted on the E.R.G. theory, there has been some studies carried out (e.g., Arnolds and Boshoff, 2002; Ashforth and Saks, 1996; Higgins and Kram, 2001; Katz, 2005; Pierce, Gardner, Dunham and Cummings, 1993). However, this lack of empirical research support on Alderfer’s E.R.G. theory has not restricted its implementation by management and human resource personnel in organisational settings.

Although overshadowed by the popularity of Maslow’s (1943) theory of human needs, E.R.G. theory certainly presents a viable alternative, overcoming many of the contradictions within Maslow’s theory. Regardless of the lack of empirical

investigations into the theory, Luthans (1998) noted that E.R.G. theory has elicited more support from contemporary researchers as far as motivation in work settings is concerned. A final statement from Alderfer appears appropriate and may apply to all motivation theories, regardless of the presence or lack of empirical support; it is “*a fair statement to say that no theory is ever final or fully comprehensive. Certainly that is true of E.R.G. theory, based upon the initial results of empirical work testing it*” (Alderfer, 1969, p. 144).

Content or Need theories provide a useful understanding of the various needs and the behaviours these needs elicit. Nevertheless, disagreement remains regarding the number of needs, with Maslow (1943) identifying five categories and Alderfer (1966) three, while Murray (1938) proposed a list of twenty needs (Morley *et al.*, 1998). All of the need theories discussed have some limitations, none are above criticism, yet they all provide an insight into employee motivation. Morley *et al.* (1998) believed that need theories do not thoroughly scrutinize the concept of motivation. Therefore a number of the more significant process theories will now be assessed to illustrate the concept of motivation beyond that of merely a response to a need.

### Process Theories

The second classification of motivation theories are the process theories, or cognitive theories. The term “*second*” however may be misleading, indicating that process theories are of lesser importance than content theories. This is not the case, both content and process theories of motivation have a comparable standing. Content theories of motivation have made, and still do make central contributions to the understanding of motivation in work environments. While content theorists argue that individuals experience various needs and respond by means of satisfying whichever need is most intense, process theorists argue that individuals are more complex and contemplative than is assumed by content theorists (Morley *et al.*, 1998).

Process theories are concerned with factors that determine an individual’s persistence or willingness in work environments. Thus, such theories focus on factors and

processes internal to an employee. Unlike content theories that focus on the characteristics of the work itself, process theories deal with employees' perceptions about their jobs, their estimates of what they stand to gain from their effort, and the decisions employees make based on their estimates.

The process theories of historical and theoretical significance are critically reviewed in this section. These include John Stacy Adam's (1963) Equity theory, Victor Vroom's (1964) Valence Instrumentality-Expectancy theory (V.I.E.) and Edwin Locke's (1968) Goal-Setting theory. Process theorists have demonstrated that prior to exerting energy for the attainment of a goal, employees enter into a decision making process. This process examines the validity of the goals they wish to pursue (Goal-Setting theory), examines the likelihood of achieving those objectives with a particular course of action (V.I.E. theory), compares their situation to that of a referent other and examines the differences between the energy they exert and the outcomes obtained from exerting that energy (Equity theory) (Morley *et al.*, 1998).

### Equity Theory

Like all other process theories, John Stacy Adam's (1963) Equity theory states that an individual's conscious evaluation of their situation and work outcomes directs the motivation process (Morley *et al.*, 1998). Adam's (1963) theory examines the motivational effects of distributive justice. Essentially this is contingent on a comparison between the inputs and outcomes of one's effort to those of another person. Although there have been several social exchange theories developed, Adam's theory is examined for several reasons. Steers *et al.* (1996) stated that Adam's theory is, for the most part, the most rigorously developed social exchange theory. They also noted that the array of research conducted on equity theory was based on "employer-employee" exchange relationships, thus the theory and the resultant research is indeed relevant to an understanding of behaviour in organisational settings. The implications of equity theory for management also warrant discussion. The theory highlights the motivational effects that comparison of pay and fringe benefits between individuals and groups can have on employees, as well as acknowledging the need employees have to believe they are being rewarded equitably for their efforts.

Adams' (1963) Equity theory is an extension of Festinger's (1957) theory of cognitive dissonance. Festinger stated that the existence of dissonance causes tension for any individual who experiences it, thus they will be moved to reduce those dissonant cognitions. Equity theory, although based on this hypothesis, also introduces a set of conditions referred to as "*inequity*," which "*result in tension or distress*," which "*the person experiencing it will be moved to reduce*" (Adams and Freedman, 1976, p. 44). The introduction of a second individual differentiates equity theory studies from cognitive dissonance studies. The main premise of equity theory being that individuals, in both their working and personal lives, seek justice. Homans (1953) referred to one's expectations of people in an exchange relationship, that is, one expects to receive rewards, but also to see others receive rewards relative to the amount of effort they exert. Therefore, people judge not only their own rewards based on effort exerted but also with the rewards others receive when they exert similar levels of effort.

Adams' (1963) model of equity theory generated considerable research in comparison to other models of equity theory. The major components of exchange relationships in Adams' (1963) model of equity theory are inputs and outcomes, with individuals contributing their inputs for outcomes. In the work environment inputs are many and varied and include among others, education, previous work experience, training, commitment and ability. Outcomes are direct results from exchanges and are generally financial in nature, but may also include other intangible rewards such as, recognition, job security, fringe benefits, seniority benefits, status symbols and responsibility. Steers and Porter (1991) regarded pay as the most significant outcome in the work setting. For consideration in exchange relationships, inputs and outcomes must first adhere to two criteria. Firstly, one or both members of an exchange relationship must accept the existence of inputs and outcomes. Secondly, both the inputs and outcomes must be regarded as relevant to the exchange. That is, they must be considered useful to the exchange. If either the inputs or outcomes are not accepted or not considered relevant by either party within the exchange, they will not be taken into consideration when evaluating that exchange relationship.

Adams (1963) used the term "*Person*" to refer to an individual and the term "*Other*" to refer to the second individual, or group of individuals, in an exchange relationship

in order to aid in abridging his discussion of equity theory. Adams (1963) defined Person as “*any individual for whom equity or inequity exists*” and Other as “*any individual or group used by Person as a referent when he makes social comparisons of his inputs and outcomes*” (Adams, 1963, p. 424). Both Person and Other may also represent, rather than any one individual, a group of individuals. Along with these definitions, Adams (1963) also stated that Other is more often than not a separate individual to Person. There are however some situations which may result in any single individual being both Other and Person, such as, in another job or a social role.

Adams (1963) suggested that individuals weigh their inputs and outcomes based on the importance they place on those inputs and outcomes. An evaluation of inputs and outcomes is achieved by separately summing the weighted inputs and outcomes. During the summation process, the inputs and outcomes are regarded as independent, yet they may be highly related to one another. Finally, the ratios of Person’s outcomes to inputs are then compared to the ratios of Other’s outcomes to inputs. Essentially Person will evaluate their outcomes and inputs by comparing them to those of Other.

Adams (1963) stated that if Person’s ratio is similar to that of Other then equity exists. Equally, if that ratio is dissimilar, then inequity is said to exist. Adams (1963) defined inequity as existing for Person “*whenever his perceived job inputs and/or outcomes stand psychologically in an obverse relation to what he perceives are the inputs and/or outcomes of Other*” (Adams, 1963, p. 424). Adams (1963) endlessly reiterated the importance of Person’s perception of their own inputs and outcomes, as well as with those of Other, rather than to their actual value. Some important characteristics of these definitions must be noted. Firstly, an individual’s perception of both inputs and outcomes are vital for the production of equity or inequity. Contrary to assumption, environmental characteristics are less important than Person or Other’s perception of their inputs and outcomes. Tornow’s (1971) research provided evidence in support of the importance of an individual’s perception by demonstrating that an outcome to Person may be perceived by Other as an input, and visa versa. Middlemist and Peterson (1976) stated that a person’s perceptions of inequity are an “*internal, psychological phenomena,*” which cannot be directly



measured, thus one must infer them from a person's behaviour. Secondly, inequity will not necessarily transpire for Person if they have high inputs and low outcomes, as long as Other has a similar ratio of outcomes to inputs. Thirdly, inequity exists for an employee when they are comparatively underpaid and comparatively overpaid. It is this aspect of Adams' theory which has generated considerable research attention. Finally, while Adams (1963) developed a formula for the measurement of both equity and inequity, Walster, Bercheid and Walster (1976) noted that these formulas are impaired in situations where the inputs of Person and Other are negative, thus Walster *et al.* (1976) devised an alternative formula to account for this anomaly.

As mentioned earlier, the presence of inequity in Person creates tension/distress in him/her. Thus Person will be moved to reduce that inequity. Adams stated that distress has "*the characteristics of anger and guilt*" (Adams and Freedman, 1976, p. 45). Adams (1963) noted that advantageous inequity produces feelings of guilt, while disadvantageous inequity produces feelings of anger. Adams and Freedman (1976) stated that advantageous inequity might be "*a product of chance, responsibility, or intention*" (Adams and Freedman, 1976, p. 46). Although there is support (Homans, 1953; Ross, Thibaut and Evenbeck, 1971) for Adams' belief that disadvantageous inequity results in anger, there is a notable lack of support affirming his belief that advantageous inequity results in feelings of guilt (Adams and Freedman, 1976). Although disadvantageous inequity is believed to result in feelings of anger, Homans (1953) noted from two studies carried out on disadvantageous inequity that individuals responded with different experiences.

Weick and Nessel (1968) believed that inequity could arise in three ways. That is, by "*own inequity*" (Person's input/outcome ratio, when compared to their internal standard, is internally unbalanced), "*comparison inequity*" (Person's input/outcome ratio is internally balanced, but unbalanced when compared to Other) or "*own-comparison inequity*" (Person's input/outcome ratio is both internally unbalanced and when compared to Other). Adams and Freedman (1976) noted that more often than not inequity is experienced by Person when Other (or visa versa) declares an injustice or sets about reducing that injustice. The presence of inequity motivates Person to reduce that inequity. The strength of a person's motivation to reduce inequity depends directly on the amount of inequity they experience. Adams and

Freedman (1976) placed great emphasis on the importance of a person's response to inequity, concluding that their response would forecast how they attempt to reduce that inequity. Middlemist and Peterson (1976) stated that tension/distress can be relieved when an individual "*re-establishes proportionate distribution of his/her outcomes and inputs*" (Middlemist and Peterson, 1976, p. 336). Adams (1963) described eight methods to aid in the reduction of inequity. The first four methods involve reducing or increasing inputs, outcomes or both to align them to a similar level of Other. There are some instances however where a person may not increase their inputs, such as, when inputs are gender or ethnicity. Adams (1963) stated that the fifth method of inequity reduction is quite different, that is, people may also "*leave the field*." He acknowledged however that this approach was quite drastic and would be considered only in cases of extreme inequity. The sixth method of inequity reduction involves that of Person, who "*may also psychologically distort their inputs and outcomes, increasing or decreasing them as required*" (Adams, 1963, p. 428). Similarly, a seventh method can be seen when Person may psychologically distort the inputs and outcomes of Other in order to reduce or increase Other's inputs and outcomes. Finally, Person may change their referent Other when inequity exists. That is, Person may select a referent Other with whom they believe to be within a similar capability or pay grade. Adams (1963) concluded that these methods of reducing inequity have varying success rates. The inconsistencies of some inputs and outcomes may disable the use of some of these approaches, while the application of some approaches may have less satisfactory results than others.

There are many adaptations of Adams' (1965) version of equity theory. Two such approaches are those of Weick (1966) and Lane and Messe (1971). These two approaches are briefly examined before being contrasted with Adams' model to determine which of the three models best determines equity within organisational settings. Weick (1966) and Weick and Nessel (1968) disagreed with Adams' approach, arguing it to be too simplistic in nature. They believed that Person, in addition to comparing their own inputs and outcomes with those of Other, should also compare them to their own internal standard, derived from previous social experiences. Weick believed that this standard should also be used to evaluate Other's outcome to input ratio. Lane and Messe's (1971) method of explaining how concerns with equity are expressed echoed that of Weick's (1966) method. They

suggested that when Person distributes rewards they should consider only the level of inputs of Other. Therefore, if the inputs of Other were to exceed a given level, the rewards would be distributed equally, otherwise Person would redirect more rewards to themselves. An examination of all three approaches was conducted by Lane and Messe (1972) resulting in them stating that no one model of equity theory could explain the behaviour of individuals, both in previous studies, as well as in their own. Bass and Barrett (1981) noted that employees measure how well they are rewarded for their work by comparing their rewards to the rewards received by other individuals in similar occupations and situations. Those who believe this comparison to be inequitable seek to achieve equity. Lawler (1973) noted that a person's desire to seek equity affects their work performance or behaviour. In the work environment, Aboulghassem (1981) stated that Person may perceive inequity as being in their favour when their effort, costs and investments are compared to those of Other, and the comparison shows Person to have been overpaid. Alternatively, Person may perceive inequity as being against him/her if a comparison with Other showed that Person were being paid less than they ought to have been. Bass and Barrett (1981) concluded that underpayment and overpayment produce feelings of anger and guilt respectively. Thus, these emotional states produce tension, resulting in Person being motivated to restore equity. Studies (Adams and Rosenbaum, 1962; Arrowood, 1961) show that those who perceive their outcomes as too high, in comparison to those of Other, are motivated to increase their inputs.

There has been considerable research (Adams and Jacobsen, 1964; Goodman and Friedman, 1968; Lawler, 1968; Wood and Lawler, 1970) conducted in equity theory regarding methods of compensation, that is, hourly versus piece-rate payment methods. Adams (1963) regarded underpayment as a negative inequity, stating that employees would perceive underpayment as inadequate for payment in relation to their work inputs. Similarly Adams (1963) believed overpayment to be perceived as a positive inequity. That is, an employee would experience feelings of guilt if it was determined that they were being overpaid relative to their colleagues. Support for these predictions is provided by research conducted by Jacques (1961) who reported that employees underpaid by 10% felt "*a sense of grievance*" to the degree that if their organisation failed to respond in sufficient time they felt "*an active desire to change jobs*" (Jacques, 1961, p. 26.). Yet Middlemist and Peterson (1976) stated that

Person may in fact tolerate a certain level of inequitable underpayment, if it allowed them to demonstrate superior prowess over Other. Jacques (1961) stated that those employees overpaid by 10-15% reported strong feelings of “*preferential treatment*,” whilst also reporting “*underlying feelings of unease*” (Jacques, 1961, p. 26). Equity theory predicts that employees working under a piece-rate payment system, who believe they are being overpaid, will simply produce fewer, but better quality, product. Alternatively, those employees who are paid hourly will increase their productivity levels. Adams and Rosenbaum (1962), however, stated that employees would increase productivity only if no other means of reducing inequity were available to them. Similarly, Adams and Rosenbaum (1962) noted from their studies that employee perceptions of inequity when working under a piece-rate system merely resulted in them avoiding inequity rather than setting about to reduce it. This is due to an increase in production being regarded as an increase in inequity, thus, as employees wish to reduce inequity, they will simply limit the level of production rather than decrease production. Arrowood (1961) provided support for these predictions from a series of studies he conducted. These predictions can provide organisations with immense leverage by which to control employees. For example, an organisation may withhold any increments in pay, benefits or promotions to employees, thus eventually it is believed that employees would resign due to the organisation’s oppressive “*message*” (Adams and Freedman, 1976).

Notwithstanding the predominant support (Andrews, 1967; Jacques, 1961; Leventhal and Michaels, 1969; Sayles, 1958) in favour of equity theory, several researchers (Campbell and Pritchard, 1976; Goodman and Friedman, 1971; Pritchard, 1969) have been critical of research in this area, expressing concerns that alternative explanations for a subject’s performance level may exist. Steers and Porter (1991) argued that inequity is often induced in subjects by misleading them into believing they lack suitable qualifications, experience, or both. Steers and Porter (1991) argued that this in turn threatens the subject’s self-esteem or perceived job security, thus they will often work harder simply to “*prove themselves*” in order to obtain job security. Middlemist and Peterson (1976) noted the distinction between a cognitive dissonance study and one using Adams’ equity theory. They stated that any equity study without a comparison Other is merely a cognitive dissonance study, thus concluding that a comparison Other is essential in any study of equity theory. Locke

(1976) questioned whether overpayment resulted in perceived inequity. He argued that unlike laboratory experiments, employees are rarely told they are overpaid and made to feel incompetent, thus Locke noted that employees are more likely to adapt their understanding of equitable payment in order to justify their rewards.

Although originally an extension of Festinger's (1957) theory of cognitive dissonance, equity theory developed into an acknowledged theory of motivation. Although Adams' (1963) version of equity theory is regarded as the predominant model of social exchange processes, there remain some scenarios where his model cannot be used. An example of such a scenario was provided by Adams and Freedman stating, "*equity theory appears weakly prepared to be applied in social problems*" (Adams and Freedman, 1976, p. 55).

Research support for equity theory is generally evident in two main areas. Those are, firstly in situations of underpayment (Crosier and Dalton, 1989) and secondly the theory's applicability in a variety of cultural settings (Shenkar and von Glinow, 1994). Equity theory remains an important motivation theory, with relatively recent extensions being applied (e.g., Huseman, Hatfield and Miles, 1987; O'Neil and Mone, 1998). A model of equity theory combining Adams' (1963) model and the revisions applied to same by Walster *et al.* (1976), as well as consideration of the issues noted by several researchers may lead to a fuller model of equity theory being developed. However, as Lane and Messe (1972) noted, no one model of equity theory has the capacity to explain employees' behaviour. Campbell and Pritchard (1976) and Lawler (1973) both argued that most of the hypotheses from equity theory can be handled by Expectancy theory. Pinder (1998) however, believed that equity theory has more to offer than its relationship with Expectancy theory, arguing that the theory comprises a significant element of distributive justice as well as deprivation theory, thus the theory is a more comprehensive model of fairness in work settings than any other available theory. Nevertheless, Steers *et al.* (1996) stated that organisational researchers have all but abandoned equity theory in favour of other motivation theories. Steers *et al.* (1996) concluded that equity theory may be of more use to social psychologists wishing to increase their understanding of interpersonal interactions in the work environment than it is to organisational behaviourists. Nevertheless, the theory acknowledges the importance of equity

consistency and fairness in the employment relationship and identifies the implications of inequity for the employee and the employer.

### Expectancy-Instrumentality Theory

Expectancy theories recognise the role of conscious thought processes and claim that a person's calculations, expectations and evaluations within this thought process lend an understanding of the process of motivation (Morley *et al.*, 1998). Victor Vroom (1964) presented the first formulation of Expectancy theory designed specifically for organisational settings. Vroom's (1964) theory is the culmination of three specific categories of beliefs that employees hold regarding their work; they are 1) Expectancy, 2) Instrumentality and 3) Valence (DiCesare and Sadri, 2003). Essentially Vroom's model assumes that employees make conscious choices about their work behaviour. Vroom's (1964) Valence Instrumentality-Expectancy (V.I.E.) theory is the most celebrated motivation theory among organisational behaviourists since its development (Locke, 1975).

Vroom's theory has been included in the present discussion for a number of reasons. Chief among these are the implications the theory has for organisational settings and for management personnel wishing to increase subordinate motivation levels. Pinder (1998) argued that V.I.E. theory helps management to understand their employees' intentions and goals in a work setting. Vroom (1964) suggested that management ought to clearly recognise their employees' goals, and link those goals to desired performance levels. Expectancy theory highlights the importance of an effort-reward balance between the effort the employee makes and the reward he/she receives. A brief description of Expectancy theory is discussed before examining in greater detail Vroom's (1964) V.I.E. theory.

Expectancy or Instrumentality theory states that people engage in activities likely to be instrumental in achieving valued goals. People are therefore motivated by the desired outcomes of their actions, coupled with the motivation to achieve these goals (Aboulghassem, 1981). Two of the most prominent figures in the development of Expectancy theory were Tolman (1932) and Lewin (1938). Their theories are based on the assumption that people have behaviour response “*expectations*” or

“*anticipations*” concerning future events. These expectations take the form of beliefs concerning the likelihood that a certain act will be followed by a certain outcome (Porter and Lawler, 1968). Expectancy theories are hedonistic in nature, that is, they assume that people endeavour to attain pleasure and avoid pain. Both Tolman (1932) and Lewin’s (1938) theories reflect the influence of hedonism. They observed behaviour as being goal-directed with organisms motivated to either attain positive goals or to avoid negative goals (Vroom, 1964). Expectancy theory maintains that people are motivated to work when they believe it is possible to achieve things they desire from work.

There has been much research carried out into Expectancy theory, with many contributions (Atkinson, 1964; Edwards, 1954; Peak, 1955; Vroom, 1964) to the development of the theory. To date the most widely accepted version of Expectancy theory is that of Victor Vroom’s Valence Instrumentality-Expectancy (V.I.E.) theory. It must be noted however that Vroom (1964) did not propose a single operational definition for Valence, Instrumentality or Expectancy as he regarded them as “*untestable*.” Thus he outlined a series of approaches for their measurement to overcome what he termed this “*eclectic*” problem (Vroom, 1964, p. 20).

Locke (1975) noted that Vroom’s V.I.E. theory is one of the most popular theories of work motivation among organisational scientists. Steers and Porter (1991) argued that Vroom’s theory provided the basis for all other Expectancy theories. They acknowledged however the significant contributions made by earlier theories (Davidson, Suppes and Siegel, 1957; Lewin, 1938; Rotter, 1955). V.I.E. theory assumes that “*the choices made by a person among alternative courses of action are lawfully related to psychological events occurring contemporaneously with the behaviour*” (Vroom, 1964, p. 14-15). That is to say, a person’s behaviour results from conscious choices they make among alternatives. These choices are related to psychological processes, particularly perception and the formulation of beliefs and attitudes. The rationale for these choices is to maximise pleasure and minimize pain (Steers and Porter, 1991). In the work environment, employees choose to perform at the level that results in the greatest personal return. V.I.E. theory specifies that people have three forms of cognitions; namely Valence, Instrumentality and Expectancy, with motivation resulting when all three cognitions are at their highest.

Vroom (1964) assumed that *“at any given point in time, a person has preferences among outcomes or states of nature”* (Vroom, 1964, p. 15). For example, a person would in all probability prefer a higher rate of pay to a lower rate. In this instance the pay level (be it higher or lower) is the outcome in question, and a preference for high pay over low pay reflects an individual’s basic fundamental need state (Vroom and Deci, 1992). The term valence is used by Vroom (1964) to refer to the affective orientations people hold towards a particular outcome. An outcome can be either negatively or positively valent. The latter is achieved when a person prefers attaining the outcome to not attaining it. Equally, an outcome is negatively valent when an individual prefers not attaining it to attaining it. Valence is represented on a scale ranging from positively valent through a zero valence to negatively valent. A zero valence results when a person is indifferent to whether they attain the outcome or not. Vroom assumed that valence could *“take a wide range of both positive and negative values”* (Vroom, 1964, p. 15). Thus, valence is the pending satisfaction from an outcome. Vroom stated the importance of recognising the difference *“between the valence of an outcome to a person and its value to that person”* (Vroom, 1964, p. 15). That is to say, that a person may hunger for an object yet obtain little satisfaction from its acquisition. Additionally, a person may endeavour to avoid an object that they may later find satisfying.

Vroom stated that at any given time there may be significant discrepancies between anticipated satisfaction from an outcome and the actual satisfaction received from that outcome. That is, for a person, the value of an outcome will be either higher or lower than the original valence (expected outcome) they were motivated by. There are many outcomes that can be either positively or negatively valent to a person, yet these outcomes are not regarded as satisfying or dissatisfying. The strength of one’s desire or aversion for these outcomes is not based on the outcome’s intrinsic properties but rather on their anticipated satisfaction or dissatisfaction as well as with other outcomes to which they are affiliated. Vroom (1964) believed that if a person perceived an object as leading to a desired outcome, then they would have a positive attitude toward it. Likewise, if the object is perceived to lead to undesired consequences then a person is believed to have a negative attitude toward it. Peak (1960) provided support in favour of these assumptions. Her study showed that



students were most negative on exam days to conditions hindering them from achieving high grades, when it was presumed their motivation for a higher grade would be strongest. Furnham (1992) believed that personality factors determine valence. He argued that some employees might not value the rewards the organisation bequeaths, thus organisations must determine what rewards employees' value, as rewards of low valence will not affect motivation. Supervisors must ensure that positively valent rewards are associated with improved job performance, but more importantly they must ensure that their employees observe this connection. It is often, however, the case that supervisors have limited resources compounded by organisational policies restricting pay and benefits (Steers and Porter, 1991). Festinger and Aronson (1960) noted that "*insufficient rewards*" after considerable energy expenditure often led employees to attribute further values to the consequences of energy expenditure.

Campbell and Pritchard (1976) defined Instrumentality as "*the perceived contingency that one outcome has for another*" (Campbell and Pritchard, 1976, p. 74). Vroom stated that "*a given level of performance is positively valent if the employee believes that it will lead to other outcomes.*" These "*other*" outcomes are called "*second-level outcomes*" (Vroom and Deci, 1992, p. 92). That is, an employee will increase their work performance if they perceive it to be instrumental in the attainment of outcomes that are believed to result in gratification. Similarly, employees will increase their performance if they perceive it as instrumental for avoiding unwanted outcomes. For example, if an employee believes that high performance is instrumental in the attainment of a promotion, or instrumental for avoiding losing one's job, then they will strive for high performance. Steers and Black (1994) supported this assumption but added that an employee's level of performance is dependent on whether they value these second-level outcomes. Vroom summarising, stated that "*something is said to be instrumental if it is believed to lead to something else, if it helps achieve or attain something else*" (Vroom and Deci, 1992, p. 93). Vroom (1964) was an advocate of considering instrumentality as a "*probability belief*" linking one outcome to another. For example, an employee would determine whether low absenteeism would lead to a bonus. This is represented on a scale ranging from 1.0 (meaning the attainment of a second level outcome is certain if the first has been attained) through 0 (meaning that there is no relationship between

attainment of either the first or second level outcomes) to  $-1.0$  (meaning that attainment of the second level outcome is certain without the first level, however, attainment is impossible with the presence of the first level outcome). Vroom termed this method, whereby instrumentality can take values ranging on a scale, an “*outcome-outcome association*” (Vroom, 1964, p. 18).

It must be noted that for an outcome to be positively valent, a person must also perceive other outcomes associated with it as positively valent. If employees believe that a high level of performance leads to things they dislike, then high performance will not be positively valent for them, thus they will not strive to achieve high performance. If employees believe however that high performance rewards them with things they desire, then a high level of performance is positively valent to them, thus they will strive for high performance (Steers and Porter, 1991). Such proposals have many implications for the design of reward systems for use in organisational settings. Buckley *et al.* (2002) suggested that pay remains an important motivational tool in the I.T. sector. They stated that people anticipate certain outcomes from their efforts and will work to achieve these desired outcomes. They also believed pay to be associated with motives such as status, security, esteem and recognition, and as people desire these outcomes they will work towards achieving them.

An individual’s behaviour is altered when they choose from a selection of alternatives, which have ambivalent outcomes and by the degree to which the individual believes those outcomes to be attainable (Vroom, 1964). Psychologists such as Tolman (1959), Rotter (1955) and Atkinson (1958) have referred to these beliefs as expectancies. Vroom defined Expectancy as “*a momentary belief concerning the likelihood that a particular act will be followed by a particular outcome*” (Vroom, 1964, p. 17).

Vroom (1964) stated that expectancies may be illustrated in terms of their strength, that is, maximal strength points to the certainty that an act will be followed by an outcome, while minimal strength points to the certainty that an act will not be followed by an outcome. This strength can be illustrated on a scale with values ranging from 0 (certainty that an act will not be followed by an outcome) through to

1 (certainty that an act will be followed by an outcome). Vroom termed this representation of expectancy “*an action-outcome association*” (Vroom, 1964, p. 18). Vroom and Deci (1992) acknowledged that an employee’s “*expectancy perceptions*” regarding varying levels of job performance are susceptible to a variety of factors. Lawler (1973) supported this statement by indicating that a person’s experience of previous successes on a task strengthens their expectancy beliefs, as does an individual’s level of self-esteem. Fox, Scott and Donohue (1993) reported that when pay is perceived as instrumental in improving self-esteem, the result was increased job performance. Vroom and Deci (1992) suggested that factors such as the quality of material and equipment available, the availability of relevant information and the degree to which a person receives support from their superior all contribute to an employee’s expectancy perception about varying levels of job performance. Hall (1976) suggested that supervisors pay close attention to the structuring of a new hire’s expectancy beliefs when entering a new work setting. Many researchers (Deci, 1975; Hall, 1976; Korman, 1970, 1976) note that successful experiences are essential for developing a new hire’s expectancy belief, however they stated that many organisations adopt a “*sink or swim*” mentality by assigning new hires tasks which are either too difficult or too monotonous. Mobley (1982) stated that the high level of turnover among recent graduates is a direct result of this “*sink or swim*” approach.

Vroom (1964) suggested that a person’s belief about expectancies, instrumentalities and valences all interact psychologically to create a motivational force to act in ways that seem most likely to bring about pleasure or to avoid pain. Vroom (1964) assumed that a person’s behaviour is the “*result of a field of forces each of which has direction and magnitude*” (Vroom, 1964, pp. 18). Vroom (1964) represented his theory as an equation summarising it as “*the force on a person to perform an act is a monotonically increasing function of the algebraic sum of the products of the valences of all outcomes and the strength of his expectancies that the act will be followed by the attainment of these outcomes*” (Vroom, 1964, p. 18). Essentially this statement affirms that people choose from a set of alternative actions the one yielding the strongest positive force. People attempt to maximise their overall best interest by using information available to them as well as their assessment of this information (Vroom and Deci, 1992). Landy and Becker (1987) criticised this approach, noting that as the number of possible outcomes increase, so too does the strain on a person’s

cognitive resources. Thus Landy and Becker (1987) argued that the predictive power of Expectancy theory diminishes as a result. Vroom and Deci (1992) stated that a person will exert little motivation if their expectancy of attaining an outcome is zero, if they believe that their actions will not yield a positively valent outcome or if they believe their actions will result in too high a number of negatively valent outcomes. Vroom (1964) stated that employees might view their outcomes as either negative or positive. In organisational settings, positive outcomes can include pay, security, interpersonal relationships, fringe benefits and the opportunity to use one's talent, whilst negative outcomes include fatigue, boredom, frustration, anxiety, harsh supervision or the threat of dismissal. Vroom (1964) believed that the important issue was how an employee perceived the outcome, not what the reality of the outcome was or whether their perceptions about the outcome were accurate or not.

Porter and Lawler (1968) demonstrated that any model looking to use Expectancy theory must first account for two major grievances of the approach. The first deals with the ahistorical approach and the ambiguity of previous learning experiences, which produce differing expectancies. Secondly, Porter and Lawler (1968) argued that Expectancy theory does not account for how outcomes actualise either positive or negative qualities for individuals. Wanous, Keon and Latack (1983) argued that Expectancy theory is most effective when an individual chooses amongst a number of jobs. They argued that Expectancy theory is more appropriate at predicting entry into an organisation than it is at predicting an individual's behaviour. Wanous *et al.* (1983) explained that an individual assesses the attractiveness of each organisation (Valence), the effort required to join a company (Instrumentality) and the expectation that the organisation will offer them employment (Expectancy). House, Shapiro and Wahba (1974) supported this limited use of the Expectancy theory as shown by Wanous *et al.* (1983). House *et al.* (1974) argued that until organisations refrain from rewarding employees based on seniority, effort, skill level and job difficulty then V.I.E. theory is not as valid in organisations as is suggested.

Aboulghassem (1981) believed that the V.I.E. components do not always prove consistent when predicting criteria such as peoples' choices, effort, performance or satisfaction. Locke (1975) advocated this belief by showing that in some studies the use of valence is the best predictor, yet in other studies instrumentality and

expectancy proved the more efficient predictors of performance. Arnold (1981), Kopelman (1977) and Mitchell (1974) agreed that a major issue with Expectancy theory remains that of the “*between/within*” issue. That is, most of the research carried out on V.I.E. theory is based on the assumption that it was intended to make behavioural and attitudinal predictions *across* individuals instead of *within* individuals. Investigations conducted in this manner at most claim to make predictions regarding single individuals and the alternatives that each of them will select. This method of testing V.I.E. theory does not account for the individual differences between peoples’ abilities, the jobs they carry out or the various levels of rewards they receive for their work.

Expectancy-Instrumentality theory has received support from empirical research carried out by Vroom (1964) and Hackman and Porter (1968). Vroom (1965) believed Expectancy theory to be the best framework within which to approach the issue of managerial motivation. Klein (1989) suggested however that Expectancy theory cannot be adequately used to describe and explain most motivational situations. The issues surrounding Expectancy theory are believed to result from the different definitions employed for the same components and the fact that the methodological requirements of the theory are not always followed (House, 1971; Wofford, 1971; Mitchell and Albright, 1972; Sheridan, Slocum and Min, 1975).

Vroom’s theory has generated an abundant body of research. Most of these studies however are based on the scientific validity of the theory (Pinder, 1998). These studies (Harrell and Stahl, 1986; Miner, 1980) suggest that there are difficulties associated with testing the V.I.E. theory. Steers *et al.* (1996) commented on the lack of a systematic approach across investigations of V.I.E. theory. They believed that this lack of an organised approach stemmed from each researcher attempting to address the issue, which V.I.E. did not, in their own unique way, of which outcomes are relevant to an individual in a particular situation. Pinder (1998) also noted the issues surrounding the conduct of V.I.E. studies, that is, whether researchers conducted impartial tests on the theory. Among the numerous studies of V.I.E. theory, there have been some influential theoretical advances in the theory from researchers such as Campbell, Dunnette, Lawler and Weick, (1970), Dachler and Mobley (1973), House *et al.* (1974) and Kopelman (1977). Nevertheless, the most

significant advancement of the theory can be seen in the work of Porter and Lawler (1968). Expectancy theory was also the basis for Locke, Cartledge and Koeppel's (1968) goal-setting theory, which consciously starts with intentions, where V.I.E. theory concludes (Pinder, 1998).

### Goal-Setting Theory

Goal-setting theory has a long established history, from its adaptation by Fredrick Winslow Taylor at the turn of the last century, who coined his approach "*task management*," to the "*level-of-aspiration*" laboratory studies conducted in the 1930s and 1940s. The rationale behind those "*level-of-aspiration*" studies was the examination of desired goals individuals seek from a task.

Theories of work motivation have evolved from more general theories of motivation with the intentions of attempting to explain task performance. Miner (2003) believed this to be particularly evident in goal-setting theory. Goal-setting theory assumes that all consciously motivated behaviour is goal-oriented (Meyer, Becker and Vandenberghe, 2004). Thus goal-setting theory focuses on the effects that conscious goals have as motivators of one's performance. According to Miner (2003), goal-setting is amongst the most dominant theories of work motivation, with Edwin Locke and his associate's (Locke, Cartledge and Koeppel, 1968) model of goal-setting theory regarded as the most comprehensive to date. The theory is supported by the empirical evidence (Locke, 1997; Pinder, 1998).

Locke *et al.*'s (1968) goal-setting theory is included in the present discussion of process theories of motivation for the distinct advantage the theory provides to management personnel wishing to increase and sustain the motivation levels of their employees. Goal-setting theory provides organisational behaviourists with a clear perspective of motivation, leading to an understanding of some of the triggers and directors of motivation for employees at work (Morley *et al.*, 1998). The simplicity of the theory enables management to set challenging, but achievable goals for their employees, and deliver, through feedback, a reward system that best suits those goals (Morley *et al.*, 1998). Goal-setting is applicable in many settings, including that of setting career goals. Such a model could be used in the development of a career

strategy (Greenhaus, Callanan and Kaplan, 1995); this would be of particular benefit to graduates entering work for the first time.

Edwin Locke and his associates (Locke, Cartledge and Koeppel, 1968) carried out research into goal-setting, which proved most influential, advancing the theory toward a model of motivation along similar lines of Expectancy theory. Locke *et al.* (1968) acknowledged that a person retains far more information than is possible to act upon, thus “*he needs a means of choosing among alternative courses of action*” (Locke *et al.*, 1968). Goal-setting provides a person with this means of choosing among alternatives. Locke argued that a person’s motivation in their work setting is defined by their desire to achieve a particular goal (Locke, 1968; Locke and Latham, 1990). Locke’s model emphasises the importance of an individual’s goal and their intentional behaviour. His model proposes three hypotheses: (1) goals or conscious intentions are the most direct motivational factors of one’s efforts or choices, (2) changes in pay or incentives determine a person’s behaviour, only if their goals also change and (3) satisfaction or dissatisfaction results from comparing a person’s performance goals on their actual or realised performance (Aboulghassem, 1981). Locke (1970) and Locke, Cartledge and Kneer (1970) regarded goals as direct antecedents of performance. The term goal has many similar names, such as, task, objective, deadline and budget. Locke and Latham (1984) argued that the distinctions between these differing terms are not of great relevance and thus resolved to use the word “*goal as an umbrella term*” to encompass the varying terminologies used (Locke and Latham, 1984, p. 5).

There are many techniques derived from goal-setting theory, such as Management by Objectives (MBO), Organisational Behaviour Modification (OBM) and Performance Planning and Evaluation Systems (PP&Es). All these techniques have goal-setting and monetary incentives at their core, therefore it would be instrumental to examine one of these techniques in detail. MBO is the most popular and theoretically relevant to goal-setting theory, thus this technique will be discussed further. Peter Drucker (1954) developed MBO as a means of motivating people rather than controlling them. MBO provides managers with a medium for implementing goal-setting theory.

Robbins (1993) argues that installing a MBO program is the best approach to make goal-setting operational.

MBO essentially translates the overall organisational objectives into specific objectives for each department and individual within the organisation. MBO develops a method whereby objectives descend down through the organisation in a hierarchical fashion. The organisation's objectives are then divided among this hierarchy in the organisation. MBO also works on a "*bottom up*" approach as well as a "*top down*" approach. That is, managers at lower levels of the hierarchy jointly set their own goals as well as receiving goals set by those higher up the hierarchy. This is similar to joint goal-setting, where goals are set for the entire organisation and then each department within the organisation. Buckley *et al.* (2002) noted that this joint goal-setting process is typically implemented in the I.T. industry. Therefore, MBO programs provide each employee with specific contributions they must make to their department, thus contributing to the department's overall performance, which feeds into overall organisational performance.

Robbins (1993) stated that there are four components necessary to achieve a successful MBO program. The first being goal specificity. That is, the objectives in any MBO program should be concise statements of expected accomplishments. Locke and Latham stated that "*goal specificity results in clear expectations*" (Locke and Latham, 1984, p. 21). It must also be possible to measure these objectives in order to evaluate them. Buckley *et al.* (2002) stated that an employee's performance level would increase if they could measure their progress. Secondly, a superior should not exclusively set a subordinate's objectives. MBO replaces imposed goals with participative goals. That is, both subordinate and superior decide the goals together. Latham and Yukl (1976) pointed out the notable lack of studies conducted to measure the influence of participation in goal-setting. French, Kay and Meyer (1966) carried out an experiment comparing assigned and participative goal-setting. The results showed no significant differences between both methods. Latham and Yukl (1976) conducted a similar study and their results were in agreement with the conclusion reached by French *et al.* (1966). Thirdly, a time constraint should be put in place, giving specific deadlines. Buckley *et al.* (2002) acknowledged this factor, but also added the importance of determining how the objectives are to be



accomplished. Finally, feedback on one's performance should be provided. This feedback however should be provided during the course of the objective and not in any one session after completion of the objective. It is essential that feedback be timely, that is, that an employee (be it subordinate or superior) receive feedback as soon as possible so that corrective action can be applied if necessary.

One should not assume from the popularity of MBO programs that it is a panacea for motivating employees. For example, Ford (1979) has written of a number of accounts where MBO programs, after implementation, have failed. Robbins (1993) however, noted that these failures were primarily due to management errors, such as, not allocating rewards for completed objectives, unrealistic expectations of results and a lack of commitment from management.

Aside from MBO programs or other such techniques, goal-setting "*does not have to be part of a wider management system in order to be effective*" (Locke and Latham, 1984, p. 5). The theory can be applied to individuals, managers, work groups or all three as effectively as it can to an entire organisational system. There is however some questions one must consider when implementing a goal-setting program. Some employees possess higher levels of autonomy than others do, thus one should not assume that all employees will either set or partake in the goal-setting process (Locke and Latham, 1984). Once employees have set goals, they have further choices; such as the number and complexity of the goals they wish to set, as well as the processes by which they set the goals. Additionally, Mobley (1971) found that individuals chose those goals they perceived as being both achievable and most desirable. Other conditions influencing the goal-setting process for individuals reported by Cummings, Schwab and Rosen (1971) include one's previous goal level and the availability of knowledge of the final results.

The inclusion of employees in the goal-setting process greatly reduces their resistance to such programmes. Sorcher (1967) reported on a study carried out at the General Electric Company, which showed that as a direct result of employee participation in the goal-setting process, the quality of work increased substantially. Other studies (French *et al.*, 1966; Latham and Yukl, 1976) reported similar findings regarding participation. Locke (1968) found that subjects who set higher goals, when compared to their previous goals, performed better than those who set lower goals.

There has been much research (Dey and Kaur, 1965; Latham and Yukl, 1975; Locke, 1968; Siegal and Fouraker, 1960) conducted on goal difficulty. These studies reported that harder goals consistently produced higher levels of performance than easier goals. Although Locke (1968) reported that employees with hard goals reached their goals less frequently than those with easier goals, they consistently performed at a higher level than those who set easy goals. However, getting employees to accept difficult goals is in itself a difficult task. Stedry (1960) believed that many employees reject hard goals assigned to them. Furthermore, he believed that more people reject hard goals than they do moderately hard goals. Stedry also noted that employees tended to reject goals set by others if they had already set their own personal goals. Bryan and Locke (1967) argued that those who reject hard goals believe that attainment of those goals is impossible, thus they no longer attempt to reach those goals. Nevertheless, many argue (Latham and Kinne, 1974; Locke and Bryan, 1969b; Locke *et al.*, 1970; Pritchard and Curtis, 1973) that once employees have accepted hard goals they generate higher performance than they would if they simply accepted easy goals or none at all. Schultz and Schultz (2006) agree with this conclusion yet added that attainment of difficult goals may be detrimental to other behaviours, such as helping colleagues. Nevertheless, Locke and Latham (1984) noted that the complexity of a task would affect the way one sets goals, yet *“there is no evidence that there are tasks on which goal-setting fails to work”* (Locke and Latham, 1984, p. 7).

Individual goal commitment is an important aspect of goal-setting theory. As Locke stated, *“It is virtually axiomatic that if there is no commitment to goals, then goal-setting will not work”* (Locke *et al.*, 1968, p. 3). Schultz and Schultz (2006) stated that goal commitment is influenced by three factors. Those are external, interactive and internal. External factors include authority, peer influence and external rewards. Competition and the prospect of participating in the goal-setting process are interactive factors, while internal factors that assist in goal commitment include self-administered rewards and one’s expectation of success. Locke (1968) stated that incentive programs, when implemented successfully, have the capacity to encourage employees to accept goals they themselves have not decided upon, and ordinarily without any form of incentive would not agree to take on board such goals. Wright (1994) however, reported that tying goals to incentives can run the risk of creating a

“goal only” mentality. That is to say, employees when rewarded with incentives may focus their time and energy into the completion of one single goal. Wright noted that such behaviour is commonplace in MBO programs, which is detrimental to organisational effectiveness. Locke (1968) also believed that orders were a means of manipulating employees into accepting goals. Instructions could be used to manipulate employees into accepting goals as their own. Seijts (2001) noted that with an increase in goal level, commitment becomes increasingly harder to obtain. Seijts argued that providing employees, who have little goal commitment, with feedback has little effect on their performance levels. Nevertheless, in situations where employees are committed to goal attainment, Locke and Latham (1984) stated that providing employees with feedback on their performance results in them responding to this feedback by setting goals to either sustain or alter their behaviour. Locke and Bryan (1969a) however, reported that feedback leads only to higher levels of performance if employees decide to raise their performance level.

Validation of Locke’s laboratory studies on goal-setting come from many field experiments (Latham and Kinne, 1974; Ronan, Latham and Kinne, 1973; White and Locke, 1981). The results obtained from these field experiments mirror those of Locke’s laboratory studies. That is, as mentioned previously, employees who are given hard goals perform better than those who are given easier goals or none at all. Latham and Kinne (1974) reported from their study that training programs in goal-setting could lead to increases in productivity and decreases in absenteeism. Buckley *et al.* (2002) accredited goal-setting with the improvement of an employee’s task identity. When employees are working toward achieving goals, they have a clearer understanding of what is required of them and of their contributions to the organisation.

Locke and Latham (1984) argued that all practicing managers can use goal-setting due to its simplicity as an effective motivational tool. Yet some (Campbell *et al.*, 1970; Heneman and Schwab, 1972) argue that this “*simple method*” is the theory’s downfall. Such arguments have questioned the vagueness of the theory in industrial settings, and raised the issue of whether the application of goal-setting is capable of making a difference to an organisation’s objectives.

Latham and Saari (1979) investigated the bearing that a supportive supervisory style has on employees. Their results illustrated that a supportive management style resulted in employees setting higher goals than they would under a more authoritarian management style. Although Likert (1967) noted that a supportive managerial style has one notable drawback: that is the time needed to include employees in the goal setting process increases, he acknowledged that the expected increases in performance would offset any time costs. Clearly a supportive managerial style has a key role to play in goal-setting, with Latham and Kinne (1974) stating that the absence of supervision in goal-setting can lead to an increase in labour turnover. Managers should provide employees with new information as it becomes available and adjust their employees' goals accordingly. However, as Peters (1997) noted, an effective manager should not change goals too often in order to avoid appearing distracted. At some point, it is inevitable that employees will reach the limit of their capacities, and thus no amount of effort will increase their performance. Locke *et al.* (1970) acknowledged this limit, yet they added that an employee's performance does not necessarily decrease when a goal becomes too difficult, provided they maintain their attempt at achieving the goal.

Locke and Latham (1984) argued that all practicing managers could use goal-setting due to its simplicity as an effective motivational tool. From their studies they believed goal-setting to be effective on all employees, regardless of race, age, sex or education. They also stated that goal-setting could be set for any action or outcome, which can be measured, thus "*since anything that exists, exists in a certain amount...goal-setting is almost universally applicable*" (Locke and Latham, 1984, p. 7). Austin and Vancouver (1996) regarded goal-setting as one of the most valid approaches to understanding the process of motivation. Yet in order to reach agreement, some researchers (Miner and Dachler, 1973; Ryan, 1970) recommended that Locke and Latham's laboratory studies be applied in more field settings. Based on these recommendations, further field experiments (Dachler and Mobley, 1973; Latham and Kinne, 1974; Latham and Baldes, 1975; Ronan *et al.*, 1973) have provided empirical support for the replication of the laboratory studies in industrial settings.

Although there exists an immense number of research studies supporting goal-setting theory, naturally there exists some criticisms of the theory, none more so than that offered by Austin and Bobko (1985). They concluded that goal-setting theory derives from a “*narrow, unidimensional*” view of the world, and argued that this view could be informed by broader approaches (Austin and Bobko, 1985, p. 290). The adherents of goal-setting have meticulously taken on board these criticisms, adapting the theory to resolve such issues; therefore these criticisms merely enhance its applicability as a dominant motivation theory. Further criticisms levelled at the theory are as a direct result of implementation issues, not those of the theory itself; such as that reported by Katz (1998) who stated that management personnel often provide their employees with free-reign on goals they set, yet as they become increasingly anxious they begin to impose numerous constraints on the project.

Goal-setting has generated considerable research support, with Pinder (1998) noting that such research is generally free of methodological errors when compared to supportive research conducted on any other theory. Steers *et al.* (1996) stated that goal-setting has been incorporated into a number of other motivation theories, as well as being a motivation theory in its own right. Locke and Latham (2002) reviewing thirty five years of work motivation research concluded that “*goal setting theory is among the most valid and practical theories of employee motivation in organisational psychology*” (Locke and Latham, 2002, p. 714).

The process theories mentioned have similarities and differences. Rollinson and Broadfield (2002) stated that in spite of these differences the theories can, to some extent, be amalgamated. For example, Mitchell (1982) suggested that both equity and goal-setting theory could be integrated into a more inclusive model of expectancy theory.

### Summary and Conclusion

The understanding of employee motivation is vital for organisations and practitioners alike. There is no simple answer to the question of how to motivate people. Money has and will remain a key element for most organisations when implementing motivational programs, yet it is widely acknowledged that financial benefits alone

are not sufficient enough to elicit motivation. In this chapter the more pertinent theories of human motivation have been discussed. The classification of motivation theories as either content or process theories allowed for the grouping of such theories for discussion.

There are however significant definitional problems and a lack of overwhelming support for current motivational theories. Thus no one model is regarded as the most appropriate in all organisational contexts, yet most discussions of the concept of motivation include most, if not all, of the aforementioned theories, thus, a comprehensive discussion of such theories helps in the understanding of the complex process of motivation.

In the next chapter the concept of stress is examined. The four primary models of stress with their resultant contributions and criticisms are analysed.

## **Chapter Three**

### **Employee Stress: A review of the theories**

#### Introduction

This chapter reviews the historical and contemporary theories relating to the stress concept. Four of the most prominent models of stress are reviewed: stress as a response, stress as a stimulus, stress as an interaction and stress as a transaction. Lazarus and Folkman (1984) are the most productive among the stress theorists, proposing not only their own theories on the stress subject, but also combining the efforts of other principle theorists in the field. The sources and consequences of stress are examined, paying particular attention to stress experienced by computing professionals.

As noted in chapter one, the concept of stress has engendered considerable debate and discussion to determine its unequivocal meaning. A lack of any definitive definition however means that other factors warrant consideration when adopting a particular approach to stress, such as the discipline of the researcher, the direction of the research and the research questions asked. At the conceptual level, many researchers agree that stress should no longer be defined in terms of stimulus or response based models, but rather in terms of an interactional or transactional process that integrates the stimulus and response definitions within an overall conceptual framework that acknowledges the dynamic linkages between all elements of the stress process. Thus, the approaches viewing stress as a stimulus and a response are included primarily for their impact on the transactional and interactional definitions of stress.

#### Response-Based Definitions of Stress

The work of Hans Selye (1956) resulted in him being characterised as the “*father of modern stress research*,” yet Selye (1982) acknowledged that the basis of his work was built on the foundations of others. Chief among those whose work he adopted

were the French physiologist Claude Bernard and the American physiologist Walter Cannon. While Bernard argued that the body maintained the vital balance of the “*milieu interieur*,” Cannon (1927) developed the concept of homeostasis, discussed previously in Maslow’s (1943) hierarchy of needs theory in Chapter Two. Homeostasis is a method to describe the body’s physiological attempt at maintaining an internal balance, regardless of any external changes (Appley and Trumbull, 1986).

According to Cannon’s (1927) principle of homeostasis, bodily systems possess a self-regulating mechanism (the autonomic nervous system controlled by the hypothalamus), which allow them to fluctuate within biologically safe margins (Aherne, 1998). Cannon identified the sympathetic-adreno-medullary system as facilitating this life preserving process (Cannon, 1914, 1927, 1929). The purpose of the sympathetic-adreno-medullary system is to achieve a balance between the “*emergency reaction*” of the body (Gray, 1971), due to environmental stimuli and the resulting energy conserving process from the emergency reaction. (Aherne, 1998). Cannon suggested that the release of adrenaline through the arousal of the process of homeostasis would help an organism to respond more rapidly to danger (Aherne, 1998). Cannon termed this process the “*fight-or-flight reaction*.” Concluding from his research, Cannon stated that organisms seek to maintain an internal stability or “*homeostasis*” in the face of environmental inconsistencies and fluctuations. Cannon’s concept of homeostasis has been criticised by many, with Cox (1978) noting that in modern society the “*fight-or-flight*” reaction appears to be somewhat suppressed. This lack of any explicit expression of such emotions, Cox (1978) believed, would increase the rate of wear and tear on the body, resulting in stress-induced pathology. Nutty (2006) stated that Cannon’s investigations of the “*fight-or-flight*” physiological response to stress could be considered an organism’s “*best attempt*” at circumventing a stressor in order to re-establish homeostasis, yet he also questioned the validity of an organism’s capacity to re-establish homeostasis in modern society, given that humans are rarely faced with stressors which provoke dramatic physiological alterations. Nutty (2006) believed that such capabilities which have served humans so well in the past may now be debilitating and even destructive. Cox (1978) also stated that there exists a propensity for the “*fight or flight*” response to be suppressed in modern society. This suppression, Cox (1978) believed, can be seen in the lack of overt expression of emotions, which increases the rate of wear and



tear on the body, resulting in stress-induced pathology. Cannon's explorations of the adaptive mechanisms of the body that enable it to survive have contributed significantly to stress research, with many researchers (Dunne, 1985; Frankenhauser, 1971; Selye, 1974) highlighting the importance of his work.

Dugan (1999) stated that the work of Selye (1956) provided much of the impetus for subsequent stress research. Selye's research (1946, 1950, 1956, 1973, 1980, 1982) is widely believed to be an extension of the work of Cannon. Selye's (1956) view of stress was that any stressor in one's environment or within the body itself would result in an adaptive response. Selye (1956) believed that the physiological stress response could be generalised to all animals, adding that this response is not dependent on the nature of the stressor (Dabney, 1998). Selye (1956) labelled this non-specific response the General Adaptation Syndrome (G.A.S.). This G.A.S. model proposes that stress is an adaptive response that results from exposure to any physical or psychological stressor, and will result in an individual experiencing up to three successive stages. Selye stated that the G.A.S., when followed over time, "*goes through a typical triphasic course*" (Selye, 1976, p. 87). These stages are "*alarm*," "*resistance*" and "*exhaustion*" (Selye, 1982). The extent to which an individual experiences these stages depends on the intensity and duration of the stimuli, as well as the coping strategies used (Dabney, 1998).

The "*alarm*" stage of the G.A.S. is similar to Cannon's "*emergency reaction*." Selye (1976) noted from his experiments that continued exposure to any noxious agent capable of eliciting this alarm reaction would result in a stage of adaptation, unless of course the stressor were sufficiently strong to kill immediately. This phase is characterised by physiological changes in the organism, such as an increase in heart rate and the secretion of non-adrenaline hormones from the adrenal cortex (Vasilaki, 1992). Proctor (1993) stated that these physiological changes remain the same, regardless of the stressor encountered. The physiological changes experienced by the organism help it to cope with the stressful stimuli. Tyrrell (1994) noted that as a result of these physiological changes, a person may feel more alert and sensitive to their surroundings.

The second stage of the G.A.S. is the “*resistance*” stage. This stage is commonly known as the “*fight or flight*” reaction (Dabney, 1998). Selye (1976) stated that the various defence mechanisms of the G.A.S. are based on a combination of this response: advance and retreat. Selye believed this response to be an antagonistic one, that is, “*one designed to activate two opposing forces*” (Selye, 1976, p. 89). Selye also believed that the manifestations of the “*resistance*” stage were the antithesis of the previous stage. The “*resistance*” stage is characterised by sweating and shivering with an increase in the activity of the anterior pituitary and adrenal cortex resulting in a return to normal levels those physiological changes that increased during the “*alarm*” stage. Essentially the individual adjusts or habituates to the stressor (Proctor, 1993). Adapting to these stress-inducing stimuli however reduces the organism’s ability to cope with subsequent stressors (Vasilaki, 1992). Tyrrell (1994) noted that this resistance to a stressor is essential, as the organism could not continue indefinitely with an ever-increasing stimulus.

The third and final phase is the “*exhaustion*” phase. Exhaustion is a consequence of depletion of the body’s physical resources, resulting in an inability to overcome stress (Dugan, 1999). Tyrrell (1994) added that a person may, due to this reduction in physical resources, be more susceptible to certain diseases such as heart attacks and ulcers. This phase is characterised by prolonged and severe adaptation (Vasilaki, 1992). Essentially the organism is now unable to adapt to the stressor and death can result from a prolonged inability to adapt (Proctor, 1993). This prolonged adaptation is what Selye referred to as the disease of adaptation (Monk, 1996).

Selye (1982) concluded that these three stages or phases of adaptation, along with their physiological changes could be “*recognised as objective indices of stress and furnished a basis for developing the entire stress concept*” (Selye, 1982, p. 10). Selye (1976) stated that at any one time during these three stages there could be stress, however, its manifestations change over time. Selye (1976) also stated that it was not necessary for all three stages to develop in order for one to speak of a G.A.S., showing through his laboratory studies that the third stage of the G.A.S., although often reached in animals, is rarely reached in humans as too few stressors inflicted on humans have the ability to provoke all three stages of the G.A.S. Thus, Selye (1982) concluded that the majority of stressors lead only to the activation of the first two

stages – “*alarm*” and “*resistance*” – following which adaptation takes place (Proctor, 1993). Even though individuals may not reach the “*exhaustion*” stage of the G.A.S., Selye believed that “*every biologic activity causes wear and tear; it leaves some irreversible chemical scars, which accumulate to constitute the signs of aging*” (Selye, 1982, p. 11).

Although Selye regarded anything that produces change as stressful, he classified two axes of stress, positive (Eustress) to negative (Distress) and hyper (too much stress) to hypo (too little stress). Essentially this meant that an individual would experience stress regardless of whether the stressor were good, bad or indifferent. According to Selye’s hypothesis, distress was considered to contribute to adverse health consequences, while eustress was theorised to be an innocuous reaction to positive stressors, which may even comprise health-promoting benefits (Selye, 1976). Selye (1956) also believed that each individual has an optimum level of stress, that is, a stressor may cause stress for one person but merely result in eustress for another. Nevertheless, Selye provided little evidence for this differentiated physiological reaction to the two forms of stress he postulated, with some researchers noting that no evidence has been presented to date to calculate which of the two axes a stimulus would produce. Finally, Selye did not believe it necessary to perceive a stressor as unpleasant or beyond one’s ability to cope for it to have an effect. Anything which produces a neuro-endocrine response is a stressor (Fletcher, 1991).

This “*response-based*” view of stress was for many years the dominant approach to stress research, with Fontaine (1992) noting that the model gained almost universal acceptance. Nevertheless, by the late 1960s and early 1970s Selye’s approach began to fall by the wayside, due to the increased criticism being levelled at the theory, along with a growing admission that the theory had been overstated. Cooper, Cooper and Eaker (1988) commented on these criticisms, noting that of main concern were the model’s omission of psychological issues and the non-specific problem. Fontaine (1992) acknowledged the minimal weighting provided by Selye’s model to psychological factors having any influence on the physiological changes during the stress process, as well as noting that supplementary criticisms focused on the unitary “*all-or-nothing*” nature of the stress response. Most notable amongst the researchers who criticised Selye’s approach was Mason (1968, 1971, 1975). Mason argued that

some stressors, such as exercising, fasting or heat do not produce the general adaptation syndrome, thus Aherne (1998) stated that the G.A.S. could not be regarded as a universal stress response. Fontaine (1992) argued that the model's near exclusive focus upon neurohumoral systems resulted in psychological variables essentially being disregarded as causative or mediating influences. Mason (1975) believed that the mechanisms which control the physiological response to stress are organised in a manner that would produce a unique pattern of change. This change in response would vary depending on the stimulus experienced. Cox (1978) agreed with Mason, adding that stressors do not have a static physiological response, although he noted that there are some stressors that may produce similar responses.

The non-specific hypothesis implies a constant universal response to any stressor. Although this non-specific hypothesis proved to be the initial attraction of the G.A.S., due to its simplicity, it was this over simplification of the stress response that drew major criticism from researchers. The non-specific response could have greatly reduced the complexity associated with stress research, however the reality is rather different, as Aherne (1998) stated that stress is a highly complex phenomenon which is influenced by numerous additional factors. Franlenhauser and Gardnell (1976) fuelled this criticism, reporting that physical and psychological factors, among others, can alter adrenaline excretion. Essentially the specific nature of the stress response indicates that different responses will occur under different circumstances. Due to these variations in response, Aherne (1998) dismissed the possibility of establishing any singular measure of stress, adding that this has been and remains an issue for researchers wishing to measure levels of stress. Selye met with further criticism from Hobfoll (1989) for depicting stress only as an outcome, meaning that researchers were unable to identify the causes of stress as they were forced to wait for the outcome to know when the stress would occur.

The influential work of Cannon and Selye hypothesised a purely physiological model, which conceptualised stress as a non-specific response (at hormonal level) to environmental stimulation. This disregard of psychological variables consequently resulted in the failure of the model to take into account the influence of the psychological process and factors in both the formation and expression of somatic

responses. In fact, psychological variables are absent to such an extent that they are virtually discounted as a causative or mediating influence in the stress response.

Although the response-based model of stress clearly has limitations, the work of Cannon and Selye represents a quintessential endeavour to utilise a conceptualisation of stress through the examination of at least some aspects of human functioning. Mikhail (1981) however regarded response-based formulations of stress more as theories of biological adaptation rather than as stress theories per se, due to their restrictive focus on the biochemical mechanism governing stress. Baum, Singer and Baum (1981) however, pointed out that stress cannot be defined without reference to the response as part of the stress process, and this response must consist of both physical and psychological components. Lazarus and Folkman (1984) stated that a viable and comprehensive model of the physiology of stress would be possible only with the inclusion of social and psychological processes, which contribute to somatic response patterns. In any event, these landmark investigations provided much of the impetus for the current interest in stress research. The next section sees a discussion of stimulus-based definitions of stress. Primary focus will be given to the work of Holmes and Rahe (1967) and their life events research.

### Stimulus-Based Definitions of Stress

Identification of potential sources of stress is the central theme of the stimulus-based models of stress (Goodell, Wolf and Rogers, 1986). This approach treats the concept of stress as a disturbing characteristic of the environment (Vasilaki, 1992), and contends that stress is a set of external circumstances that impinge upon and influence the functioning of the person. These external circumstances are regarded as a force acting on a person or an object, hence stimulus-based definitions of stress have their roots in engineering. A physics and engineering analogy illustrates this foundation, stating that stress is a force exerted, which in turn results in a stress reaction or strain within the individual. If the tolerance level of the individual or object is exceeded, permanent damage occurs. Individuals are continually besieged with potential stressors, however just one apparently minor or innocuous stressor can disrupt the balance between an individual's ability to cope and a resultant complete breakdown. Thus, response-based definitions of stress regard stress as an

independent variable that elicits some response from the person (Cooper, Dewe, O'Driscoll, 2001).

In this instance stress is considered a stimulus rather than a response. Of interest are environmental stressors which are presumed to result in stress. This approach can be considered an extension of the earlier work of Cannon and Selye. Both Cannon (1927) and Selye (1956) illustrated that basic physiological processes are altered, thus providing evidence that stressful life events (that is, noxious physical stimulation) can prove harmful. Cannon and Selye however, were predominantly concerned with the “*survival functions*” inherent in these physiological responses, thus a logical extension, as noted by Fontaine (1992), is the examination of a link between life events and physiological changes that may develop into pathological conditions. Cannon did, as Cox (1978) noted, outline “*specific conditions (life events), under which these physiological changes develop into pathological conditions.*” Nevertheless, Cannon merely highlighted the significance of life events, leaving aside any explicit examination, thus it remained for researchers such as Hinkle (1961) to investigate these events and their effects. Life events studies have dominated the stimulus-based model of stress, helping to establish the view that “*illness*” is not solely due to organic causes. Aherne (1998) stated that life events research presented researchers with the first level through which a somewhat closer understanding of stress took place, yet acknowledged that the approach is not without its limitations.

Adolf Meyer (1951, 1958) was one of the earliest proponents of the “*life events*” approach to the conceptualisation of stress. Meyer suggested that physicians complete a “*life-chart*” when assessing patients. In the 1930s, Meyer’s life-chart may have been the first systematic attempt at investigating the relationship between stressful situations and pathogenic reactions of the patient. Meyer amassed extensive data from these life-charts, which implicated life events disorder or “*dis-ease.*” This collection of data led to the development of the Schedule of Recent Experiences (SRE), which comprised a series of life changing events that correlated with the time of onset of illness (Holmes and Rahe, 1967). The SRE, in addition to the work of Meyer, led Thomas Holmes and Richard Rahe (1967) to develop the Social Readjustment Rating Scale (SRRS).

Like that of the definitional problems surrounding the term stress, there are also differences among researchers about how to define the stressful characteristics of life events. The primary differences among researchers is whether the stressfulness of life events is idiographic or nomothetic in character. The latter approach is implicit in the work of Holmes and Rahe (1967) who defined stressful life events as those “*whose advent is either indicative of or requires a significant change in the ongoing life pattern of the individual*” (Holmes and Rahe, 1967, p. 217). The nomothetic approach can also be seen in the work of Paykel, Prusoff and Uhlenhuth (1971) who along with Holmes and Rahe predicted the impact of stressful life events on individuals from average perceptions of these events. The idiographic approach however, sees Hinkle argue of life events that “*people react to their life situations or social conditions in terms of the meaning of these situations to them*” (Hinkle, 1973, p. 46). The idiographic approach is widely accepted amongst those researchers (Hinkle, 1973; McGrath, 1970; Rahe, 1974; Theorell, 1974; Vinokur and Selzer, 1975) who deal explicitly with the problem of defining stressful life events. Nevertheless, the approach most widely publicised and implemented in the measurement of life events is that of Holmes and Rahe’s (1967) SRRS checklist, thus their work is discussed in the current research as it is regarded as the predominant approach in the measurement of life events.

The life events approach assumes that the more readjustment required to cope with an event, the more stress is inherent in that event. Aherne (1998) noted that life event studies have, as their theoretical basis, the view that change is an essential component of a stressful situation. Thus, a stressful event can be judged by the amount of “*social readjustment*” required of the individual experiencing it (Holmes and Rahe, 1967). Social readjustment measures the intensity and length of time necessary to accommodate to a life event, regardless of the desirability of the event (Dunne, 1985). This emphasis on the amount of change caused by an event brought with it the need to quantify and measure life events (Aherne, 1998).

A series of seminars delivered by Eugene Galanter on the technique of subjective magnitude estimation led Holmes and Rahe (1967) to construct a questionnaire for assigning a magnitude of change to each of the forty-three items they revised from the Schedule of Recent Experiences. Subsequently, Holmes and Rahe referred to this

life event checklist as the Social Readjustment Rating Scale (SRRS). This SRRS requires respondents to report retrospectively on forty-three major life events. Those life events occurring only in the past twelve months are considered. In order to determine the personal meaning of these life events for individuals, Holmes and Rahe conducted interviews throughout the development of the SRRS. Those interviews, as Holmes and Rahe expected, highlighted variations in the psychological significance of the events between individuals. These events range on a scale from eleven (minor violation of the law) to one hundred (death of a spouse), where death of a spouse would be considered a particularly stress-provoking event, with a violation of the law only a minor event in comparison. The weightings assigned to these events reflect the amount of adaptation required to adjust to a particular life event. This weighted measure implies that one major event can engender more stress than two or more “*trivial*” events. The sum of these weightings, as rated by the participant, is considered a measure of their stress. Holmes and Rahe stated that those who scored 300 or more statistically stood an 80% chance of succumbing to illness while a score of fewer than 150 is an indicator of minor stress. Proctor (1993) noted that essentially the greater the number of, and severity of, life changes within a specified time-period, the greater the probability of faulty adaptive responses occurring within the person. A consequence of these faulty adaptive responses is a lower “*bodily resistance*,” resulting in increased probability of disease occurrence. Since its development, the SRRS has become a widely used scale in the social and behavioural sciences, as well as being utilised in numerous studies examining the degree of association between its scores and physical/psychological health in a variety of populations and within a host of cultural contexts (Rahe, 1969; Cohen, 1988a).

The initial enthusiasm which surrounded Holmes and Rahe’s (1967) SRRS mirrored the initial response given to Selye’s GAS, as it soon gave way to more critical responses, with researchers (Brown and Harris, 1989; Cohen, 1979; Lazarus, 1966; Lazarus and Folkman, 1984) beginning to communicate dissatisfaction with strictly environmental approaches to the conceptualisation of stress. Much of this criticism derived from the attempt to define stress objectively, solely as a product of the event. Corresponding to Selye’s biological perspective, life event’s research refuted the importance of psychological mediation by adhering to the notion of a uniform



response across persons, simply as a function of their exposure to identical stressors (Fontaine, 1992). Vossel (1987) and Vasilaki (1992) both acknowledged that this uniform response across persons generated little support through either field or laboratory investigations. Such is the case that Lazarus (1966) believed considerable inter-individual variation in response to identical stresses the norm, stating that “*no objective criterion is sufficient to describe a situation as ‘stressful’ and that only the person experiencing the event can do this.*”

Brown (1974) argued that narrow statements for each of the items in the life event’s checklist were too vague and did not take into account the different ways in which respondents would construe these items. Equally, Proctor (1993) stated that the weightings provided for each life event remain constant, in spite of the fact that the same life event will result in varying degrees of adjustment for those experiencing it. Thus, Kessler, Price and Wortman (1985) stated that the SRRS does not take into consideration “*personal meaning,*” nor does it provide any explanation why the majority of those who experience stressful life events do not become ill as a result. Cohen (1988b) and Zimmerman (1983) who both conducted reviews of the research of the scales in the life event’s checklist suggested that the use of a weighting score does not enhance prediction of physical health problems. Aherne (1998) stated that the issue of the quantification of the meaning of an event for an individual is flawed due to the underlying assumption that differences in the impact of a life event for an individual can be measured objectively. Thus, Aherne (1998) stated that it is one’s personal meaning of a life event that should be evaluated and not some objective criterion. Aherne (1998) however, added that personal meanings are a qualitative phenomenon, of which quantitative measurement methods cannot account for, thus any attempts to measure personal meanings in such a manner would run into problems. There have however been some attempts (Brown and Harris, 1989; Zitzow, 1984) at incorporating the personal meaning of events into a similar checklist-based instrument as Holmes and Rahe’s (1967), whilst also undertaking to resolve the issue of event variability. Similarly, Horowitz, Wilner and Alvarez (1979) developed the Impact of Event Scale, which was designed to assess mediating psychological processes that may influence the stress-outcome relationship. Fontaine (1992) however, stated that, leaving aside the aforementioned questionnaire-based approaches, there has been a virtual exclusion of how one interprets a particular

event from the life events approach due to the difficulty of assessing adequately this phenomenon.

The quantification of life events is inextricably linked to attempts at establishing a relationship between life events and illness. A further difficulty, which Fontaine (1992) noted, is the absence of a coherent theoretical rationale to explain why life events are stressful and what the specific mechanism is which underlies the proposed connection between stressful events and illness. Many studies (Bielauskas and Webb, 1974; Greenberg, 1980; Marx, Garrity and Bowers, 1975) exist which have established some degree of relationship between life events and the occurrence of illness. Aherne (1998) however, noted that the use of retrospective designs in the foregoing studies presents a range of difficulties for researchers. Such difficulties include, among others, the longer the duration between illness and an event, the more likely it is that some correlation will be obtained if that illness occurs regularly, as well as reliability issues surrounding self-reporting measures, as used in the life events approach. Brown (1973) also added to these difficulties, stating that a present illness may impress upon any reporting of a past event. Despite these difficulties, Kanner, Coyne, Schaefer and Lazarus (1981) stated that there exists a preoccupation with life events and an illness relationship. Nevertheless, Aherne (1998) noted that whilst some relationship does exist between life events and illness, it is a weak relationship and one in which no causal link has been established.

Dabney (1998) believed that a considerable limitation to the life events approach is the assumption that one will react only to excessive demands. Thus, she stated that tedious and undemanding situations may be perceived just as stressful. The assumption that all individuals respond in a similar manner to stressful situations fails to acknowledge any subjective cognitive processes that differentiate one individual from another. Some researchers (Chamberlain and Zika, 1990; Kanner *et al.*, 1981; Monroe, 1983) have suggested that “*minor life events*” are a better predictor of psychological well-being than “*major life events*,” whilst also demonstrating that the pattern of daily stressors varies between different occupational groups.

The life events approach to the study of stress has been examined as a prime example of an approach that treats stress as a stimulus. Holmes and Rahe's (1967) life events approach to stress is the major "*stress as stimulus*" orientation, with Aherne (1998) stating that life events research represented the first level at which an understanding of stress began to take place. Inherent in the stimulus-based approach is the view that stress should be considered "*pure environmental events, uncontaminated by perception, appraisals, or reactions*" (Lazarus and Folkman, 1986, p. 69). Both Dugan (1999) and McNamara (2000) noted that Holmes and Rahe's contribution to stress research is still important today, with their life event checklist remaining one of the most popular methods of assessing stress; this is despite its extensive criticisms.

Response and stimulus-based definitions of stress are now widely believed to ignore individual differences and the perceptual and cognitive processes that might underpin these differences (Cox, 1990; Sutherland and Cooper, 1990). A number of prevailing criticisms among both response and stimulus-based definitions of stress exist, which bring about their omission as a framework for the current research. Firstly, both stimulus and response-based definitions fail to account for any individual differences to the reaction of stress. The second criticism is the impact which both models have on the understanding of the stress process. This criticism can be seen in the view that limiting the definition of stress to only one dimension of a process draws attention away from the nature of the process itself. Both stimulus and response definitions of stress each focus on a single aspect of a relationship. The reality however is that a stimulus or response may only be regarded as "*stressful*" or a "*stress response*" when both components are considered in relation to one another. This has resulted in more contemporary stress definitions focusing on the interaction between the stimulus and the response.

The realisation that theoretical models and definitions proposed by Selye (1956) and Holmes and Rahe (1967) were unable to provide a comprehensive theory of stress led to a requirement for the development of more sophisticated models which would take personal meaning into account (Proctor, 1993). Thus, it remained for other researchers to examine how people appraise and cope with stressors, as well as elaborating on individual differences in the stress response. Foremost among such

psychologically oriented approaches were those proposed by Lazarus and Folkman (1984).

### Interactional Models of Stress

The stimulus-response (S-R) formulations of stress regard the person as a passive recipient in the operation of stress-inducing situations. These models do not consider psychological processes within the individual, nor do they deal with individual differences, thus a third approach to the study of stress was proposed, the interactional model. Fontaine (1992, p. 29) stated that *“this approach to stress research attempts to integrate personal and environmental views by contending that these variables interrelate.”* Endler and Edwards (1978) stated that prior to the introduction of interactional models of stress an emphasis was placed on either the person or the situation. This view of stress however, as a global construct, inherent in either the person or the environment gradually shifted to the view of stress as a multidimensional construct. That is, stress was viewed as part of an ongoing process of person-environment interaction, with the importance of an individual’s perception of the situation and their active participation in this interaction all central to any discussion of the interactional process (Endler, 1975, 1980).

The interactional approach to defining stress focuses on the statistical interaction between the stimulus and the response. That is, as Cox and Mackay (1976) noted, stress forms part of a complex and dynamic system of transaction between the person and the environment. This approach, described as *“structural”* (Stahl, Grim, Donald, and Neikirk, 1975) and *“quantitative”* (Strauss, 1973), is one where a relationship, usually correlational, is hypothesised between a stimulus and a response. Stress evolves from a relationship between the person and the environment. That is, when an event is perceived as threatening, the individual will evaluate whether the threat is relevant or not. As Sarafino stated, stress is a *“condition that results when person/environment transactions lead the individual to perceive a discrepancy – whether real or not – between the demands of a situation and the resources of the person’s biological, psychological, or social systems”* (Sarafino, 1990, p. 74). This

evaluation of relevance is based on motives, interests, goals, beliefs and values of the person experiencing it (Vasilaki, 1992).

The interactional approach to stress is most evident in the search for moderator variables. Generally these moderators are personality characteristics, with Type-A behaviour pattern (Jenkins, 1997), hardiness (Ouellette, 1997), positive/negative affect (Burke, Brief, and George, 1993) and self-reliance (Quick, Joplin and Nelson, Mangelsdorff and Fiedler, 1996) all regarded as the most influential of moderators. These moderators, as well as others such as locus of control, self-esteem and self-efficacy, are regarded as having predictive value in the relationship between stressful life events and adaptive outcomes. These moderating variables also refer to a person's perception of a situation and the differences that determine their response to a stressful event. Baron and Kenny have defined a moderator as a variable that *"affects the direction and/or strength of the relation between an independent or predictor variable and a dependent or criterion variable"* (Baron and Kenny, 1986, p. 1174). Therefore, a moderator is a third factor which exerts an influence on the zero-order correlation between two variables.

Holahan and Moos (1987) pointed out that essentially the interactional approach seeks to determine the extent to which a given moderator interacts with environmental circumstances to improve their predictive value. The research conducted on moderators brought about the replacement of stimulus-response (S-R) formulations of stress with a stimulus-organism-response (S-O-R) formulation. The interactional model of stress has, as its underlying assumption, the preconception that personality and environmental variables are stable throughout any stressful encounter as well as during and after measurement, which allows this approach to search for the causes of outcomes in both the existing environmental and psychological factors. The causes of these outcomes are sought by dismantling them as well as examining their additive effects (Lazarus and Folkman, 1984). Thus, as Lazarus and Launier noted, the interactional model *"follows the logic of analysis of variance, in which one partitions the person and environment antecedent variables in accordance with the proportion of outcome variation they account for separately and by interaction"* (Lazarus and Launier, 1978, p. 289). Fontaine (1992) noted that these variables are then bound (interactions) and simultaneously separated (main effects) in search of

the determinants of stressful encounters. Lazarus and Launier (1978) stated that if statistical interactions are found, then an interactive process is said to have occurred, regardless of whether there exists direct evidence for such a process.

Considerable research attention has been focused on those variables which act as mediators or moderators in the stress response. However, these terms have often been used with the implicit assumption that they are interchangeable, yet Folkman and Lazarus (1988) stated that moderators are “*antecedent conditions*,” such as biographical and personality characteristics that are inherent with other conditions to produce an outcome, whereas a mediator is a variable such as coping, which is generated in the encounter and changes the relationship between the antecedent and the outcome variable.

Interactional models of stress have been widely recommended and applied to the study of stress (Cooper and Baglioni, 1988; Magnusson, 1982; Endler and Edwards, 1978). As well as the research conducted on moderator variables, there have been other approaches devised under the interactionist hypothesis, including appraisal theory, which Lazarus (1976) believed made a significant person-focused contribution to the interactionist perspective on stress. This approach examined the influence of cognitive appraisal and suggested that an individual’s stress reaction depends on how they interpret or appraise an event as harmful, threatening or challenging. Aherne (1998) believed that appraisal theory made significant person-focused contributions to the interactionist perspective of stress. Although there is much research published on the interactional approach to defining stress, the approach is not without its limitations.

Fontaine (1992) argued that the most apparent shortcoming of the interactionist approach is the assumption that both dispositional variables and environmental parameters are stable and therefore unchanging as encounters unfold. Lazarus and Folkman (1984) stated that this limitation is evident in the fact that more often than not these relevant variables were measured on only one occasion rather than at intermittent time points as the encounter unfolded. Lazarus and Launier noted a related limitation with the logic of analysis of variance that guides interactive research efforts in which, although “*researchers often speak of statistical interaction*

*between a person and environment as an interactive process, they are really looking at static fractions of variance rather than an actual interactive process” (Lazarus and Launier, 1978, p. 290).*

The interactional approach also implies a linear one-way cause and effect from the environment, via the person, to the response (Altman, 1976). Fontaine (1992) stated that this unidirectional approach does not consider the premise that an individual may be an active agent in a person-environment encounter, and that a person’s behaviour can produce changes in his or her environment. Nutty (2006) believed that there is a consensus of opinion among researchers that any stressful encounter is an intermittent continuation of ever-changing relationships between variables, and that traditional interactionism, with its linear model of causation, is unable to capture this complexity. Moreover, with its adherence to statistical concepts of interaction, it attempts to compartmentalise and “*partial out*” a variable’s influence without acknowledging that these variables are fused in nature and cannot be so readily separated without instilling artificiality. That is, “*the instability, change and flux inherent within the process of engaging in stressful commerce with the environment are sacrificed in order to seek out statistically derived determinants*” (Fontaine, 1992, p. 31).

Lazarus and Folkman (1984) stated that the interactional approach “*tends to treat the person and the environment as static phenomena, a still photo that captures a moment in time when the person is responding to the environment*” (Lazarus and Folkman, 1984, p. 293). Essentially, as Cooper, Dewe and O’Driscoll (2001) reiterated, the interactional approach is primarily static, with any consideration of process limited to inferential explanations when the interaction fails to materialise or is different from that predicted. Cooper *et al.* (2001) believed that focusing only on the interaction between two variables means that any attempts at explaining the complexity of such relationships are limited to “*structural manipulations,*” such as the influence of a third (moderator) variable, which they regarded as providing no explanation to the stress process.

Although the interactional approach has a number of limitations, Vasilaki (1992) stated that it is the most comprehensive, conclusive approach to stress, and one

which has a more global view of the problems related to the understanding of stress. The interactional approach is included in the present discussion of stress due to the attention it drew to the separate constructs that play an important role in understanding stress. Cooper *et al.* (2001) however, noted that job stress research has investigated a large array of moderator variables, yet they believed that occasionally there existed little theoretical rationale for the inclusion of moderators in such studies, which would result in inconsistent and often ambiguous findings about the role of such variables. Lazarus (1990) believed that the interactional approach to stress does not provide a sufficiently comprehensive framework to enable a complete understanding of the stress process. Thus, a need existed to move beyond the simple identification of potential moderator variables to more comprehensive theories that attempted to explain the mechanisms by which all relevant factors interact. Transactional models of stress endeavour to explore the essential nature of stressor-response-outcome relationships and to encapsulate an understanding of the dynamic stress process itself, not merely the statistical relationship between variables.

#### Transactional Models of Stress

The transactional approach developed out of an attempt to deal with the perceived inadequacies of more conventional approaches to stress. Since the stimulus-response (S-R) formulations of stress, subsequent theorising has lent more towards cognitive models of stress that have as their basis a dynamic transaction between an individual and his/her environment (Cox, 1988; Endler and Edwards, 1982; Lazarus and Launier, 1978; McGrath, 1970). The concept of “*personal meaning*” is central to any transactional model. Transactional models of stress provide a contrast to the unidirectional, antecedent-consequent approaches, by viewing the person and environment as being in a dynamic, reciprocal, bidirectional relationship (Lazarus and Folkman, 1984). Lazarus and Folkman (1986) stated that prior knowledge of environmental or person factors alone is insufficient and that the key elements of these factors must be designated relationally. Unlike the interactional definition of stress, which focuses on the structural features of an individual’s interaction with their environment, transactional definitions are more concerned with the dynamics of the psychological mechanisms of cognitive appraisal and coping that underpin a stressful encounter.



The idea of stress as a dynamic cognitive state is at the centre of the transactional definition (Cox and Mackay, 1976). Dewe, Cox and Ferguson (1993) stated that any disruption to homeostasis, or an imbalance, would bring about the requirement for a return to normal levels of homeostasis or a resolution to the imbalance. Another feature of the transactional approach is its concern with process rather than structure. That is, the process-orientation seeks to describe the resultant flow of events which occur during stress-engendering encounters. As both the environment and person factors invariably change, so too must their relationship (Lazarus and Folkman, 1984). Thus, transactionalism provides a framework for observing this process between the person and environment. Lazarus and Folkman (1986, p. 75) stated that, by themselves, “*no single variable, whether structural, causal antecedent variable, a process, or an outcome can stand for stress,*” but rather it is the confluence of these variables in transaction that influence the onset, duration and outcome of any stressful encounter. Thus, the term transaction implies that stress is neither in the person nor the environment but rather in the relationship between the two factors (Lazarus and Folkman, 1986; Lazarus, 1990).

The most influential of all proponents of the psychological model of stress is Richard Lazarus. Lazarus, along with his colleagues (Lazarus, 1966; Lazarus and Launier, 1978; Lazarus and Folkman, 1984, 1987) developed a cognitive theory, which has significantly influenced stress research. Lazarus (1976) incorporated the principles of appraisal into his transactional model, awarding central precedence to this cognitive functioning in his theory. Lazarus and Folkman (1984) argued that by means of this cognitive appraisal, a link between the social, psychological and physiological levels of stress can be established. Cognitive appraisal takes on three forms: “*primary appraisal,*” “*secondary appraisal*” and “*reappraisal.*” The appraisal process seeks to establish whether an individual is at risk from stress, and if so, what resources are available to them to deal with that risk. A person will give meaning to a stressful encounter during the primary appraisal process, with those meanings involving harm and the threat of harm or challenge regarded as the most accurate through which to express the appraisal process (Bernstein, 1987; Fineman, 1986; Novacek and Lazarus, 1990). This appraisal process is reflected in Lazarus and Folkman’s definition of stress as “*a particular relationship between the person and the environment that is appraised by the person as taxing or exceeding his or her*

*resources and endangering his or her well-being*” (Lazarus and Folkman, 1984, p. 19). That is, stress arises when the demands of a particular encounter are appraised by an individual as about to tax or exceed their available resources, thus threatening their well-being (Lazarus, 1991a). This appraisal of threat against one’s resources necessitates a change in their functioning to “*manage*” the encounter. Stress experienced at one analytical level however, does not necessarily mean that it will be experienced at another, thus an individual who experiences physiological stress does not necessarily result in them experiencing psychological stress. This appraisal process links to three important themes within the transactional definition of stress. They are: a dynamic cognitive state, a disruption or imbalance in normal functioning, and the resolution of that disruption or imbalance (Beehr and Franz, 1987; Beehr, 1998; Holroyd and Lazarus, 1982; Newtown, 1989). Thus, as mentioned previously, Lazarus and Folkman’s transactional definition of stress views stress as residing in neither the individual nor the environment but rather as embedded in an ongoing process that involves an individual transacting with their environment.

Folkman and Lazarus (1985) stated that cognitive appraisal could be most easily understood as the process of categorising an encounter. To further delineate the concept of appraisal, they divided it into three types. Primary appraisal determines whether an individual will judge an encounter as being irrelevant, benign or stressful. Secondary appraisal forms one’s judgement of what can be done regarding the encounter, while reappraisal occurs when new information forces a review of an encounter (Proctor, 1993). Situations may be reappraised repeatedly over time.

Primary appraisal is itself further divided into three sub-divisions – irrelevant, benign-positive and stressful (Folkman and Lazarus, 1980; Folkman, 1984; Lazarus and Launier, 1978). Naturally the first sub-division carries no implications for one’s well-being, thus an appraisal of a transaction as irrelevant “*means that the person does not consider it as having any implication whatsoever for well-being in its present form*” (Lazarus and Launier, 1978, p. 302). A benign-positive appraisal however, “*indicates that the transaction does not tax or exceed the person’s resources and signals only positive consequences*” (Folkman and Lazarus, 1980, p. 840). The third sub-division includes harm/loss (the damage has already occurred), threat (the threat is anticipated) and challenge. Monk (1996) noted that the latter

focuses on the potential for gain or growth inherent in an encounter and is characterised by pleasurable emotions, contrary to threat, which is typified by negative emotions. Both sub-divisions of threat and challenge call for a mobilisation of coping resources. Although many person-environment transactions may be appraised as falling into one of these three stress categories, Fontaine (1992) believed that this is not always the case, as primary appraisals are not necessarily mutually exclusive and often shift as an encounter unfolds, and are likely to overlap and fluctuate during person-environment transactions. Ultimately, if the primary appraisal process determines the existence of a threat or challenge, then it is thought that individuals engage in the process of secondary appraisal.

Lazarus and Launier (1978, p. 306) stated that *“the essential difference between secondary appraisal and primary appraisal lies in what is being evaluated. Secondary appraisal deals with coping resources and options.”* Secondary appraisal is in fact a complex evaluative process, which considers current coping options, as well as the likelihood of a coping strategy achieving a desired effect, and the probability of successfully applying a specific coping strategy or a set of coping strategies. Secondary appraisal draws upon the use of expectancy theory by means of Bandura’s (1977, 1982) expectancies to distinguish between outcome expectancy and efficacy expectation. Outcome expectancy refers to a person’s evaluation that a given behaviour will lead to certain outcomes while efficacy expectation refers to a person’s conviction that he or she can successfully execute the behaviour required to produce the outcomes. Bandura (1986) also believed that goal-setting has an important role to play in self-efficacy, stating that the process of setting attainable goals, along with the development of strategies for attaining those goals, coupled with realistic evaluations of feedback, allows individuals to develop a sense of mastery and self-efficacy.

Reappraisal *“refers to a changed appraisal on the basis of new information from the environment, which may resist or nourish pressures on the person, and/or information from the person’s own reactions”* (Lazarus and Folkman, 1984, p. 38). Essentially, as Fontaine (1992) noted, reappraisals represent the active transformation processes, which occur between primary and secondary appraisals. They are modifications of earlier, context-specific appraisals. The dynamic shifting

of appraisal and reappraisal however, cannot be so readily captured, as they need not be conscious or deliberate. In fact, in most instances appraisal and reappraisal are thought to occur outside one's awareness (Lazarus, 1991b; Lazarus and Folkman, 1984).

Of equal importance to the psychological viewpoint of stress is the concept of coping, which consists of "*cognitive and behavioural efforts to manage (master, reduce, or tolerate) a troubled person-environment relationship*" (Folkman and Lazarus, 1985, p. 152). Lazarus and Folkman devoted much of their research attention to the study of coping strategies and processes (Folkman and Lazarus, 1980; Folkman, 1984; Folkman, Lazarus, Dunkel-Schetter, DeLongis and Gruen, 1986; Folkman, Lazarus, Gruen and DeLongis, 1986). Discontented with the more traditional approaches to coping, Lazarus and Folkman (1984) developed a self-report checklist they referred to as the "*Ways of Coping Checklist*" in order to assess coping in response to specific stressors. This instrument was designed to measure eight coping scales (confrontive coping, distancing, self-control, seeking social support, accepting responsibility, escape avoidance, planful problem solving and positive reappraisal) all of which are grouped theoretically into two categories, namely problem and emotion-focused coping. Coping strategies are separated into these respective groups, on the basis of the function they are believed to serve for an individual.

Monks (1996) concluded that emotion-oriented coping focuses on expressing, moderating or controlling one's emotional reactions to a stressful event, while problem-oriented coping focuses on altering the troubled relationship between the individual and the internal or external environment. The latter coping strategy directs its attention towards changing either the individual or environment in order to address these relationship issues. However, along with other researchers (Carver, Scheier and Weintraub, 1989; Edward and Endler, 1989; Endler and Parker, 1989, 1990) Lazarus and Folkman (1984) acknowledged the presence of considerable individual differences in coping styles.

Monk (1996) stated that many studies (Aspinwall and Taylor, 1992; Cronkite and Moos, 1984; Folkman and Lazarus, 1988) indicate that individuals who use active

coping strategies, such as problem-focused coping as well as planning and seeking social support, show good adjustment to stress, whereas those who utilise avoidance-coping strategies, such as denial and wishful thinking, are at a far greater risk of developing adverse responses to stress. Fontaine (1992) stated that the process of coping is extremely complicated, due to its intimate ties with both cognitive appraisal and the reappraisal process. Folkman and Lazarus (1980, 1985) acknowledged the complexity associated with the process of coping, whilst also stating that various forms of coping are often used simultaneously during stressful situations. A distinction must be made between coping resources and strategies. Monk (1996) noted that coping resources are innate capacities that assist individuals to deal more competently with stressors, to experience less intensive symptoms upon exposure to a stressor, or to recover faster from exposure. Conversely, a coping strategy is understood to be the things which people do in reaction to a specific stressor occurring within a specific context (Hammer and Marting, 1988; Perlin and Schooler, 1978). Thus, coping strategies refer to behaviours occurring subsequent to a stressor(s) while coping resources act as “*precursors of behaviour*” and as background factors (Wheaton, 1983). That is, as Monk stated, “*resources are what you have*” (Monk, 1996, p. 45). Thus, coping is paramount to determining the outcome of a stressful encounter. That is, if primary appraisal suggests that one’s personal well-being is at stake, and the coping resources are perceived as inadequate, then the situation will be perceived by the individual as stressful.

Although cognitive, transactional models such as that proposed by Lazarus and Folkman (1984) have come close to reflecting the complexity and individuality of the stress process, they have not been without criticism. Fontaine (1992) and Hammen (1988) have both argued that one of the most pressing issues arising from the transactional model is that it is not readily amenable to rigorous empirical investigation, thus as such, the approach may serve more as a meta-theoretical guide than as a verifiably, empirically-driven research strategy. Hammen (1998) also argued that the mechanisms of both the appraisal and coping processes have not been adequately explained. McNamara (2000) noted that debate remains regarding whether one needs to appraise a situation as stressful simply to have stress-related emotions. She argued that a person could sometimes react in a certain manner without ever having thought about an event in a particular light. She also noted that

the transactional approach assumes that there are general personalities with certain traits and patterns of behaviour, yet some argue that responses to stress cannot always be readily predicted based on one's personality type.

Other researchers, such as Cox and MacKay (1976) have developed models similar to Lazarus and Folkman's (1984) transactional model. Cox and Mackay's (1976) model also stressed the importance of a person's cognitive appraisal of potentially stressful situations and their ability to cope with those situations. The inclusion of moderating and mediating variables in these models, such as personality factors, social support and coping strategies, provided transactional models with a distinct advantage over earlier stimulus-based and response-based models of stress. Regardless of its criticisms, Dabney (1998) regarded transactional theory as the most useful definition of stress to adopt, and conceptual framework to use, when investigating the nature and consequences of the stress process. She also stated that Lazarus and Folkman's (1984) stress theory is perhaps one of the most widely used conceptualisations of stress.

#### Organisational Stress, Sources and Consequences for Computing Graduates

Workplace stress is a highly publicised issue in present society and one that is of high concern for all organisations. Cox, Randall and Griffiths (2002, p. 3) stated that *“work-related stress is currently one of the greatest challenges to the health of working people and to the healthiness of their work organisations.”* This sudden awareness in organisational stress can in part be attributed to the escalating costs associated with same. In a report commissioned by the Ministry of Social Affairs and Employment in the Netherlands, Koningsveld and Mossink (2004) reported that costs of absenteeism and disability amounted to €12 billion. Of this overall cost, over half accounted for work-related sick leave and disability caused by psychological and musculoskeletal disorders. Reports of work-related stress in monetary value are common practice. Stress-related diseases however are a worldwide phenomenon, as are stress management programs with claims of being a panacea for such problems. Yet, in spite of the numerous reports of increases in work stress, Jones and Bright (2001) are doubtful of any such great increase, arguing that past working environments were just as conducive to work stress. Thus, they threw caution to

claims that individuals suffer higher levels of stress today than they did in the past, believing that other needs were more salient than the concept of stress in times past.

Cox (1978) has argued that research into occupational stress is similar to research in all other areas of stress, that is, fraught with many different approaches and models. Some researchers (Cooper and Marshall, 1976; Kearns, 1973; Warr and Wall, 1975) have utilised response-based definitions of stress, while others (French and Caplan, 1973; Kahn, Wolfe, Quinn, Snoek, Rosenthal, 1964; Kahn, 1974; Parrot, 1971) have used stimulus-based approaches, yet others (McGrath, 1976) have implemented an interactional approach to occupational stress. The more traditional psychological approaches of these models, as Jones and Bright (2001) noted, tend to examine the characteristics of work environments (stressors) which are related to strain in terms of diminished psychological well-being, physical well-being and in some instances performance, and thus are more general frameworks that *“are more useful in illustrating the scope of the stress phenomenon ... rather than testable theories”* (Jones and Bright, 2001, p. 179). Briner and Reynolds (1993) have criticised these approaches for suggesting a relationship between a great many different phenomena, and it is this criticism which provides little in the way of guidance for practitioners using them. In contrast, Jones and Bright (2001) stated that both the interactional and transactional models go some way towards suggesting simple and testable hypotheses, thus providing more guidance than the more traditional approaches for practitioners.

A plethora of studies investigating aspects of employees' working environments that induce stress have fuelled the expansion of work-related job stressors. Larson (2004) regarded job stressors as any characteristic of the workplace which poses a threat to the individual. Cooper *et al.* (2001) stated that such stressors can include the level of complexity, the variety of tasks performed, the amount of discretion and control that individuals have over the pace and timing of their work, and the physical environment in which the work is performed. Glowinkowski and Cooper (1985), on a review of the stress literature, identified five potential sources of stress, namely; role conflict, role clarity, interpersonal relations at work, career factors, such as a lack of promotion and organisational climate. The latter includes issues such as communication and organisational trust.

Workload, whether overload or underload, can generate both psychological and physical stress. The Yerkes-Dodson Law (1908) states that there is an inverted-U relationship between the amount of work required of an individual and their health and performance, thus each individual has an optimal band of workload. Substantial deviations either side of this optimal band are likely to bring about stress. It is important to distinguish between quantitative and qualitative overload and underload. Quantitative overload refers to a requirement to complete too much work within a given timeframe, while quantitative underload refers to monotonous, predictable work with no challenge. Poulton (1978) noted that a lack of stimulation can be particularly damaging at night as the individual attempts to readjust to changes in their sleep pattern but who do not have enough stimulation to remain alert. Qualitative overload however, occurs when individuals perceive themselves as having a lack of skills or capacities to satisfactorily perform their work. Qualitative underload is also regarded as stressful, as individuals are not given the opportunity to use their skills or to develop further abilities. Johnson (1991) reported that qualitative underload is a common experience among recent graduates who, upon entering their profession for the first time, often expect challenging projects but in fact more often than not receive repetitive tasks. In a study conducted by Longenecker, Schaffer and Scazzero (1999) on I.T. personnel in various sectors of their industry, they found that an increased workload contributed highly as a source of stress for those employees. Schultz and Schultz (2006) stated that a certain amount of stress can be stimulating, invigorating and desirable, thus one needs to achieve an optimal balance between work overload and underload to function and remain in good health.

The present day working culture has resulted in perpetually longer working hours. This increase in working hours, compounded by shorter respites can produce stress. Sparks, Cooper, Fried and Shirom (1997) conducted a meta-analysis of research in this field, and obtained small but statistically significant correlations between hours of work and overall health, as well as both psychological and physiological health symptoms. In addition to the increases in working hours, recent years have witnessed the emergence of an increasing variety of different patterns of working hours. Numerous studies (Folkard, 1996; Jamal and Baba, 1992; Seymour and Buscherhof, 1991; Totterdell, Spelten, Smith, Barton, and Folkard, 1995) have found that shift work can lead to a variety of difficulties for workers and their families.



Complications associated with shift work include disturbances in circadian rhythm, family and social life. The circadian rhythm essentially refers to the 24-hour cycle in the physiological processes of living beings. Studies show that a disturbance in one's circadian rhythm is associated with a decline in physical health, satisfaction and overall subjective well-being.

The speed at which new technologies are developed and introduced can be daunting, not least for those individuals who had just managed to grasp existing versions. These constant technological changes may pose a threat to some individuals. However, if adequate training is provided upon introduction of such technology, then potentially stressful situations can be averted. In the aforementioned study by Longenecker *et al.* (1999), they noted, with surprise, the absence of technological advances as a factor contributing to stress for computing professionals. Technological advances however, as a source of stress, is not merely the preserve of subordinates, as superiors and managers alike can also experience the strain of keeping pace with new developments (Cartwright and Cooper, 1997). Cooper *et al.* (2001) noted that the introduction of new technologies may put added pressure on I.T. personnel, resulting in them experiencing work overload if they do not receive adequate guidance and supervision from their supervisors.

Longenecker *et al.* (1999) have also found that ineffective management and supervision can be a source of stress for I.T. personnel. This report however conflicts with that of others, such as Vivien and Thompson (1996) who stated that, in particular, male I.T. personnel welcomed a lack of guidance from supervisors as favourable, as it allowed them more autonomy to make independent decisions. However, Vivien and Thompson (1996) reasoned that male I.T. personnel may seek out such positions in gratification of their autonomy needs, thus they are less likely to report stress in such instances. Regardless of whether computing professionals seek positions with a lack of supervisory input or not, it is evident that graduates from all streams entering employment for the first time are reliant upon guidance from both their supervisor and colleagues alike (Johnson, 1991), thus the importance of such relationships should not be overlooked.

Chief among the sources of stress for computing professionals, as reported by Longenecker *et al.* (1999) are poor communications and a lack of resources. Poor communications with one's superiors has connotations with effective management and supervision. Therefore, a lack of guidance together with poor communication can be a major source of stress for many employees (Motowidlo, Packard and Manning, 1986; Narayanan, Menon and Spector, 1999). Aziz (2003) who investigated the prevalence of organisational role stresses among I.T. employees concluded that resource inadequacy was the most potent stressor. The foregoing discussion on the sources of work-related stress is by no means exhaustive, but rather includes some of the most commonly reported and most intense stressors that computing professionals experience.

The known effects of stress upon individuals include fatigue, an inability to concentrate, lack of motivation, headaches and physical illness. At the organisational level, stress manifests in the form of absenteeism, high levels of staff turnover and an overall reduction in productivity (Johnson, 1991). Ganster and Schaubroeck (1991) reported that employee stress leads to significant costs for the organisation by adversely affecting employee performance and prompting withdrawal behaviour, as reflected by increased absenteeism, tardiness and turnover. Individuals experience job stress when they have little or no control over their jobs or when their work demands exceed their abilities (Donovan and Kleiner, 1994). Larson (2004) also stated that stress occurs when "*conditions on a job inhibit, stifle, or thwart the attainment of expectations and goals*" (Larson, 2004, p. 1121). Vasilaki (1992) noted that the manifestations of stress could be physical, such as peptic ulcers or cardiovascular diseases, psychological such as depression or anxiety or behavioural, such as a deterioration in work performance and interpersonal relationships. Before examining in greater detail these manifestations, it must be noted that biographical factors, like age or sex and location factors have little relationship with stress symptoms (Kyriacou and Sutcliffe, 1978). Vasilaki (1992) stated that these biographical factors are far too difficult to control for and too general to facilitate in the understanding of stress and anxiety. Thus, reports by researchers such as Vivien and Thompson (1996) stating that female employees experience higher levels of stress than their male counterparts does not however imply that female employees are affected more often by stressful situations. Laughlin (1984) argued that it may be

more a case that female employees accept that they suffer stress rather than the implication that they experience it more often. Thus, as Cichon and Koff (1989) stated, the context is more important than the biographical data.

Organisational stress, when left unchecked, can be extremely detrimental for employees in all hierarchical levels of the organisation. Many reports (Calabrese, Kling and Gold, 1987; Cohen and Williamson, 1991; Frese, 1985; Matteson and Ivancevich, 1987) suggest that high levels of unrestrained stress not only undermine the quality, productivity and creativity of the employees but also their health, well-being and morale. Aziz (2004) noted that many studies (Hafner, 1968; Hersen, 1972; Strange and Brown, 1970; Wolfe, 1986) examining the ill-effects of stress on employees have demonstrated that stress may result in problems such as hyper-irritability, sleep disturbances, disturbed interpersonal relationships, as well as a wide range of somatic and psychological patterns, all of which are detrimental to the individual. High levels of stress, when unchecked in employees, can have profound reverberations for the organisation as a whole. Organisational consequences include such exacting issues as poor quality of work, low productivity, absenteeism and high turnover (Cooper and Cartwright, 1994; Edworthy, 2000; Johnson, 1991).

Factors such as work overload and role ambiguity also contribute to stress, but Johnson (1991) stated that the response of an individual to a stressor plays a crucial role in determining the overall impact of the stressor. Johnson (1991) also stated that role overload is a particular issue for graduates. Burnstein (1963) stated that I.T. graduates often experience a “*fear of failure*” which leads them to accept too much work and work exceptionally long hours. Howard, Cunningham and Rechnitzer (1978) stated that accepting more and more work as well as working longer hours could eventually culminate in excessive fatigue, leading to poor performance. Johnson (1991) stated that the response of the graduate to “*work underload*” could either result in them responding proactively or enduring their present situation. Johnson (1991) however, noted that either response could generate interpersonal conflicts at work with the potential to accentuate the stress problem.

Some researchers (Proctor, 1993; Weiner, Akabas and Sommer, 1973) advocate that not all stress is detrimental. In fact, Weiner *et al.* (1973) stated that “*for many*

*workers ... we saw their participation in the world of work as oxygen, sustaining them in the face of emotional disorder*" (Weiner *et al.*, 1973, p. 272). Such claims however, must not be taken lightly, with Heins, Fahey and Lediem (1984) stating that too much stress is likely to detract from organisational performance.

### Summary and Conclusion

Each of the four approaches examined differ in the level of analysis they endorse. For instance, Fontaine (1992) stated that the interactional approach can best be thought of as an attempt to integrate environmental and personalological views in an effort to determine their separate and collective influence upon relevant outcomes. He also added that the most notable application of the interactional research style was the attempt to identify personality characteristics that "*moderate*" the relationship between stressful life events and the experience of disorder and "*disease*." Although this approach has a number of limitations, it is the chosen framework for the data collection and analysis in the current research. Time constraints prohibit a transactional approach being implemented, due to the necessity of a longitudinal study, as well as issues surrounding the empirical testing of a transactional model when considering the relationship between motivation and stress. Thus, the proposed aims and objectives of this thesis fit neatly into an interactional model, that is, there is the proposed stimulus (work), the proposed response (stress) and the search for moderating variables (demographics of the individual respondent and organisational factors). Another important aspect is that stress research has been dominated by the quantitative approach, thus, as the interactional model embodies this approach, through implementation in the current research a link is established with the current and historical tradition in this research domain.

The stress models discussed in this chapter illustrate the progression from more traditional approaches to more sophisticated models of stress, which incorporate cognitive appraisal as an important element in the perception of stress. Although Dabney (1998) believed that researchers placed more emphasis on those aspects of the definition of stress that best suited their research area, she stated that it is now generally accepted that stress is a process, a subjective experience, dependent on the person and the situation and existing when an individual says it does.

In the next chapter the interrelationship between motivation and stress is examined, paying close attention to this relationship in the Information Technology industry.

## Chapter Four

### Interrelationship between Motivation and Stress

#### Introduction

Although the effects of work motivation and stress on organisations are widely reported, there remains a dearth of studies examining the relationship between both these concepts. Thus, with so many researchers enthralled by the concept of work motivation and stress, a palpable progression is to examine the interrelationship between these two academic domains. Morley *et al.* (1998, p. 55) stated that “*the experience of stress is linked to motivation in that the drive and commitment created by high levels of motivation may also contribute to higher stress levels in individuals and groups at work.*” A low level of motivation may in some situations result in employees experiencing stress. Similarly, it is thought that stress can, in some instances, motivate. That is, when an individual is under stress they may feel pressurised, which can trigger feelings of underachievement, resulting in one working harder to compensate for those feelings of underachievement.

This chapter will examine the current literature that address aspects of the relationship between motivation and stress and critically evaluates the few studies that have examined elements of this relationship, whether directly or indirectly in the Information Technology industry.

#### Stress

This section concentrates on the stress aspect of the interrelationship between motivation and stress in the computing industry by discussing the implications of both high and low levels of employee stress from both the employing organisation's and the employee's aspect. Thus, the financial, performance and statutory obligations associated with high stress for organisations are now examined, as are the physiological, psychological and behavioural implications for the employee.

The soaring costs associated with a high level of stress for both employees and the employing organisation are widely reported (Howard, 1995; Lim and Teo, 1999; McHugh, 1993; Thong and Yap, 2000). For the most part, the effects of stress are not minor but rather they affect, quite profoundly, both parties.

Organisational issues related to a high level of stress include, among others, an increase in employee turnover. This is of particular concern within the computing industry, as Lim and Teo (1999) noted. They stated that the computing industry experiences higher than average levels of turnover, resulting in increased recruitment and training budgets. Other manifestations of stress include ill-health, absenteeism and statutory sick pay. In fact, McNally (2007) reporting from a study commissioned by the Small Firms Association (SFA) stated that absenteeism from work costs small businesses with sick pay schemes €757 million annually. McNally (2007) added that this figure does not take account of the other direct costs, such as the requirement to replace absent employees, overtime payments and the cost of medical referrals, or the indirect costs, such as the effect on productivity and quality, the increased work pressure on colleagues and the administration time required to manage absenteeism. In reality, McNally (2007) noted that this cost could be in excess of €1 billion. The SFA stated that stress had overtaken back pain as the most commonly cited problem on medical certificates.

Under the Safety Health and Welfare at Work Act, 1989, employers are under general statutory duties to take reasonable care for the health, safety and welfare of their employees whilst at work. That is, employers have a duty “*so far as is reasonably practicable*” for the safety, health and welfare at work of all its employees. Thus, the onus is placed with the employer to ensure that they provide safe working environments that do not unduly risk the health of employees. However, the term “*so far as is reasonably practicable*” is ambiguous, thus the employer’s liability is not absolute. The Health and Safety Act, 2005 was introduced with the intention of protecting employee rights while increasing the obligations on the employer regarding stress. The Health and Safety Authority (HSA) is charged with enforcing this law, yet limited means have meant that employers in breach of the various guidelines imposed by the act have, as of yet, not been prosecuted.

The aforementioned ambiguity surrounding the 1989 Safety, Health and Welfare at Work Act was clarified in a 2004 ruling by the Irish High Court, thus removing the confusion surrounding stress. Essentially the ruling stated that unless employees actively complained about stress they suffered because of their job prior to leaving, they would not be successful in any court action taken against their employers. Additionally, the ruling acknowledged that stress is an intrinsic part of some professions, thereby exonerating employers who let their employees work in such stressful environments, given that it is an inherent part of their corporate culture.

Although this ruling placed greater responsibility with the employee to ensure they are aware of their own mental health and take genuine steps to deal with it at an early stage, it by no means exonerates employers from having to consider workplace stress if they wish to curtail its associated costs, such as sick leave and turnover. In the United Kingdom, Howard (1995) noted that under the Health and Safety at Work Act (1974), employers must consider the mental, as well as the physical, health of their employees. It is inevitable that such considerations will eventually materialise in Irish law, however, until such changes are implemented, organisations should voluntarily adhere to best practice with regard to stress, if not to ensure the mental well-being of their employees, then for the financial well-being of the organisation.

Maudgalya-Wallace, Daraiseh and Salem (2006) stated that despite its large pay scale, the I.T. profession has witnessed some of the highest turnover and lowest employee satisfaction rates among employees when compared to any other sector. Indeed, the average cost of replacing an I.T. employee is about twice their annual salary (Young, 2002).

Similarly, the implications of high stress for employees can also be far reaching. Cooper (2005) reported that close to two out of every three individuals experience sleeping difficulties, irritability, difficulty concentrating or eating disorders due to stress. He also stated that a significant number of employees believed that their work and the amount of work they do is the main contributor to such conditions. More than forty percent blamed comparative poor pay, a third blamed I.T., whilst almost a third stated that job security and the consequences of making mistakes at work were causing them stress. Nevertheless, some computing employees are more vulnerable



to suffering from stress than others. Cox (1993) has shown that individuals experience occupational stress in different ways, with the extent to which they suffer stress dependent on how they perceive the demands of their job. Savery and Luks (2001) reported that the higher the perceived influence one has over their job, the lower their occupational stress is.

A number of research studies (Colborn, 1994; Engler, 1995; Garner, 1997; Vowler, 1995) provide evidence to suggest that the stress level of I.T. professionals has increased significantly in the past few years. Thong and Yap (2000) stated that occupational stress outcomes in the form of psychological and physiological symptoms, such as illness, absenteeism and turnover are becoming a major cause of concern for I.T. personnel management. Sonnentag, Brodbeck, Heinbokel and Stolte (1992) discovered that work-related stress is positively related to burnout among software developers. McHugh (1993) noted that other effects of stress on I.T. employees, which are frequently reported, include lowered motivation and job satisfaction.

The concept of The Yerkes-Dodson Law (1908), while briefly introduced in Chapter Three, states that there is an inverted-U relationship between the amount of work required of an individual and their health and performance, thus each individual has an optimal band of workload. Substantial deviations either side of this optimal band are likely to bring about stress. The term Eustress, coined by Selye (1964), or “*good stress*” are terms commonly used to denote this “*reasonable*” amount of pressure.

LeFevre *et al.* (2003) stated that, through popular applications of the Yerkes Dodson Law (1908), such as those of Benson and Allen (1980), Certo (2003) and Lussier (2002), common management practices have come to assume that a “*reasonable*” amount of pressure, anxiety or fear in one’s environment will lead to a higher level of performance, than if stress is not present. Thus, on the basis of the inverted-U relationship, stress is beneficial to performance, that is, until some optimum level is reached, after which performance will decline. Consequently, management personnel attempt to maintain stress at an optimal level to achieve the required performance, rather than endeavouring to minimise it. Some writers (Amabile, Conti, Coon, Lazenby and Herron, 1996; Hoyt and Gerloff, 1999) have identified that stress

inducing conditions, such as challenge and technological uncertainty are beneficial if they give rise to conditions that motivate creativity. In this instance, technological uncertainty should not be mistaken for technological obsolescence, which can contribute to eventual burnout.

LeFevre *et al.* (2003) however, stated that such applications of the Yerkes Dodson Law (1908) have not been supported by empirical research, nor are they consistent with Selye's original work. Although Schultz and Schultz (2006) stated that a certain amount of stress can be stimulating, invigorating and desirable, LeFevre *et al.* (2003) questioned the utility of having managers take responsibility for maintaining, at a certain level, their employees' stress. Such is the case that three major reviews of occupational stress and management interventions (De Frank and Cooper, 1987; van der Hek and Plomp, 1997; van de Klink, Blonk, Schene and van Dijk, 2001) made no mention of any positive aspect or effects of stress.

Westman and Eden (1996) stated that the rationale for the inverted-U relationship is that when individuals experience a low level of stress they do not experience improved performance, while experiencing too high a level of stress may result in them expending more time and resources in coping with stress. Consequently, a level of stress regarded as too low or too high and the individual may invest less effort in performing the task, resulting in a relatively lower level of performance. Cohen, Evans, Stokolos and Krantz (1986) have suggested that high stress causes a narrowing of attention, resulting in poor judgement, a propensity to commit errors and an inability to distinguish the trivial from the important. *"Thus, a moderate amount of stress causes the individual to be activated and to expend maximal energy in job performance"* (Westman and Eden, 1996, p. 166).

The next section, while following a similar structure to that of the current, will explore the dysfunctions associated with a low and high level of motivation. A thorough understanding of these concepts, and their associated dysfunctions, will assist in developing any potential relationship between motivation and stress in the computing industry.

## Motivation

This section contemplates the motivation facet of the interrelationship between motivation and stress in the computing industry. Thus, the remainder of this chapter will discuss further the implications of a low and high level of motivation for organisations employing computing professionals.

McMeekin and Coombs (1999) regard the motivation of technical professionals as a crucial determinant of innovative capacity. Thus, organisations which are able to implement appraisal systems, establish reward mechanisms and find ways to negotiate between the employees' career goals and the needs of the company are more likely to be innovative (Badawy, 1998; Gupta and Singhal, 1993). Organisations however which fail to recognise the implications of employee motivation almost certainly experience a reduction in output, followed by a loss of personnel, increased development costs and missed schedules (Lee and Katz, 1992).

I.T. professionals tend to be self-motivated individuals who thrive on autonomy and challenge. When motivated, they tend to be "*results oriented*" problem-solvers, capable of expending high levels of effort and innovation to complete a project (Hoyt and Gerloff, 1999). Unsurprisingly the realities of competitive markets, budget constraints, schedules and risk of technical obsolescence often restrict employees' freedom to be creative (Dougherty and Hardy, 1996; Glynn, 1996). These conditions ultimately produce negative motivation and stress that eventually lead to personnel turnover (Hoyt and Gerloff, 1999).

Organisations should pay a great deal of attention to the motivation of their computing employees towards producing business results. Talaq (2004) stated that managers play an important role in their organisations in leading and motivating their I.T. employees, and they should act accordingly in a way that facilitates and enables their employees to perform behaviours that lead to valued results. It is however no easy task to motivate technical professionals. Allen and Katz (1995) identified a third category of career orientation among technical professionals, in addition to the more commonly cited "*dual ladder*" structure. The dual ladder consists of a management and a scientific career progression, with both positions carrying equitable status and

pay. Allen and Katz (1995) however, identified a third category of career orientation, namely, the career project. Essentially this career orientation allows for the movement from one project to more interesting ones rather than an ascending progression to management status. Thus, in addition to attempting to increase the motivation of technical professionals, who by definition are autonomous individuals, the I.T. manager must also consider the varying degrees of career orientation of those same individuals.

Bowden (1995), after conducting an in-depth analysis of career management practices for technical staff, identified four career states which can be used to identify the ways in which technical professionals conduct themselves regarding their careers. These states consist of sustainers, subsisters, builders and searchers. The latter two are similar in that they are both actively concerned with the management of their careers towards higher status, although searchers look beyond their immediate environment to achieve this. Sustainers perform well, are loyal to the organisation and do not seek changes in responsibility or rewards. Finally, subsisters have diminished motivation and loyalty but do not actively seek to make changes to their situation. To exacerbate matters, Bowden (1995) stated that individuals may also experience shifts in these career states throughout their respective careers. Thus management whose wish it is to motivate their technical professionals must also take into account these differing technical groups, and their career management strategies.

Clearly, demotivated employees have detrimental effects on their employing organisation. Many researchers (Drazin and Schoonhoven, 1996; Glynn, 1996; Kondo, 1996; Orpen, 1994) have focused their attention towards motivating, and sustaining motivated employees. Many of these studies have illustrated that organisational productivity and performance decline with respect to demotivated employees. Conversely, as Talaq (2004) stated, the actions of motivated I.T. individuals lead to business performance outputs.

The relationship between changes in arousal and motivation are often expressed as an inverted-U function. Thus, an intermediate level of arousal is preferable for sustained employee motivation. The issues associated with a high level of motivation are often not reported in the management literature, rather the emphasis remains on

the dysfunctions associated with low levels of employee motivation. Nevertheless, some reports (Burisch, 1989; Maslach, Schaufeli, Leiter, 2001; Pines, 1993; Schaufeli and Enzmann, 1998) claim that in order for one to develop burnout a high level of motivation is thought to be necessary. Thus, Moore (2000) suggested that highly motivated I.T. personnel may be the most vulnerable to work exhaustion as burnout leads to reduced motivation, resulting in an increased inability to mobilise interest and capabilities.

### Summary and Conclusion

The current research aims to provide a framework for all organisations who wish to restrain the rise of negative consequences associated with employee stress while increasing their employees' work motivation, by researching the interrelationship between these two aspects of the organisational environment and implement support mechanisms and policy guidelines for employee and employer.

The next chapter will describe the methodology and the data collection techniques adopted in the present study.

## **Chapter Five**

### **Research Methodology**

#### Introduction

This chapter describes the research methods utilised to investigate the aims and objectives outlined in the first chapter. As both quantitative and qualitative research approaches were adopted, these methodologies and other pertinent research issues in the organisational life sciences are discussed in detail. Polit, Beck and Hungler (2001) stated that mixed method approaches are common in current day research, thus, it is important that an in-depth understanding of the strengths and weaknesses of both approaches and their underlying philosophy is obtained.

#### Research Design

The research design is the overall plan that enables researchers to come up with solutions to research problems, whilst guiding them through the various stages of research, namely collecting, analysing and interpreting observations (Nachmias and Nachmias, 1996). The research design needs to effectively produce the required solutions for the research activities, for example, what and how data is to be collected. Thus, it is essential that the research problem is understood if required solutions are to be produced (Ghauri, Grnhaug and Kristianslund, 1995). Research can be divided into three main categories: exploratory, descriptive and causal. Exploratory research, as Talaq (2004) stated, aims to uncover the boundaries of the environment in which the problems, opportunities or situations of interest are likely to reside and to discover the important variables that may be found there and which are relevant to the research project. Alternatively, descriptive research aims to provide an accurate and valid representation of those variables discovered by exploratory research. When the aim is to establish a causal link between these variables, then a causal research approach is used. Characterised by a low degree of flexibility and a formal structure, causal research is most useful when a “*cause and effect*” relationship between one or more variable needs to be established (Talaq,

2004). Talaq (2004) stated that when multiple methods of data collection are used, the findings from each method need to be reconciled with one another. This process is known as “*triangulation*” (Nachmias and Nachmias, 1996).

A decision regarding the appropriate approach and methodology for conducting the research needs to be addressed. There are two main types of research methodology, namely quantitative and qualitative methodologies. Each methodology is accompanied by a number of methods of data collection. The next two sections explore the differences between quantitative and qualitative methodologies and how the two methodologies can be combined.

The methodological distinctions most commonly used focus on the differences between quantitative research, which is generally associated with the philosophical traditions of positivism, and qualitative research, most commonly allied with post-positivist philosophy (Polit *et al.*, 2001). Positivism adopts a clear quantitative approach to investigating phenomena, as opposed to post-positivist approaches, which aim to describe and explore in-depth phenomena from a qualitative perspective (Crossan, 2003).

### Quantitative Research

Crossan (2003) stated that the “*traditional*” scientific approach to research has its underpinnings in positivist philosophy. Although positivism can be defined in many ways, Smith (1998) provided a useful insight into positivist approaches within the organisational life sciences, when he stated that they “*assume things can be studied as hard facts and the relationship between these facts can be established as scientific laws.*”

The basic reasoning of positivism assumes that an objective reality exists which is independent of human behaviour and is therefore not a creation of the human mind (Crossan, 2003). A major criticism of the positivist approach is that it does not provide the means to examine human beings and their behaviours in an in-depth manner. In reality, humans are subject to many influences on behaviour, feelings, perceptions and attitudes that positivist researchers would reject as irrelevant

(Crossan, 2003). Thus, critics argue that the positivist approach yields useful, but limited data, which only provide a superficial view of the phenomenon under investigation (Bond, 1993; Moccia, 1988; Payle, 1995).

Bryman (1988) stated that “*quantitative research is often conceptualised by its practitioners as having a logical structure in which theories determine the problems to which researchers address themselves in the form of hypotheses derived from general theories*” (Bryman, 1988, p. 18). Nevertheless, this approach is by no means the only one available to practitioners. In fact, Warshay (1975) argued that quantitative research has a propensity to comprise the examination of concepts, which are hardly at all derived from some prior theory. Bryman (1988) stated that hypotheses are often derived more from a body of literature relating to a concept than from a theory per se. The former approach is utilised in the current investigation into the relationship between employee motivation and stress in the computing industry.

Kidder and Judd (1986, p. 40) stated that a necessary part of conducting research is the ability “*to measure the concepts we wish to study.*” Measuring concepts is generally achieved through questionnaire devices or some other method. Lazarsfeld’s (1958) delineation of the “*flow of concepts to empirical indices*” is one of the best known schemas for dealing with the translation of concepts into observable entities. This schema, described by Bryman (1988, p. 26) as “*rigorous and systematic,*” consists of a sequence of four stages. Firstly, one must develop an *imagery* about a particular facet of the theoretical domain, which are subsequently broken down into different components, known as “*dimensions.*” Thirdly, it is necessary to develop *indicators* for each dimension, and finally Lazarsfeld proposed the *formation of indices*. This latter stage essentially entails gathering together the indicators to form an index of each of the constituent dimensions. The formulation of indices, that is, the development of a group of questions, which stand for each of the delineated dimensions, is regarded as crucial within the overall operational process. This process as pertaining to the current investigation is explained later.



## Qualitative Research

Following the recognition by scholars such as Jacob Bronowski (1956) and Karl Popper (1959) that within the world of modern science the elementary justifications of positivism were no longer entirely defensible, a new philosophy emerged, that of post-positivism (Crossan, 2003). Post-positivism provides an alternative to the traditions and foundations of positivism for conducting disciplined research. Forbes, King, Eastlick, Kushner, Letourneau, Myrick and Profetto-McGrath (1999) suggested that post-positivism is concerned with establishing and searching for a “*warrantable assertibility*,” that is, evidence that is valid and sound proof for the existence of phenomena (Phillips, 1990). Crossan (2003) noted that this is in contrast to the positivist approach of making claims to absolute truth through the establishment of generalisation and laws.

In contrast to the quantitative approach where theories and concepts are the starting point for investigators, Bryman (1988) stated that qualitative researchers often reject the idea of using a theory as a precursor to an investigation since it may not reflect subjects’ views about what is going on and what is important. Qualitative research tends to adopt a more open approach, unlike quantitative research, which is more structured. That is, the sampling and questionnaire construction are conducted prior to the start of data collection. On the other hand, ethnographers such as Cohen (1978) advocate that the delineation of a research focus be deferred as long as possible. Miles and Huberman (1994) referred to this approach as “*loosely structured*.” Whyte (1984) however drew attention to the problem of such approaches, stating that one may “*find so many interesting things to study that you are at a loss to delimit the scope of your project and focus on specific problems*” (Whyte, 1984, p. 225). Thus, Miles and Huberman (1994) believed that a “*tighter*” design for those working with well-delineated constructs is more appropriate. However, they noted that many qualitative research studies lie somewhat between these two methods. That is, researchers usually have some rudimentary conceptual framework from which to begin.

When conducting qualitative research, one must formulate *research questions*, this may precede or follow the development of the conceptual framework. Along similar

lines to a quantitative approach, these questions represent the facets of the empirical domain and may be general or particular, descriptive or explanatory in nature. Next, one must *define the case*. Miles and Huberman (1994) defined a case as a phenomenon of some sort occurring in a bounded context, that is, a case is the unit of analysis under investigation. Although, there may exist more than one case, and some may contain a sub-case(s), Yin (1984) suggested that qualitative research by its very nature contains single cases. The next step is to *decide the sample*. Qualitative researchers, unlike quantitative researchers, work with a small sample. That is not to say however that selecting the sample size is straightforward. Finally, the *instrumentation* stage comprises specific methods for collecting data. There are variations in the amount of preparation required at the instrumentation stage, as Miles and Huberman (1994) stated, it may be “*loosely to tightly structured*.”

Criticisms of post-positivist approaches generally relate to the interactive participatory nature of qualitative methods (Crossan, 2003). Parahoo (1997) has suggested that this is the main weakness of post-positivist approaches and one that stems from the proximity of the researcher to the investigation. Others, such as Mays and Pope (1995), have argued that qualitative research lacks “*reproductibility*,” that is, research is personal to the researcher to such an extent that one cannot guarantee that a different researcher would reach similar conclusions.

### Multi-Method Approach

Talaq (2004) stated that some researchers perceive qualitative and quantitative methodologies as incompatible because they have different epistemological bases and using them together is mixing paradigms. Nevertheless, he stated that the majority of researchers consider qualitative and quantitative methodologies as different ways of looking at phenomena and using them together is symbiotic. In fact, Ali (1998) and Nachmias and Nachmias (1996) noted a recent shift within the organisational life sciences towards multi-method approaches, which tend to reject narrow analytical paradigms in favour of breadth of information, which the use of more than one method may provide. Validating this theory Wright (1995) stated that combining qualitative methods and quantitative methods can make the resulting research more meaningful and have a greater probability of being valid, that is, of

actually measuring what it means to measure. Research methodologists have advocated the use of triangulation and multi-method strategies, defined as the use of more than one method of data collection in conducting a research study to gather more reliable results (Brewer and Hunter, 1989; McGrath, Martin, Kulka, 1982; Wright, 1995).

Bryman (1988) stated that investigators who work with both qualitative and quantitative methods should not lose sight of the significance of a distinction between quantitative and qualitative data. He noted however that studies which do combine both approaches (e.g., Woods, 1979; Ball, 1981) tend not to accord equal or even near equal weightings to them. This weighting may in fact shift over the course of the investigation. Webb, Campbell, Schwartz and Sechrest (1966) have suggested that the use of more than one method of investigation is likely to exhibit more confidence in the findings of a study. Thus, Bryman (1988) concluded that by combining qualitative and quantitative research, a researcher's claims for the validity of their conclusions are enhanced if they can be shown to provide mutual confirmation. Nevertheless, a combination which provides mutually reinforcing results may also expose discrepant findings.

Bryman (1988) stated that qualitative research might facilitate the construction of scales and indices for quantitative research, while also assisting in the analysis of quantitative data. Such approaches however are more common than its inverse. That is, there are fewer examples of investigations in which quantitative research precedes and provides an aid to the collection of qualitative data. Thus, the use of quantitative methods of data collection in predominantly qualitative studies occurs in large part because of the researcher's calculation that a reliance on qualitative methods will not allow all the relevant issues to be fully addressed (Bryman, 1988).

There are a number of barriers which need to be addressed when integrating quantitative and qualitative research methods. Bryman (1988) noted that one of these barriers is the view of quantitative and qualitative research as based on fundamentally incompatible epistemological positions. Consequently, Bryman (1988) stated that some qualitative researchers have eschewed survey procedures because of what he referred to as "*their positivist taint.*" A further obstacle is that of

cost. Bryman (1988) stated that there are substantial costs associated with conducting investigations in which the two traditions are brought together.

Bryman (1988) believed that discussions of qualitative and quantitative research traditions have resulted in an exaggerated portrayal of their differences. Similarly, Miles and Huberman (1994) believed that the foregoing argument is essentially unproductive. Along with Reichardt and Cook (1979) and Miller and Fredericks (1991), they believed that the distinctions between these approaches should not be tied to epistemological preferences. Indeed, Howe's analysis (1985, 1988) illustrated that quantitative and qualitative methods are "*inextricably intertwined*," not only at the level of specific data sets but also at the levels of study design and analysis.

### Chosen Research Methods

Choosing appropriate research design and data collection methods depends, according to Peterson (1982), on the availability of resources and the extent to which the relevant data can be collected. The researcher's experiences, understanding of philosophy and personal beliefs may also have some bearing on the methods adopted (Denzin and Lincoln, 1998). Since the present study examined the inter-relationship between employee motivation and stress, a combination of qualitative and quantitative research methodologies was deemed appropriate. At the end of chapter one the primary aims and objectives of the study were given:

- 1) To identify and describe the factors that motivate and demotivate recently employed computing graduates.
- 2) To examine the implications of these motivational and demotivational factors/levels for both the computing graduate and their employing organisation.
- 3) To identify and describe the factors that create stress among recently employed computing graduates.
- 4) To examine the implications of these stress factors/levels for both the computing graduate and their employing organisation.

5) To examine the interrelationships between motivation and stress for both parties to the employment relationship.

6) To examine the consequences of this interrelationship for both parties to the employment relationship.

In order to address these research aims, it was determined that a combination of research designs and a mixed method approach would yield more conclusive findings. There is, as Bryman (2004, p. 464) noted, a “*growing recognition of the potential of multi-strategy research.*” A mixed-method approach will increase the validity and reliability of the results, thus providing a more accurate evaluation than research based solely on a qualitative or quantitative methodology. It was felt that a survey methodology and interview schedule would be the most suitable means of obtaining the required information to satisfy the research objectives.

Bryman (1989) defined a survey as “*the collection of data on a number of units and usually at a single juncture in time, with a view to collecting systematically a body of quantifiable data in respect of a number of variables which are then examined to discern patterns of association*” (Bryman, 1989, p. 104). Methods by which a survey can be carried out include interviews, questionnaires or telephone surveys. Typical of the survey approach are the use of a fixed quantitative design, the collection of small amounts of data in standardised form from a relatively large number of individuals, and the selection of representative samples of individuals from known populations (Robson, 2002). Robson (2002) stated that most surveys involve the use of a questionnaire. A self-completion postal questionnaire (see Appendix B) was utilised for the current study.

The use of survey techniques has two main advantages for this study. Firstly, surveys are considered well suited to descriptive research where the interest is counting how many people within a sample possess particular attributes (Bryman and Cramer, 1995). Secondly, the use of a survey would allow associations between variables to be mapped out and measured to show whether associations between variables were strong or weak.

There is however also a number of disadvantages associated with the use of survey techniques. Ryan (2000) stated that a survey methodology frequently involves the use of a structured questionnaire, which she noted obtains less in depth information than other methods, such as interviews. Hakim (1987) stated however that this criticism is offset by the fact that measurement is consistent across all respondents, thus allowing comparisons to be carried out. A second disadvantage is that confidence in the findings is dependent upon the quality of individual responses, thus there is some scepticism about whether survey responses carry real meaning (Bryman, 1995). As pointed out previously, this criticism is overcome in the current study with a mixed-method approach. Other disadvantages include the availability of distribution lists, response rates and time restrictions.

A commonly used typology distinguishes among structured, semi-structured and unstructured interviews. Robson (2002) stated that each type of interview can be linked to the depth of response sought. A semi-structured interview is implemented in the present study. Robson (2002) stated that interviews lend themselves well to use in combination with other methods, that is, in a multi-method approach. Many other researchers such as Bryman (1988) and Webb *et al.* (1966) have lent support in favour of mixed-method approaches, which utilise interviews as part of the research process.

There are a number of advantages associated with the use of interview schedules. Most widely reported of these advantages are that they provide “*rich*” in depth data (Robson, 2002). The interview schedule allows for further “*probing*,” thus allowing one to investigate further the respondent’s underlying motives in a manner that self-administered questionnaires cannot. Non-verbal responses provide cues which aid the verbal responses to such an extent that Robson (2002) stated that they may actually alter or, in extreme cases, reverse the answers given.

A disadvantage which must be taken into consideration is that of research bias. Robson (2002) stated that the physical presence of an interviewer can affect the interviewee’s responses. That is, factors such as the researcher’s skills, experience, class, gender, age, personality and degree of responsiveness towards the interview can influence the responses. These effects become particularly evident in studies

which employ several researchers. That is not to say however that they are absent with single interviewer studies, rather, as Robson (2002) stated, the affects become virtually impossible to gauge. Interviewing can also be time consuming, particularly so for single person interviewers, and more so if geographical considerations apply.

The procedure utilised in this study to aid in the development of the questionnaire and interview schedule was an extensive literature review, questionnaire development, interview schedule design and a pilot study. An extensive literature review was conducted on the concept of motivation and stress. The questionnaire and interview items for both motivation and stress were developed based on this literature review, and the specific aims and objectives of the research. The questionnaire/interview items were further refined using a pilot study.

### Literature Review

A comprehensive literature review of the motivation and stress domains was conducted. Literature was sourced from libraries in Waterford Institute of Technology as well as online databases such as ABI Inform (Proquest), Business Sources Premier, Emerald, Index to Theses and Ingenta among others. Full text articles unavailable on these databases were retrieved from other Institutions and the British Library. Several theories of motivation were discussed in detail, and implications for higher and lower motivation in the computing industry were noted. Four principle models of stress were also examined, as well as the organisational consequences of high and low stress levels for both the employee and the employing organisation. Whilst examining these research domains in their own right an extensive literature review of their interrelationship was carried out. The literature review aimed to lay a strong theoretical foundation for the development of the questionnaire and interview schedule.

### The Measurement Instruments: Development and Construction

In order to fulfil the aims and objectives of the study, certain information must be collected and analysed. The study utilised, as data collection methods, a structured questionnaire for employees and a semi-structured interview schedule for employers.

The majority of the data collected from the questionnaire was attitudinal in nature, thus it was decided that this data would be collected through Likert type scales. Although the interview schedule contained predominantly open-ended questions, Likert scales were also used.

Once the variables and their relevant indicators had been identified, the development and construction of the data collection instruments could begin. One of the most important steps in any survey design is the operationalisation of variables (Oppenheim, 1994). This is, as Ryan (2000) noted, essentially a statement of the variables to be measured, and for each of these, the formulation of a set of indicators, questions and scales (see Appendix A).

The motivation dimensions were then grouped into two categories, namely intrinsic and extrinsic motivation, and the stress into three dimensions, sources, levels and consequences.

The utilisation of the intrinsic/extrinsic method of categorising the dimensions was also adopted for both the sources and levels of stress. The consequences of stress were sought under the classifications of behavioural, psychological and physiological. These groupings and their respective reliability estimates are shown in Appendix A (Questionnaire Scales and Reliabilities). These dimensions in both motivation and stress were based on the models in the literature review in Chapters Two and Three.

Conducting item analysis and examining for internal consistency allows those items with the highest internal consistencies to be selected for inclusion in the final scales. Reliability estimates for each scale ranged from .645 to .871. The selected items were then reassembled into the order envisaged for the final questionnaire (see Appendix B).

### Questionnaire Design

Once the process of operationalisation had been achieved, the employee questionnaire was completed (see Appendix B). A vital skill in designing and



constructing a questionnaire is the ability to structure, focus, phrase and ask sets of questions in a manner that is intelligible to respondents. Such questions however must minimise bias while providing data that can be statistically analysed. Taking consideration of four interrelated issues during questionnaire design can help achieve these objectives. These issues are questionnaire focus, questionnaire phraseology, the form of response and finally question sequencing and overall presentation.

Questionnaire focus concerns two primary issues; the extent to which the questions asked in the questionnaire adequately cover the various aspects of the research problem(s), and that they do so with sufficient detail. Ryan (2000) stated that “*it is particularly important that there is provision in the questionnaire for eliciting data on all the important variables*” (Ryan, 2000, p. 49). That is, with all the important variables accounted for, it allows for statistical analysis of the relationship between the dependent variables, as well as statistical control over the extraneous variables. Equally, one must assess whether the questions are relevant to the research problem, thus the designer must eliminate those questions that do not serve to answer the objectives of the research. The operationalisation of variables and the pilot study were used for this stage in the present study.

Questionnaire phraseology is the term used to describe whether the questions asked are intelligible to respondents (Payne, 1951). Feedback from the pilot study was an important aid in ensuring appropriate phraseology.

It is important that each response can provide data in a form that is suitable for the statistical techniques the researcher intends using, bearing in mind the reliability and validity of the measurement scales actually encoded in the questionnaire design (Kidder and Judd, 1986). Thus, the variable’s operationalisation and measurement and their subsequent encoding in the questionnaire design must fit the statistical techniques used in the study.

The sequencing of the questions and the overall presentation of the questionnaire are important aspects of the design process, particularly for self-administered questionnaires, as is the case in the present study. Questions which have a natural and logical order combined with the overall presentation of the questionnaire are

important aspects that need consideration in order to secure a high response rate. Indeed, such actions have been shown to improve the response rate by seven percent, while a follow up letter can improve it by twenty percent (Converse and Presser, 1988).

The design of the present questionnaire incorporated the aforementioned stages. In order to increase the response rate and gain information the questionnaire design:

1. Followed a simple format to ensure questions were not omitted.
2. Included more closed-ended questions which are regarded as easier and quicker to complete.
3. Provided open-ended questions which allowed respondents to add additional information that may give a deeper insight into the data obtained (Tourangeau, Rips and Rasinski, 2000).
4. Aimed to avoid respondent fatigue by not being excessively long (Bryman, 2004).

Questionnaires were distributed to computing graduates with the aim of identifying their views, insights and perceptions of what motivates and demotivates them at work, as well as their perceptions of the stress levels, sources and consequences they experience at work. Further to these issues, it was deemed necessary to ascertain their views on the interrelationship between motivation and stress in the computing industry.

### Interview Design

A structured interview (see Appendix C) was deemed appropriate for the qualitative aspect of the study. This approach was adopted in order to use the same dimensions as those used in the questionnaire (see Appendix A). Using these dimensions would ensure that the same issues covered in the questionnaire were also covered in the interview. Thus both employers' and employees' views on motivation and stress would focus on the same issues.

The views, insights and perceptions of managers were considered crucial to the study. The interview was undertaken with the aim of determining managements' perceptions of what motivates and demotivates their employees, as well as their perceptions regarding their employees' stress levels, sources and consequences at work.

### The Pilot Study

A pilot study was undertaken prior to distribution of the questionnaire to ascertain any difficulties respondents may encounter when completing the questionnaire. The pilot study aims to determine the efficiency of the layout, the clarity of the definitions, the adequacy of the questions, the efficiency of the instructions, the codes chosen for precoded questions and finally the probable cost and duration of the main survey and of its various stages.

The pilot study was conducted on a convenience sample of twenty four participants at Waterford Institute of Technology. The pilot study was conducted to find answers to the following questions;

1. Were the questions easily understood?
2. Was there difficulty answering the questions?
3. Were there any irrelevant questions?
4. Did the questions follow a logical sequence?
5. Could the questionnaire be completed within a reasonable amount of time?
6. Were there any issues associated with the layout and overall presentation?
7. Was the terminology/phraseology intelligible?

Modifications implemented from feedback from the pilot study included maintaining consistency among the response categories in each Likert scale, as well as some content, structural and aesthetic changes to the layout of the questionnaire.

Similarly, the aim of the pilot study conducted for the interview schedule was to ascertain any difficulties the interviewees, and indeed the interviewer, may encounter during the interview process. The pilot study aimed to determine the clarity of the

definitions, the adequacy of the questions, the length of time taken to administer and the efficiency of the instructions used in the interview. The pilot study was administered to one individual. Modifications implemented from feedback from the pilot study consisted primarily of structural changes to the questions.

### Quantitative Sampling

The sampling dilemma is reasonably straightforward. Time and cost prohibited data collection on the entire population of recently graduated computing professionals in Ireland. It is often however the population that is of interest to researchers and consumers of research alike, rather than a subset of the population. Thus, extending the findings from a subset of the population, or a sample, to the entire population is critically important to overcome the dilemma between cost and time on the one hand and information needs on the other.

It is incumbent on the researcher to clearly define the target population. There are no strict rules to follow, and the researcher must rely on logic and judgment as the population is defined in keeping with the objectives of the study.

Usually the population is too large for the researcher to attempt to survey all of its members. So a small, but carefully chosen, sample can be used to represent the population. The sample should reflect in some way the characteristics of the population from which it is drawn.

Sampling methods are classified as either probability or non-probability. In probability samples, each member of the population has a known non-zero probability of being selected. In non-probability sampling, members are selected from the population in some nonrandom manner. However, in non-probability sampling the degree to which the sample differs from the population remains unknown, but the information gathered from the research still provides significant insights and can be a good source of data in descriptive research.

This quantitative aspect of this study utilised non-probability convenience sampling. The alumni list of Waterford Institute of Technology's (W.I.T.) I.T./Computing

graduate cohorts was the basis of the sample. This type of sampling procedure is regarded as less representative compared to probability samples, however as the alumni cohort was based upon W.I.T.s Computing Department which provides a wide base of Informatics degrees, this issue of representativeness and consequent lowered generalisation became less of a difficulty.

W.I.T.'s computing and I.T. degrees range from Applied and Commercial Computing, to Software Development, to Multimedia and Information Systems. Due to this wide spread of Informatics programmes, graduates would be dispersed geographically, hierarchically and sectororally throughout many differing industrial sectors of the computing industry and thus would be more representative of the larger computing employee population currently working in Ireland today. This increased representativeness of the sample will to a certain degree increase the research result's generalisability beyond that which is normally found in most non-probability samples. However, it is acknowledged that this sampling approach may be viewed as a limitation of the current study, but to undertake a completely random and representative sample would have been beyond the scope of a single researcher, both temporally and financially, so convenience sampling was identified as the most logical methodological approach, given the nature of the research along with the research aims and objectives.

The sampling equation utilised in this study is from Moser and Kalton (1979) and is presented below and identified a sample size of 330, which is required for the present study.

$$n = \frac{pq}{s^2/p} (1-f)^2$$

Where  $p$  is equal to the proportion of the sample possessing the attribute being measured and  $q$  is the proportion which does not possess that attribute, so  $p + q = 1$ . For the present study purposes,  $p$  and  $q$  were set at .5 respectively. The author chose to calculate a sample size with a standard error of not greater than .5% ( $s^2/p$ ). This was chosen due to the fact that the author felt the improvement in precision was not

worth the extra cost associated with the larger sample. The assumption was made that  $f$  (the sample fraction) was small enough to ignore (that is, less than 1 in 5). The sample size calculations were as follows:

$$n = \frac{0.5 * 0.5}{\frac{(2.75)^2}{100}} \qquad n = \frac{0.25}{(.0275)^2} \qquad n = 330$$

### Qualitative Sampling

A feature of qualitative sampling is the fact that the number of cases sampled is often small. This is because a phenomenon only need appear once to be of value. There is no need for scale as there is no need for estimates of statistical significance. Thus, unlike statistical sampling, where the emphasis is on having a representative sample that is used to substantiate findings to the wider environment, purposeful sampling (a technique often employed in qualitative investigations) is concerned with selecting information-rich cases whose study will illuminate the questions under enquiry, hence, the term purposeful sampling (Miles and Huberman, 1994). In general terms, this form of sampling consists of the “*procedures used to identify, choose, and gain access to relevant units which will be used for data generation by any method*” (Mason, 1996, p. 83).

The selection of structured interviews represents the first important element of the sampling process. This element of the sampling process is determined by selection criteria such as the sampling strategy that best fits the purpose of the current study, the resources available, the questions being asked, and the constraints being faced. The intensity and therefore the length of the qualitative interview will also impact on the design of the qualitative sampling strategy and the decision of the sample size. However, with a purposive non-random sample the number of people interviewed is less important than the criteria used to select them. This is because a phenomenon need only appear once to be of value. There is no need for scale as there is no need for estimates of statistical significance. Furthermore, because qualitative

investigation aims for depth as well as breadth, the analysis of large numbers of in-depth interviews would simply be unmanageable because of a single researcher's ability to effectively analyse large quantities of qualitative data. However, the small-scale approach will only work in instance where the researcher has a strong sampling strategy (Ritchie and Lewis, 2003).

In order to achieve the objectives of this research, managers of a computing organisation or a department needed to be involved. Due to the resources and the purpose of this element of the research study, only three participants were necessary as the qualitative aspect provides more in-depth information than the employee questionnaire.

### The Main Study

Three hundred and thirty graduates of Waterford Institute of Technology were selected from an alumni list. A letter (see Appendix D) explaining the study and the research contributions was sent to three hundred and thirty computing graduates up to five years working in their profession after graduation, along with the questionnaire and a return addressed envelope. Nine questionnaires were returned due to change of address or because participants were absent from that address. The initial response rate was 10.5%. However, a reminder letter (see Appendix D) sent to each of the participants three weeks later increased the response rate to 21%, significantly higher than the “10% baseline as a useful rule of thumb” for a postal survey response rate referred to by Jankowicz (1995, p. 246). So, in total, sixty-eight questionnaires were returned and usable for this study.

Structured interviews were conducted with three managers/supervisors from three organisations in order to meet the needs of the qualitative aspect of the study. The selected employers/supervisors were contacted by letter (see Appendix D), which was subsequently followed up by email and phone call. Suitable meeting arrangements were organised with those who agreed to participate in the interview.

Prior to each interview, confidentiality was assured, with an understanding that the individual or employing organisation would in no way be identified by the responses

the participants provided. This reassurance would help participants feel at ease, where it is believed that they would provide more “*rich*” data.

### Data Analysis

The quantitative data was analysed using a Windows version fifteen of SPSS (Statistical Package for the Social Sciences). This is a powerful software package for microcomputer data management and analysis. This statistical package was used to conduct analyses on the raw data to supply results that aided in the examination of the aims and objectives of the study. Essentially SPSS involves the creation of values to represent the information received. This information then provided the basis for the presentation of the results.

The qualitative data analysis was somewhat different. Information gleaned from answers to the open-ended questions in the questionnaire and the interview schedule were coded, noting all the major themes, typologies, concepts and propositions. This involved the use of coloured highlighters to aid in the recognition of these themes, a method which is consistent with those recommended by Taylor and Bogdan (1998) and Denzin and Lincoln (2000).

### Summary and Conclusion

This chapter described the research methods adopted to investigate the aims and objectives of the present study. In order to garner information from a comprehensive range of sources, a multi-method approach was utilised. The next chapter will illustrate the results obtained from the employee questionnaire, while a discussion of the findings will be delayed until the final chapter, chapter eight.



## Chapter Six

### Questionnaire Results

#### Introduction

This chapter presents the results of the quantitative empirical study, which identified and described the interrelationship between motivation and stress in the computing industry. This chapter will identify and describe the factors that motivate and demotivate recently employed computing graduates, will identify and describe the factors that create stress among recently employed computing graduates and will examine the relationship between motivation and stress for both employee and employer. A discussion based on these findings will be presented in the final chapter.

#### Employee Demographics and Characteristics

As stated in Chapter Five, a postal questionnaire was sent to 330 graduates of Waterford Institute of Technology (W.I.T.). Of those posted out, sixty-eight replied, while nine were returned unopened due to incorrect addresses. The sample included only those graduates who graduated within the last five years. Table 6.1 shows the age groups of the participants in the study.

| Age group   | Frequency | Valid Percent |
|-------------|-----------|---------------|
| 20-24       | 21        | 30.9          |
| 25-30       | 33        | 48.5          |
| 31-34       | 10        | 14.7          |
| 35-40       | 2         | 2.9           |
| 41-50       | 1         | 1.5           |
| 51 and over | 1         | 1.5           |

*Table 6.1. Age*

Unsurprisingly, the majority of the sample fell within the age group twenty to thirty, with a lower proportion of the sample comprising older age groups. Perhaps this variance is a result of a lower number of mature students entering third level education, that is, when compared with those who enter directly from second level.

|        | Frequency | Valid Percent |
|--------|-----------|---------------|
| Male   | 40        | 58.8          |
| Female | 28        | 41.2          |

*Table 6.2. Gender*

Table 6.2 shows the number of male and female respondents. The gender division in this sample, in terms of numbers employed in the computing industry, is similar to those reported by the United Nations Economic Commission for Europe (UNECE). They reported that 45% of technical positions in 2005 were filled by female employees, while men occupied 55% of the positions. Those statistics illustrated a downward adjustment from the 2004 figure for male occupied positions compared to an increase in female occupied positions for the same period. This contrasts with previous years, where male occupied positions consistently grew year on year for fourteen consecutive years. Nevertheless, there remains a perception among the general populace of the computing profession as primarily male dominated. Perhaps the endurance of this and other misperceptions about the computing industry discourage women from entering the field.

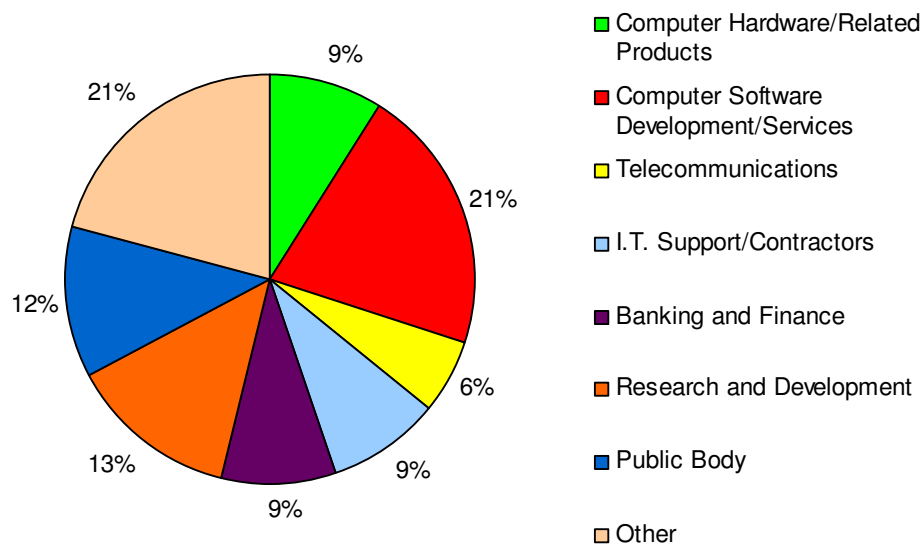
Table 6.3 shows the percentage of participants with a degree compared to those with a higher postgraduate degree. Those contacted for participation in the study consisted primarily of graduates from ordinary and honours degree programmes. Consequently, it was anticipated that the majority of the sample would not have continued with further education after achieving their primary degree. The relatively low number of individuals progressing with further education in the computing field

may well be due to the current high employability of computing graduates in Irish industry.

|                            | Frequency | Valid Percent |
|----------------------------|-----------|---------------|
| Degree                     | 59        | 86.8          |
| Higher Postgraduate Degree | 9         | 13.2          |

*Table 6.3. Qualification Level*

The Central Statistics Office (CSO) reported that the computing industry as a whole accounted for just over 5% of the total number of organisations and 8% of total employment in Ireland in 2005, yet in terms of turnover it contributed 20% of the total turnover in the industry and services sectors. Figure 6.1 illustrates the percentage of employees in this survey working within the varying sectors of the computing industry. For example, those working in computer software/related services represent the majority of the participants, comprising 21% of the sample, while 13% of the sample represent those working within the Research and Development domain.



*Figure 6.1. Computing Industry Sectors*

The relatively large proportion of the sample working within the computer software/services sector is consistent with reports (Enterprise Ireland) rating Ireland as the largest exporter of software in the world. While there were seven categories to choose from, 21% of respondents did in fact chose the ‘Other’ category, with the majority of participants indicating that they worked in the I.T. department of a public body institution, thus it was deemed appropriate to include ‘Public Body’ as an additional category when presenting the results. In addition to creating this new category, the ‘Electrical Engineering’ category is eliminated from Figure 6.1 as no participant from the sample selected that sector. Although the ‘Banking and Finance’ and ‘Public Body’ sectors only constitute twenty-one percent of the computing industry in this sample, according to an iReach report they invested €1.41 billion in I.T., 60% of the total amount spent in the computing industry in 2006.

| Location | Frequency | Valid Percent |
|----------|-----------|---------------|
| America  | 19        | 27.9          |
| Europe   | 5         | 7.4           |
| Ireland  | 43        | 63.2          |
| Other    | 1         | 1.5           |

*Table 6.4. Organisation Origin*

The origin of organisations in the sample is shown in Table 6.4. Surprisingly, 63.2% of the sample stated that their organisation originated in Ireland. This is in stark contrast to 7.4% originating in Europe, while a lower than expected number originated in the United States, at 27.9%. These results however are consistent with those of the CSO, who reported that foreign-owned enterprises accounted for only 10% of the total number of ICT enterprises, yet they contributed 56% of total employment and 85% of total turnover in the sector, since they tend to be on a large scale with an average of 304 persons employed compared with an average of 41 employees for indigenous-owned ICT manufacturers. The CSO reported that just over 91% of ICT service enterprises were Irish-owned. The high number of

employees working in foreign-owned computing organisations, in addition to their financial contribution to the market, may account for the common perception that most computing organisations are foreign-owned rather than indigenous-owned.

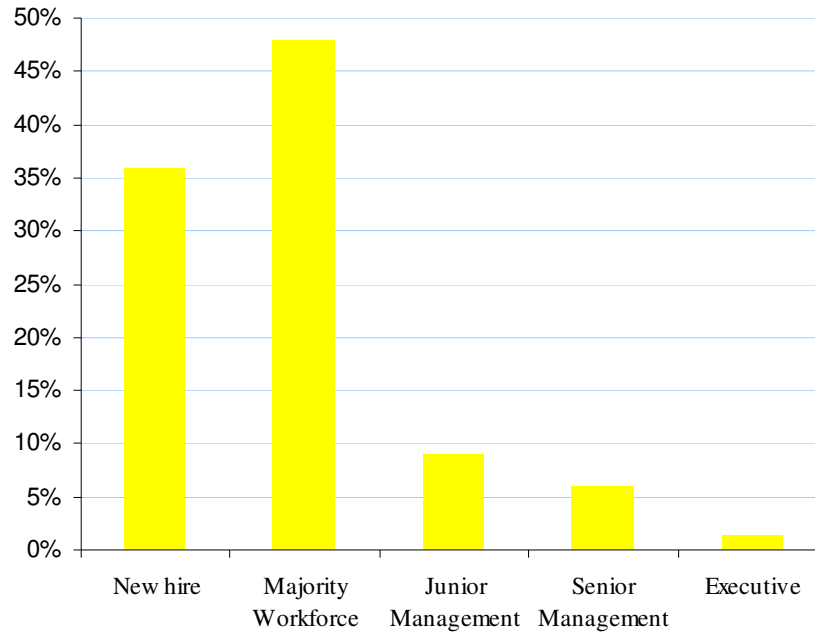
The broad size range of the organisations whose employees participated in this research is represented in Table 6.5.

| Number of<br>Employees | Frequency | Valid Percent |
|------------------------|-----------|---------------|
| <25 (Micro)            | 12        | 17.6          |
| 25-100 (Small)         | 11        | 16.2          |
| 101-500 (Medium)       | 16        | 23.5          |
| 501-1000 (Large)       | 9         | 13.2          |
| >1,000 (Macro)         | 20        | 29.4          |

*Table 6.5. Number of Employees*

For the purpose of the present research, organisations with less than 25 employees are classified as micro organisations, organisations with 25-100 employees as small, organisations with 101-500 as medium-sized organisations, those with 501-1000 employees as large and finally organisations with more than 1000 employees are classified as macro organisations.

Figure 6.2 demonstrates that a significant proportion of employees classified themselves as part of the ‘majority workforce,’ while 35.8% represent ‘new hires.’ For the purpose of the present research, those participants categorised as ‘new hire’ are defined as employees who have worked in the organisation for less than one year.

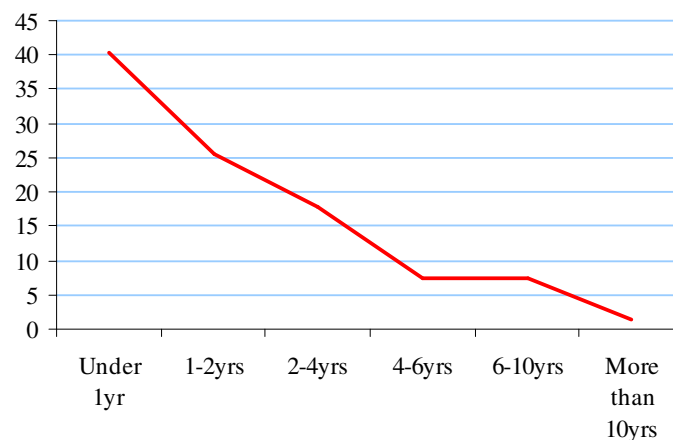


**Figure 6.2. Employee Level in Organisational Hierarchy**

It was anticipated that a significant majority of the sample would choose the first two categories, namely ‘new hire’ and ‘majority workforce,’ as the study only aimed to investigate graduates up to and including five years after graduation. Indeed, 83.3% of the sample chose the first two categories. With such a high number of employees in either ‘new hire’ or ‘majority workforce’ roles, combined with the relatively short period of time for which they remain in such roles (see Figure 6.3), it is clear that employee retention and turnover is an issue within the computing industry, certainly at the graduate level.

Figure 6.3 displays the sharp decline in the length of time employees stay with an organisation. The percentage of those who remain with the organisation declines after two years of employment. However, bearing in mind that the aim of the study is to investigate the interrelationship between motivation and stress for employees in the computing industry for the first five years after graduation, one cannot presuppose, on the basis of a single response, that such a pattern would transpire were the parameters of the study expanded. Nevertheless, 7.4% of the sample was employed with the same organisation for four to six years, three in the capacity of

‘majority workforce’ and one in ‘senior management.’ When considering the aim of the study (to examine graduates for the first five years after graduation) there is an anomaly with the results presented in Figure 6.3. That is, a number of the respondents reported that they have been working with their respective organisations for more than five years and in one case more than ten years. It is however entirely possible that these respondents pursued further education whilst continuing employment with their respective organisations.



*Figure 6.3. Length of Time in Organisation*

Although, Sethi, King and Campbell-Quick (2004) stated that some employees opt to switch careers as a result of job stress, when they feel committed to an organisation they are likely to remain with the organisation (Igbaria and Greenhaus, 1992; Mobley, Griffeth, Hand and Meglino, 1979). Burnes (2005) concluded from a study on employee turnover intention that 61.5% of I.T. professionals would like to work for the same organisation in five years time. Burnes’s (2005) findings lend support to those of the present study, where 47.1% of the sample stated that they would like to remain in the same organisation, albeit at a higher rank than at present, while 36.8% stated that they would prefer to work in a different job in five years time (see Table 6.6.). Johnson and Sargeant (1998) however, reported that at least half of technical

professionals have no intention of remaining in their present roles for more than five years.

| Item                       | Yes % | No %  |
|----------------------------|-------|-------|
| Same work at the same rank | 5.9   | 94.1  |
| Same work at a higher rank | 47.1  | 52.9  |
| Doing a different job      | 36.8  | 63.2  |
| Being self-employed        | 7.4   | 92.6  |
| Not being employed         | 0     | 100.0 |
| Don't know                 | 7.4   | 92.6  |

*Table 6.6. Career Expectations*

To summarise, the participants are predominantly male, aged between twenty-five and thirty years of age, who after having achieved a primary degree stay with the organisation for less than a year, expect to work at a higher rank in five years time, classify themselves as part of the 'majority workforce,' working in the computer software/services sector, in an organisation established in Ireland with more than one thousand employees.

#### Questionnaire Results: Motivation

The dimensions used in the present study are similar to those provided in a report (Stavroula, Griffiths and Cox, 2003) conducted by the Institute of Work, Health and Organisations (W.H.O.). In their report, Stavroula *et al.* (2003) stated that job insecurity and lack of promotional prospects would thwart career development, status and pay, while inadequate, inconsiderate or unsupportive supervision and poor relationships with co-workers destabilises interpersonal relationships. However, for the purpose of the present study, two of the dimensions derived from the motivation theories discussed in Chapter Two have been amalgamated to produce one dimension. That is, feedback and Locke *et al.*'s (1968) interpretation of goal-setting



have been amalgamated to produce a single dimension and hence forth they will be referred to as 'Feedback.'

Table 6.7 shows social relationships as the greatest source of motivation (72.7%), followed in sequence by skill variety, task identity, recognition, advancement, feedback, fiscal equity and job security, while autonomy is rated by the sample as the least source of motivation respectively.

| Dimension     | Considered a source of<br>motivation | Not considered a source<br>of motivation |
|---------------|--------------------------------------|--|
| Job Security  | 22.4                                 | 22.4                                     |
| Social        | 72.7                                 | 6.1                                      |
| Fiscal Equity | 25.8                                 | 34.8                                     |
| Skill Variety | 52.2                                 | 17.9                                     |
| Autonomy      | 16.7                                 | 9.1                                      |
| Advancement   | 33.3                                 | 24.2                                     |
| Recognition   | 37.9                                 | 22.7                                     |
| Task Identity | 40.9                                 | 9.1                                      |
| Feedback      | 28.8                                 | 22.7                                     |

*Table 6.7. Sources of Motivation*

A significant proportion of the respondents (72.7%) rated social relationships (with colleagues and superiors) as a significant motivator. This result however is not supported in the literature. In fact many studies report that social relationships are not a source of motivation for computing professionals. It may be however that this dimension rated highly in the present study given that the sample were relatively recent graduates, who upon entering the workforce initially require more social interaction. Skill variety and task identity were also rated as significant sources of motivation among the sample. This would demonstrate that the sample placed greater emphasis on the work itself as a motivator rather than financial or personal

motivators such as fiscal equity and job security. It is surprising however that advancement opportunities and feedback, given the prevalence of contract work in the computing industry, outperformed job security as a source of motivation. Nevertheless, the ranking provided by the sample for advancement opportunities is relatively low when compared to those of other studies which report that computing professionals have a high need for achievement. Indeed, the American Institute of Certified Public Accountants (AICPA), after conducting a worldwide study, identified advancement opportunities, at 76%, as the most valued work incentive among employees under thirty years of age, which is the predominant age profile of the present sample. Second to advancement opportunities in the AICAP study were flexible work schedules (73%) and opportunities to learn new skills (68%). Although differences are evident among the highest motivators in both these studies, the results of the present study lend some support to those published by the AICPA.

#### Questionnaire Results: Stress

The survey results for the sources of stress are presented in Table 6.8. The relatively low scores for social relationships as the sources of both motivation and stress would indicate that social relationships are not regarded as a potential motivator or stressor.

| Dimension     | Considered a source of stress | Not considered a sources of stress |
|---------------|-------------------------------|------------------------------------|
| Job Security  | 32.8                          | 34.3                               |
| Social        | 19.4                          | 52.2                               |
| Fiscal Equity | 22.4                          | 35.8                               |
| Skill Variety | 20.9                          | 29.9                               |
| Autonomy      | 22.4                          | 28.4                               |
| Advancement   | 37.3                          | 11.9                               |
| Recognition   | 10.4                          | 34.3                               |
| Task Identity | 17.9                          | 23.9                               |
| Feedback      | 26.9                          | 26.9                               |

*Table 6.8. Sources of Stress*

It was expected from the literature review that collectively job security and fiscal equity may be ranked as the main sources of stress. However, as Table 6.8 shows, 37.3% of the sample ranked advancement opportunities as the main source of stress in their working life. This high ranking for advancement opportunities is consistent with the concept of the need for achievement in McClelland *et al.*'s (1953) Achievement Motivation theory, discussed in Chapter Two. In addition to advancement opportunities, job security, feedback, fiscal equity, autonomy, skill variety, social relationships, task identity and recognition were consecutively rated as sources of stress. There is significant support for these dimensions as sources of stress, such as from a study conducted by Yandrick and Freeman (1996) who illustrated that autonomy is a source of stress for male employees working in demanding roles that give them little control. Consequently, they are three times more likely to experience stress related illnesses than their male counterparts in similar roles who have more autonomy in their work.

Table 6.9 reports the levels of occupational stress experienced by the sample. Whilst ranked as one of the highest causes of stress for the participants of this study, the lack of advancement opportunities was again noted by 41.8% of the sample as the main contributor to the high stress levels in their current employment.

| Dimension     | Impacts on stress level | Does not impact on stress level |
|---------------|-------------------------|---------------------------------|
| Job Security  | 27.9                    | 45.6                            |
| Social        | 22.1                    | 52.9                            |
| Fiscal Equity | 33.8                    | 35.3                            |
| Skill Variety | 25.0                    | 41.2                            |
| Autonomy      | 17.6                    | 51.5                            |
| Advancement   | 41.8                    | 40.3                            |
| Recognition   | 33.8                    | 44.1                            |
| Task Identity | 20.6                    | 55.9                            |
| Feedback      | 26.5                    | 39.7                            |

**Table 6.9. Stress Levels**

The consequences of stress for both the employing organisation and employees are widely reported and have already been discussed in detail in Chapter Four. In a report published in 2006 the Small Firms Association (SFA) reported that stress is the key cause of absence from work with a national average absenteeism rate of 3.8% per employee each year, which equates to a loss of nine working days per employee. This average increases to 7.1% in the technical/electronics industry, akin to sixteen working days per employee, the highest of all industries in the survey. The associated costs for organisations with sick pay schemes include replacement staff, medical costs, lost productivity and administration costs associated with managing absenteeism.

| Dimension     | Perceived as a<br>consequence of stress | Not perceived as a<br>consequence of stress |
|---------------|---|---|
| Physiological | 37.3                                    | 14.9  |
| Psychological | 34.3                                    | 6.0   |
| Behavioural   | 35.8                                    | 11.9  |

*Table 6.10. Consequences of Stress*

Table 6.10 shows that the physiological, psychological and behavioural consequences of stress were perceived with near equal weighting by the sample. The last European-wide study of stress-related illnesses undertaken by EUROSTAT was in 1999. They reported that 846,310 employees in the European Union were diagnosed with a stress-related illness in 1999, with 12.5% of that figure diagnosed with two or more stress related illnesses. In all probability these figures will have increased since EUROSTAT's study. Psychologically, Pennebaker (1990) illustrated that individuals demonstrating uncontrollable stress tend to experience a shift in thought processes to a superficial, simplistic, unoriginal style of thinking. Consequently, their productivity levels would decrease substantially. Seligman (1972) stated that uncontrollable stress resulted in diminished problem-solving abilities. A lack of creativity and lowered problem solving skills would be seen as

disadvantageous to an I.T. employer. Those employees who regard stress as uncontrollable often show greater reactivity to, and prolonged recovery from, challenging tasks (Brosschot, Benschop, Godaert, Olff, De Smet, Heijnen and Ballieux, 1994).

To summarise the overall findings related to motivation and stress, the majority of the sample rated skill variety as the greatest source of motivation for them, with social relationships rating quite low as a motivator. The lack of advancement opportunities was the highest producer of stress with a lack of recognition the lowest contributor. A similar trend emerged for the levels of stress as for the sources of motivation. That is, the dimensions fiscal equity and social relationships were again rated as the highest and lowest level of stress respectively. As a final point, the consequences of stress were collectively rated with near identical impact.

#### Factors Affecting Motivation and Stress

Further data analyses utilising One-Way Analysis of Variance (ANOVA) was undertaken to investigate if any of the demographic variables were significantly related to either employee motivation or stress. The demographic variables included in the data analysis were gender, age, level of education, level in the organisation, total time in the organisation, organisation origin, the number of employees and the organisation's description. Some researchers (Cichon and Koff, 1989; Kyriacou and Sutcliffe, 1978; Vasilaki, 1992) believe that biographical factors such as age and gender have little relationship with stress. Nevertheless, all the demographics will be presented in the current results including those not significantly associated with differences in stress or motivation for I.T. professionals. The One-Way ANOVA test is essentially an F test in which an estimate of the between-groups variance is compared with an estimate of the within-groups variance by dividing the former by the latter. Because One-Way ANOVAs are an omnibus test, to safeguard against this limitation the Tukey Honestly Significant Difference (HSD) test, which is a posteriori test, was applied to the results. However, the Tukey HSD test was not applied to the age and education level demographics as they contain less than three categories.

| Dimension                    | Gender | Age    | Education Level | Level in Org |
|------------------------------|--------|--------|-----------------|--------------|
| Job security (Motivation)    | .064   | .772   | 1.000           | .054         |
| Social (Motivation)          | 1.000  | .663   | 1.000           | .554         |
| Fiscal Equity (Motivation)   | .435   | .893   | .144            | .023**       |
| Skill Variety (Motivation)   | .932   | .538   | .378            | .248         |
| Autonomy (Motivation)        | .315   | .313   | .823            | .115         |
| Advancement (Motivation)     | .405   | .936   | .306            | .065         |
| Recognition (Motivation)     | .185   | .403   | .274            | .435         |
| Task Identity (Motivation)   | .312   | .898   | .630            | .210         |
| Feedback (Motivation)        | .574   | .392   | .446            | .757         |
| Job Security (Stress)        | .024** | .326   | .422            | .047**       |
| Social (Stress)              | .063   | .522   | .638            | .195         |
| Fiscal Equity (Stress)       | .838   | .280   | .188            | .500         |
| Skill Variety (Stress)       | .235   | .703   | .923            | .052         |
| Autonomy (Stress)            | .211   | .910   | .468            | .709         |
| Advancement (Stress)         | .118   | .083   | .490            | .109         |
| Recognition (Stress)         | .337   | .578   | .027**          | .766         |
| Task Identity (Stress)       | .076   | .911   | .055            | .690         |
| Feedback (Stress)            | .315   | .913   | .336            | .467         |
| Job security (Level)         | .022** | .753   | .063            | .034**       |
| Social (Level)               | .314   | .587   | .159            | .483         |
| Fiscal Equity (Level)        | .399   | .672   | .297            | .003**       |
| Skill Variety (Level)        | .322   | .335   | .300            | .056         |
| Autonomy (Level)             | .163   | .171   | .084            | .102         |
| Advancement (Level)          | .982   | .024** | .400            | .132         |
| Recognition (Level)          | .881   | .204   | .384            | .103         |
| Task Identity (Level)        | .649   | .198   | .858            | .007**       |
| Feedback (Level)             | .860   | .761   | .535            | .023**       |
| Physiological (Consequences) | .466   | .743   | .301            | .169         |
| Psychological (Consequences) | .251   | .964   | .369            | .129         |
| Behavioural (Consequences)   | .191   | .659   | .533            | .818         |

*Table 6.11. Demographic Variables in Relation to Motivation and Stress*

### Gender

As can be seen from Table 6.11, a number of the dimensions on the sources and levels of stress scale display significant differences amongst the demographic variables: gender, age, education level and the level in the organisation. Although a

small number of significant differences emerged in relation to gender and education level, Tukey's HSD test cannot be executed on these demographics as they consist of less than three categories. In spite of that, the female respondents reported that job security was a source of stress in their work, which ultimately generates considerable levels of stress, whereas job security was not at all a concern for the male respondents. The computing industry remains a predominantly male dominated profession. This relative isolation and lack of proactive role models moving up the hierarchy may lead female employees to believe that their jobs are at risk as senior management positions are predominantly held by male employees.

#### Education Level

With regard to education level, the lack of recognition from their superiors is a cause of stress for those respondents holding a primary degree, while their counterparts with a higher postgraduate degree do not find the lack of recognition from management a source of stress. It may be that those holding higher postgraduate degrees feel more competent and as a result require less recognition from management and co-workers than those with primary degrees.

#### Age

Differences among age groups show that the youngest and eldest age categories, namely 20-24 and 35 and over, reported lower stress levels with regard to advancement opportunities in their organisation. In contrast, the remaining two age groups felt that advancement opportunities cause them considerable stress. Perhaps the eldest and youngest participants are less focused on promotional opportunities, given that initially those in the age group 20-24 may be less ambitious while those aged 35 and over may feel they have reached a stable plateau in the organisational hierarchy.

#### Level in the Organisation

The significant differences between the participants working at different ranks in the computing industry are also shown in Table 6.11. Senior management personnel

disagreed with the contention that financial rewards act as a source of motivation while their counterparts who categorised themselves as majority workforce believe that financial rewards are a source of motivation. Buckley *et al.* (2002) suggested that pay is associated with various motives such as job security. Although job security is a source of stress for all employees, and as noted above, particularly for female computing graduates, those working at senior management grade do not believe that the job security dimension is a source of stress. It could be that job security is not perceived to be an issue that affects senior management groups as they may perceive themselves to be more integral to the organisational functioning and as they move further up the organisational hierarchy they are more likely to be paid better, therefore supporting Buckley *et al.*'s (2002) argument that pay and job security are associated.

Significant differences presented in Table 6.11 illustrate that employees holding senior management positions experience significantly lower stress levels in relation to job security than their counterparts in majority workforce and junior management roles. Similarly, senior managers report lower stress levels with regard to fiscal equity than those in majority workforce and junior management roles. Comparable findings have been reported by Arnolds and Boshoff (2002) who discovered that unlike management personnel, extrinsic rewards can act as a motivator for frontline employees.

Employees in senior management positions also experience less stress as a result of task identity, while those in new hire and junior management roles regard task identity as a cause of stress. Finally, feedback is regarded as causing a high level of stress for junior management employees, while new hire, senior management and majority workforce employees believe that feedback results in low stress levels. This is surprising given that one would expect those in new hire and majority workforce roles to experience higher levels of stress in relation to feedback than do junior management personnel. Perhaps those in junior management positions are new to their post given that the study examined computing professionals for the first five years after graduation and therefore they may still be in a probation period in that rank. Love and Irani (2007) identified an association for computing employees between the period of tenure with a firm and their level of stress. They suggested that



tenure is a significant predictor of stress, anxiety and depression, with less experienced employees at far greater risk of adjustment problems than their more experienced counterparts. It would appear that the results for those in senior management positions presented in Table 6.11 do support the results of Love and Irani's (2007) study. However, it must be noted that only four respondents selected the senior management category with significantly more selecting the remaining categories. Thus, conclusions of agreement between the present study and that of Love and Irani's must be tentatively made.

Although no significant differences are observed for the autonomy dimension, it appears that autonomy is a moderate source of stress for computing professionals at all levels. Love and Irani (2007) suggest that computing personnel who engage in accepting responsibility may become overwhelmed trying to manage all the work-related stressors without being able to diffuse responsibility amongst co-workers. That is, autonomous computing employees may find their workload a source of stress since for the most part they do not have subordinates to whom they can delegate work to alleviate this workload.

Table 6.12 presents the results for the remainder of the demographic variables. Significant differences are primarily reported in the sources of motivation dimensions, with the level and consequences of stress each illustrating only one significant difference each. The demographic variables presented in Table 6.12 include the total time spent with the organisation, the organisation's origin, the number of employees in the organisation and its description. The latter variable is a description of the primary function of each organisation.

| Dimension                    | Total time with Org | Org Origin | Num of Employees | Org description |
|------------------------------|---------------------|------------|------------------|-----------------|
| Job security (Motivation)    | .427                | .324       | .304             | .127            |
| Social (Motivation)          | .726                | .720       | .096             | .126            |
| Fiscal Equity (Motivation)   | .100                | .505       | .140             | .269            |
| Skill Variety (Motivation)   | .436                | .555       | .047**           | .041**          |
| Autonomy (Motivation)        | .007**              | .673       | .002**           | .497            |
| Advancement (Motivation)     | .877                | .419       | .626             | .580            |
| Recognition (Motivation)     | .717                | .822       | .413             | .015**          |
| Task Identity (Motivation)   | .092                | .259       | .993             | .533            |
| Feedback (Motivation)        | .647                | .587       | .939             | .050**          |
| Job Security (Stress)        | .314                | .974       | .404             | .379            |
| Social (Stress)              | .764                | .906       | .180             | .096            |
| Fiscal Equity (Stress)       | .893                | .447       | .848             | .125            |
| Skill Variety (Stress)       | .625                | .908       | .996             | .883            |
| Autonomy (Stress)            | .243                | .459       | .366             | .128            |
| Advancement (Stress)         | .093                | .304       | .829             | .667            |
| Recognition (Stress)         | .122                | .819       | .123             | .220            |
| Task Identity (Stress)       | .752                | .264       | .905             | .096            |
| Feedback (Stress)            | .434                | .820       | .861             | .353            |
| Security (Level)             | .424                | .832       | .158             | .074            |
| Social (Level)               | .970                | .216       | .187             | .480            |
| Fiscal Equity (Level)        | .293                | .956       | .430             | .198            |
| Skill Variety (Level)        | .144                | .312       | .539             | .101            |
| Autonomy (Level)             | .121                | .231       | .591             | .400            |
| Advancement (Level)          | .808                | .842       | .955             | .198            |
| Recognition (Level)          | .778                | .408       | .039**           | .220            |
| Task Identity (Level)        | .346                | .878       | .351             | .437            |
| Feedback (Level)             | .483                | .696       | .764             | .083            |
| Physiological (Consequences) | .187                | .173       | .562             | .922            |
| Psychological (Consequences) | .890                | .903       | .634             | .376            |
| Behavioural (Consequences)   | .316                | .026**     | .525             | .349            |

*Table 6.12. Demographic Variables in Relation to Motivation and Stress*

#### Total time with Organisation

Participants who have been working in the same organisation for less than a year and between four to six years reported that autonomy is not an important motivator for them, while those working with the same organisation for between one and four

years felt that autonomy is a strong motivator for them in their work. It is likely that those working with the organisation for less than one year, that is ‘*new hires*’, are more likely to focus on settling into their role than the respondents who have been working with the same organisation for between one and four years. Similarly, those working with the same organisation for four to six years are likely not to find autonomy a source of motivation as they may have attained positions of power.

### Organisation Origin

Employees working for organisations established in the United States who operate facilities in Ireland experience less behavioural consequences as a result of stress. In contrast employees working for Irish or European firms report higher instances of behavioural consequences as a result of work-place stress. This difference may be attributable to U.S. organisations introducing “*best practice*” measures from overseas.

### Number of Employees

Using the classification introduced in Table 6.5, those participants employed in micro organisations (< 25 employees) do not believe that skill variety is a source of motivation, while their counterparts working in small organisations (25-100 employees) believe that skill variety is a source of motivation. Typically, employees of small organisations tend to perform a number of functions as they have fewer co-workers with whom the work-load can be divided. Although the results of the present study for employees working in small organisations supports this view, it does not for those in micro-sized organisations. However, all the respondents in micro-sized organisations were employed by organisations established in Ireland, thus it could be that these organisations are newly formed and not in a position to provide their employees with skill variety. Similar findings emerge for the dimension autonomy. That is, autonomy is a source of motivation for those working in micro organisations, but not for those working in small organisations. Similarly, smaller organisations tend to have less of a hierarchical leadership structure, thus employees may have more autonomy. As can be seen from Table 6.12, the lack of recognition caused

significant levels of stress for the respondents working in micro organisations in comparison to those in medium-sized organisations.

### Organisation Description

Public body and computer-software sector employees felt that skill variety is a motivator for them, while the remaining sectors all felt that skill variety is not a source of motivation for them. Comparable findings emerged for the dimension recognition, although on this occasion in addition to public body and computer-software employees, the respondents working in the computer services sector also felt that recognition was a source of motivation for them. Rainey (1982) believed that employees working in the public sector often do so out of a desire to deliver a worthwhile service to society, thus recognition from the organisation would rate favourably with such employees. Many studies (Houston, 2000; Jurkiewicz, Massey and Brown, 1998; Karl and Sutton, 1998) support these findings by illustrating that public sector employees are more motivated by, among others, skill variety and recognition. The feedback dimension proved to be a source of demotivation for employees working within a Research and Development role, as they felt that they were not involved in decisions affecting their work, unlike those in the Computer Software and the Public Body sectors who felt that they had an input into decisions affecting their work. Studies (Raudsepp, 1980; Vivien and Thompson, 1996) show that autonomy is a vital source of motivation for computing personnel, particularly so for graduates (Hall, 1971). Therefore, this aspect of feedback and exclusion from the decision making process should be re-examined by managers in the computing domain to gain the optimum amount of motivation from their employees.

Of all the dimensions reported in Tables 6.11 and 6.12, Social Relationships, Physiological and Psychological consequences of stress were the only ones to emerge without any significant differences among the demographic variables. However, significant differences were not expected for the social relationship dimension with regard motivation, given that over seventy percent of the sample felt that social relationship with their colleagues and superiors was a source of motivation for them. Thus, it would have been surprising for any differences to emerge between any categories. Nevertheless, the result for the social relationship

dimension with regard stress as a source is consistent with studies (Buckley *et al.*, 2002; Couger, 1988) which report that computing professionals do not believe their social relationships with either their colleagues or superiors act as a stressor.

Further discussion based on the above findings will be presented in the final chapter. The next section will present the results of the analysis of the interrelationship between motivation and stress.

#### Quantitative Results on Interrelationship between Motivation and Stress

As this study utilised an empirical cross-sectional approach of which the advantages are outlined in Chapter Four, the main limitation of this strategy has been the fact that cause and effect cannot be separated between the variables of stress and motivation. Thus, analysis may be undertaken on the significance of the relationship (if any) between employee motivation and stress, but not on the exact nature of the interrelationship. This will need further longitudinal type research to explore and explain in detail the nature of this interconnection.

However, it must be noted that the results so far have delved further into this relationship than any study conducted thus far and that a number of significant and important findings have already been identified. The relationship between motivation and stress will now be explored utilising a regression approach.

The results presented in Table 6.13 are those of a bivariate regression analysis. A multivariate regression approach was attempted, however, no additional significant groupings were identified other than job security and fiscal equity. Nevertheless, combining these two dimensions is expected to provide significant results as they are relatively close in meaning, thus it was decided to continue with a bivariate regression analysis as it would yield more significant results.

As the preceding results empirically analysed the variables motivation and stress independently, and the following results are now analysed at an interdependent level, while the majority of the results may support the previous findings, it is possible that

a small number of interdependent relationships may differ somewhat from the empirical analysis of the independent variables.

| Dimension     | Sources of Stress | Level of Stress   | Physiological Consequences | Psychological Consequences | Behavioural Consequences |
|---------------|-------------------|-------------------|----------------------------|----------------------------|--------------------------|
| Job Security  | .003**<br>(.354)  | .003**<br>(-.362) | .794<br>(-.032)            | .528<br>(-.079)            | .267<br>(-.138)          |
| Social        | .032**<br>(.265)  | .049**<br>(-.243) | .370<br>(.112)             | .114<br>(-.196)            | .337<br>(-.120)          |
| Fiscal Equity | .000**<br>(-.530) | .000**<br>(.584)  | .293<br>(.131)             | .004**<br>(.352)           | .524<br>(.080)           |
| Skill Variety | .003**<br>(.358)  | .020**<br>(-.284) | .157<br>(.175)             | .213<br>(-.154)            | .181<br>(.165)           |
| Autonomy      | .661<br>(-.055)   | .536<br>(-.077)   | .030**<br>(.268)           | .544<br>(.076)             | .020**<br>(.287)         |
| Advancement   | .000**<br>(.444)  | .000**<br>(-.500) | .281<br>(-.135)            | .018**<br>(-.291)          | .170<br>(-.171)          |
| Recognition   | .248<br>(.144)    | .039**<br>(-.255) | .327<br>(.123)             | .386<br>(-.108)            | .673<br>(-.053)          |
| Task Identity | .160<br>(.175)    | .630<br>(-.060)   | .442<br>(.096)             | .321<br>(-.124)            | .411<br>(.103)           |
| Feedback      | .345<br>(.118)    | .032**<br>(-.264) | .050**<br>(.242)           | .219<br>(.153)             | .197<br>(1.61)           |

*Table 6.13. Sources of Motivation Dependent on Sources, Levels and Consequences of Stress*

The job security variable for the sources of stress is positively related with the sources of motivation, that is, job security is not a motivator but is a cause of stress for the sample. A negative significant relationship between the sources of motivation and the levels of stress signifies that reduced job security is a cause of increased levels of stress. Wiley (1997) discovered that job loss or the threat to one's job security can result in employees experiencing severe psychological reactions, such as

low self-esteem, low self-confidence and anxiety. Thong and Yap (2000) stated that physiological and psychological stress outcomes such as those illustrated by Wiley (1997) are of major concern for I.T. personnel management.

The independent results for the social relationship dimension rated this dimension as the highest source of motivation, yet it was seen as a relatively low source and level of stress respectively. Thus, the interdependent results for this dimension illustrate a positive relationship, that is, the lack of social support from colleagues and superiors produced stress for the sample. Some studies (Cummings, 1990; House, 1981; Jayaratne, Himle and Chess, 1988) suggest that social support can buffer the impact of occupational stress, predictions which are mirrored in the present study. Indeed, Table 6.13 shows a negative significant relationship between the social dimension as a source of motivation, and its ensuing level of stress. These results support those provided by Longenecker *et al.* (1999) who stated that poor relationships result in significant levels of stress for I.T. professionals.

The fiscal equity dimension for both the sources and levels of stress and motivation is negatively related. Thus, reduced fiscal equity is a cause, and indeed results in increased levels, of stress amongst the sample. These results are consistent with those provided by Cooper (2005) who reported that forty percent of employees believed that comparative poor pay caused them significant levels of stress, while a third believed that job security contributed to a high stress level. The high stress levels resulting from a lack of job security and fiscal equity, as Cooper (2005) noted, results in employees experiencing sleeping difficulties, irritability, difficulty concentrating and eating disorders.

The sources of motivation and stress are positively related with regard to the skill variety dimension. The lack of skill variety is a cause of stress for the sample. The threat of technical obsolescence for computing professionals can be a significant contributor to stress. However, some reports suggest that not all computing professionals consider technological change a threat to their technical competence. Most reports acknowledge that the relentless demand placed upon computing professionals to update their technical skills generates stress in one form or another (Tsai, Compeau and Haggerty, 2007). However, a negative significant relationship

between the sources of motivation and the levels of stress for this dimension also illustrates that reduced skill variety is a cause of increased levels of stress for computing professionals. Previous research clearly indicates that the broader the range of skills and abilities tapped early in a person's career, the more likely it is that the person will remain to become a more effective and successful contributing member of the organisation (Katz, 2003).

The variables stress and motivation are again positively related with regard to the advancement dimension, that is, those deprived of advancement opportunities experience stress. This relationship is unsurprising given that achievement is a significant motivator for computing professionals, as was the case when Couger (1988) presented his findings. This is also supported by the negative relationship between the sources of motivation and the levels of stress in the present study, which signify that increased levels of stress are attributable to insufficient advancement opportunities.

Although there is a lack of any direct relationship between motivation and the sources/levels of stress, a positive significant relationship emerged between motivation and the physiological consequences of stress. Thus, a lack of autonomy resulted in the sample experiencing physiological reactions. Other results in the literature have however provided support in favour of a more direct relationship, such as that of Vivien and Thompson (1996), who stated that gratification of employees' autonomy needs leads to decreases in instances of stress. An opposing view was however provided for by Katz (1978) who suggested that in the early months of a new job employees are either insensitive or react negatively to challenging job characteristics such as autonomy and skill variety, thus lending support to the present findings. Nevertheless, many reports, such as that of Raudsepp (1980), state that autonomy is rated as a high source of motivation among technical professionals.

A negative significant relationship emerged between the sources of motivation and the level of stress for the recognition and feedback dimensions. That is, reduced recognition and feedback from management was a cause of increased levels of stress for the sample. A further relationship is also evident between motivation and the



physiological consequences of stress for the feedback dimension. This is an equally important relationship, given the extensive literature (Aziz, 2004; Hafner, 1968; Hersen, 1972; Strange and Brown, 1970; Wolfe, 1986) which demonstrates the negative consequences of employee stress. Such reports demonstrate that the manifestations of stress can be physiological such as peptic ulcers or cardiovascular diseases, psychological such as depression or anxiety, or behavioural such as deteriorations in work performance and interpersonal relationships.

It is surprising that an interrelationship (interdependent approach) did not emerge for the dimension task identity between the sources of motivation and sources of stress given the results reported in earlier tables (see Tables 6.7 and 6.8) where task identity was rated by the respondents as the third highest motivator while being rated as the lowest source of stress respectively (dependent approach).

These results are discussed further in the final chapter. The next section will present the results of the qualitative interrelationship between motivation and stress.

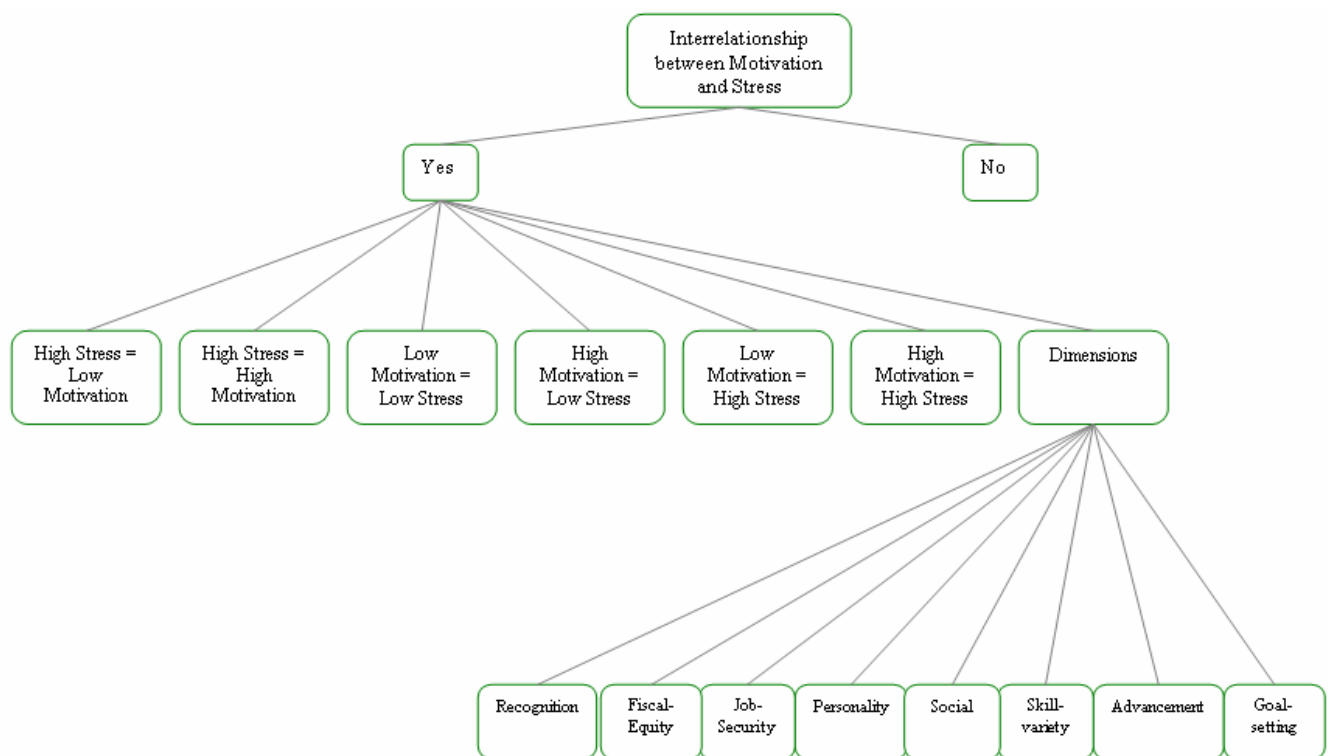
#### Qualitative Results on the Interrelationship

The qualitative results obtained from Part 4 of the questionnaire are presented in this section. Of the sixty-eight original responses, the vast majority believe that a relationship between motivation and stress existed. However, eight participants chose not to fill in the open-ended question relating to the interrelationship between the two variables, while a further twelve did not believe a relationship exists between motivation and stress in the computing industry. The results in this section are presented according to the major themes identified from the participants' transcripts.

Seven major themes were identified from the responses of those participants who believe that there is an interrelationship between motivation and stress in the computing industry. These are 1) High Stress leads to Low Motivation, 2) High Stress leads to High Motivation, 3) Low Motivation leads to Low Stress, 4) High Motivation leads to Low Stress, 5) Low Motivation leads to High Stress, 6) High Motivation leads to High Stress and 7) Dimension-Related. The latter theme relates to seven of the dimensions used in the questionnaire and interview schedule (see

Appendix A). These include recognition, fiscal-equity, job-security, social relationships, skill-variety, advancement and goal-setting. In addition to these dimensions, personality was reported as a factor in the interrelationship. These themes and their corresponding sub-themes are illustrated in Figure 6.4.

A significant number of direct quotes are taken from the questionnaire transcripts to illustrate and highlight the themes noted in the qualitative research and these are presented in italics below.



**Figure 6.4. Qualitative themes**

Some of the respondents noted that performance issues and reduced motivation arise out of high stress levels:

*“...constant stress I think leads to poor performance in the workplace. When you are under constant stress relating to a long running project your interest*

*in the project will drop and job performance on the project will suffer”*  
(Male, Age: 25-30, Majority Workforce).

*“...too much stress is counter-productive, also I tend to go into ‘panic attack’ mode, where I spend so much time worrying that I don’t make any progress at all”* (Female, Age: 25-30, New Hire).

*“If stress levels are high, motivation is hard to maintain”* (Female, Age: 25-30, New Hire).

Some respondents believe a certain level of stress is necessary to generate and sustain motivation:

*“I believe that a certain level of stress is necessary and acts as a motivator. However, only stress caused by the actual work has the effect of motivating a person. Stress caused by other factors – e.g. not enough money or relationship problems at home/in work will act as a de-motivating factor”*  
(Female, Age: 31-34, Junior Management).

*“Stress may lead to motivation (i.e. strive to better yourself so there is less stress). A threshold of stress is required to keep you interested in your work ... makes you feel you are making a difference in the organisation – motivates you”* (Male, Age: 20-24, New Hire).

*“I think stress and motivation are definitely tied together – I often find it hard to be really productive until there is a large amount of stress involved”*  
(Female, Age: 25-30, New Hire).

While the predominant view was that a high level of motivation leads to increased stress, a single respondent believed that a low level of motivation will result in lower stress levels:

*“If you don’t get motivation then you’re more relaxed and not worried about getting work done, and so are less stressed”* (Male, Age: 25-30, Majority Workforce).

Those who maintain that a high level of motivation is imperative so as to reduce or eliminate stress completely stated that:

*“Stress is self imposed; if motivated there is no stress and I am happy doing my work”* (Male, Age: 25-30, Majority Workforce).

*“Motivation is important in keeping a person active and not letting stress take over their life”* (Male, Age: 20-24, Majority Workforce).

*“Without motivation stress levels in the organisation rise. You need motivation to become more involved and thus less stressed”* (Female, Age: 25-30, New Hire).

The respondents who believe that low motivation leads to high stress stated that such individuals have a low sense of self-worth; consequently they are more likely to suffer as a result of external stressors:

*“Lack of motivation can be very stressful, generally motivated people have a sense of self-worth and are less inclined to be affected by external stressors”* (Male, Age: 31-34, Senior Management).

Although the connection between low motivation and high stress had been made, one participant stated that it was not always an overtly noticeable one:

*“I’d say there is an unclear but definite link between the two, where there is a lack of motivation I’d expect a higher stress rate ... but this isn’t always obvious?”* (Male, Age: 25-30, New Hire).

The following indicate that sustained increases in one’s motivation can gradually lead to an accumulation of excessively high levels of stress. This belief that a high

level of motivation leads to a high level of stress was the predominant theme emanating from the sample, who stated that:

*“The harder you work the more you are asked to do ... you reach breaking point and eventually fail”* (Male, Age: 31-34, Majority Workforce).

*“The more you do the more you’re expected to do and know. The more you know the more people you answer and you can in turn become more stressed”* (Male, Age: 25-30, Majority Workforce).

*“Too much motivation can place pressure on an individual to perform to an un-sustainable level: the external and internal wish to maintain this level can be a stressor in itself”* (Male, Age: 31-34, Senior Management).

A number of the participants believed that various dimensions from the questionnaire (see Appendix A) were instrumental in establishing a relationship between motivation and stress in the computing industry. These include job security, fiscal equity, recognition, social relationships, skill-variety, advancement and goal-setting, while some respondents believe that personality was also a contributor to this interrelationship.

*“Job security is always the threat to position and motivation, which causes me the greatest stress”* (Female, Age: 31-34, Junior Management).

*“I would certainly feel that good rewards and recognition for work well done would motivate me and also lessen stress situations”* (Female, Age: 20-24, New Hire).

*“... if employers tailored their benefits to each employee’s wishes then there would be less stress ... a little flexibility would go a long way”* (Male, Age: 25-30, Majority Workforce).

Relationships with colleagues and superiors were identified as a source of stress, which ultimately leads to reduced motivation:

*“Stressed out people can result (unnecessarily at times) and peoples’ perception of the situation can result in demotivated reactions, potentially negatively effecting production and team relations” (Female, Age 25-30, Majority Workforce).*

*“On a continuous basis stress can be demotivating and lead to poor relationships with work/workplace/managers etc.” (Female, Age: 25-30, New Hire).*

*“Motivation is very difficult if you are under severe pressure from your manager to meet targets. This leads to stress, especially if your manager relays their stress on you, in turn you feel stressed to reach targets” (Female, Age: 31-34, Junior Management).*

*“Stress is directly related to the pressures being put on you by your boss/co-workers ... Motivation on the other hand is directly related to the way in which employees are treated by their supervisor/management. The better a person is treated by their colleagues/supervisor the more motivation they have and hence reduced stress” (Male, Age: 45-40, Majority Workforce).*

Some participants stated that the motivation to excel in their careers ultimately results in increased stress:

*“The stress comes from wanting to make a positive impact on my work now so as to benefit my career in the long term” (Male, Age: 25-30, New Hire).*

*“Motivation can be a good thing ... but if people get obsessed with work, getting ahead etc., it can lead to stress” (Male, Age: 20-24, New Hire).*

While some portray motivation and stress as an infinite cycle where:

*“Motivation encourages you to work but also increases your stress as you’re probably going to want to get more work done as a result” (Male, Age; 20-24, Majority Workforce).*

The perception of some participants was that goal-setting linked motivation and stress. That is, those who are motivated to undertake goals they set will experience reduced stress levels:

*“In my opinion a person that is motivated is a person that is focused, believes in what they are doing, sets goals ... this setting of goals is where stress comes in ... Once motivated to achieve attainable goals stress will be reduced”* (Male, Age: 20-24, Majority Workforce).

*“Most motivated people will have to deal with a certain degree of stress as they reach to achieve new goals and this is quite normal”* (Female, Age: 25-30, New Hire).

However, one respondent believed that the linkage created by goal-setting between motivation and stress may in due course lead to increased stress levels:

*“High levels of stress are generally self-propagating, resulting in an individual constantly setting higher self-standards which ultimately results in high stress levels”* (Male, Age: 51 and over, Executive).

One participant regarded a lack of challenging work resulting from poor management as enormously stressful:

*“I did not have enough challenging work to do, so days were long and it totally stressed me out ... more so doing nothing than doing a job which is very stressful”* (Male, Age: 25-30, Majority Workforce).

The interrelationship between high stress levels and high motivation:

*“...probably depends somewhat on an individual’s personality type. Some personality types likely find stress a motivating factor. If a particular situation is stressful in a work environment, for example an impending project deadline, which can motivate them to work harder in order to meet that deadline. Therefore some stress is important, perhaps even necessary in*

*a work environment in order to keep the work challenging” (Male, Age: 25-30, New Hire).*

A few participants explicitly stated that there is no relationship between motivation and stress. Stating that both are entirely separate entities:

*“I don’t see any relationship between these two. In my opinion they are two completely different reactions with nothing in common” (Female, Age: 20-24, Majority Workforce).*

*“I don’t think there is a relationship. Stress is purely pressure from work with deadlines etc., motivation is if you are motivated about your job, i.e., If your job is interesting” (Female, Age: 25-30, Majority Workforce).*

*“I don’t know if it’s so much a relationship between motivation and stress in the workplace as it is a relationship between a lack of communication/appreciation and frustration in the workplace” (Female, Age: 25-30, New Hire).*

*“Not much to be honest ... Motivation comes from knowing that people use the product I work on. Stress doesn’t come from that – it comes from politics within the workplace” (Male, Age: 25-30, New Hire).*

The overall consensus, with regard to a lack of an interrelationship between employee motivation and stress in the computing industry, was that motivation and stress arise from different factors in the workplace and these factors do not affect each other. However, a recurring statement from the above quotations from these respondents is that they do not have target deadlines (in a manner of speaking), but rather their organisation places greater emphasis on achieving the task with a high standard and without the need to redo work, and as such they may not experience much stress in their work. Indeed, the feedback dimension (which incorporates both feedback and goal-setting) was rated by the sample as one of the highest sources of stress in their work, with further analysis illustrating that the majority of the respondents who stated that no interrelationship exists did not regard this dimension



as either a stressor or a motivator. Indeed, of all the dimensions, this contingent only rated job security, fiscal equity and a lack of advancement opportunities as a source of stress in their work. Thus, in comparison to the other respondents it appears that this group are faced with less stressors and more motivators in their work. Nevertheless, it cannot be assumed that were the opposite true that they may recognise a relationship between motivation and stress.

### Summary and Conclusion

This chapter presented the results of the quantitative aspect of the study. The demographic characteristics, as well as being presented on their own merit were examined in relation to their influence on the sources of motivation and the sources, levels and consequences of stress using One-Way Analysis of Variance (ANOVA). In addition, the concept of stress and motivation were also individually presented. The primary aim of the study, that is, to examine whether an interrelationship between motivation and stress in the computing industry exists, was explored utilising a cross correlation regression technique. Finally, the qualitative section of the questionnaire was presented using a significant number of direct quotes taken from the questionnaire transcripts to illustrate and highlight the main themes noted in the qualitative research.

A discussion based on the results of this chapter is presented in the final chapter. The next chapter will present the qualitative results of the study, obtained from the interview schedule.

## Chapter Seven

### Interview Schedule Results

#### Introduction

This chapter describes the results of the qualitative element of the present research, which identified and described the interrelationship between motivation and stress in the computing industry from the employers' perspective. Following a brief introduction of the organisational demographics, the motivation and stress results are introduced. Finally, the perception of those managers/supervisors of the interrelationship between motivation and stress in the computing industry is presented. A discussion based on those findings and the qualitative results will be presented in the final chapter.

#### Organisational Demographics and Characteristics

As stated in Chapter Five, structured interviews were conducted with three supervisors/managers from three different organisations. The dimensions utilised in the employee questionnaire were also used to form the basis of the interview schedule questions. In terms of the levels of management, each organisation comprised at least two levels of management. The participants described the corporate culture of their respective organisations, with three distinct cultures identified. Those were, firstly a culture which encouraged each employee to be individually creative, secondly a socially oriented organisational culture, and finally one in which those who work on newer more advanced technologies are more highly regarded. Below in italics are quotes to illustrate and highlight the differences noted in the corporate culture of each of the participating organisations:

*“Each member is encouraged to be individually creative, whilst at the same time be part of a complete team working towards the same company objectives as per mission statement”.*

*“The people make the place fun and enjoyable with clubs to motivate social activities. Management do not join in all the activities”.*

*“Corporate culture – work long hours – “Superstars” are regarded highly if working on newer technologies. Older technologies are just seen as maintenance”.*

Using the organisation description seen in Figure 6.1, two of the organisations were involved in computer hardware and software related products, while the third organisation can be categorised as an I.T. section of a manufacturing industry. Although the latter of these organisations was established in Ireland, it has witnessed continued expansion throughout Ireland and in overseas markets such as the United Kingdom and the United States. Thus, it is now regarded as a leading international organisation. The two remaining organisations both originate from the United States, although one of these has only recently ventured into the Irish market with the development of a software company, a venture which is a marked departure from its U.S. businesses. Using the classification system introduced in Chapter Six (see Table 6.5), two of the organisations are classified as macro organisations (greater than 1000 employees), while the organisation in the computer software sector can be classified as a medium-sized organisation (101-500 employees). This latter classification is unsurprising given that the majority of software related organisations tend not to be substantial organisations with thousands of employees.

### Motivation

This section will present the perceptions of the interviewees regarding the sources of motivation and demotivation concerning their employees. These perceptions are identified on the basis of the dimensions used in the employee questionnaire.

Although one of the participants did not believe that job security was a motivator for contract staff, she did state that employees over thirty-five years of age had a desire to remain in their present employment. Similarly, one participant felt that younger employees who did not have financial or familial commitments were less inclined to view job security as a motivator:

*“Very important since it relieves added unnecessary stress”.*

*“Very important to individuals who have a family and a mortgage. Not so much to younger, single people”.*

*“Out of twenty staff I have fifteen contractors. Job security does not worry them at all. All these contractors are less than thirty-five years of age. The five full-timers want to be based here full-time”.*

The predominant view of the social relationship dimension was of employees relying greatly on the social support of both their colleagues and superiors. However, one participant believed that those over thirty-five years of age were less inclined to attend organisational social gatherings:

*“Employees rely heavily on the support of their colleagues to get the job done ... their supervisors need to be encouraging in order to support and to be behind every effort and guide them in their best direction”.*

*“We have a sport and social club at work that has constant activities organised ... those in the thirty plus age bracket rarely attend organised sports events”.*

Fiscal equity was perceived to be a significant source of stress. Interestingly, the employers were aware that fiscal equity was both a stressor and a motivator, although they did not mention the relationship between both. Hence, the principle view was of unsatisfied employees seeking additional benefit packages. Two participants stated that inequity existed in their organisation’s payment system, whereby full-time employees were paid less than their counterparts working on a contract basis:

*“The full-timers do express the unfairness of their salaries versus contractor rates, but it’s the nature of this business”.*

*“Mostly long term employees do not reap the benefits”.*

The participants' views are that the inequity between salaries and financial rewards of those in permanent and contract positions is an inherent part of the industry. This inequity is an issue for the sample, given that the respondents of the questionnaire reported that fiscal equity caused them significant levels of stress. However, the views reported above from the I.T. managers/supervisors questioned appear to suggest that management feel that this inequity is something which they are unable to change and beyond their remit.

The skill variety dimension was perceived by the managers and supervisors as an important motivator for their employees. However, some noted that certain individuals are content with simply being kept busy:

*“It depends on the individuals. I’m finding that my staff in the below thirty age bracket are very keen to work on newer technologies and lead projects. The over thirties are not so vocal and are more content to just be kept busy”.*

Although the opportunity for independent thought and action was perceived to have a favourable impact on employees, it was again the prevailing view that certain employees favoured more independence than others. Nevertheless, the participants believed that employees should receive guidance from management regardless of whether they value independent thought and action:

*“Individual employees vary but should be catered for and assisted to be independent if so inclined”.*

*“Depends on the individual – some individuals are much more motivated and work on their own initiative, others require constant guidance”.*

*“Most prefer independent thought with guidance from management to allow this”.*

The perception of those managers and supervisors interviewed on the value their employees placed on promotional opportunities was again dependent on the individual employee. That is, they felt that some of their employees strive for career

progression while others are content with merely working at the same level without expressing a desire for promotion:

*“... again, can depend on the individual but the majority want the opportunity for promotion”.*

*“About forty percent would value promotion”.*

*“Motivated employees value opportunity and work towards the challenge. Others less motivated could be happy to stay at the same level always”.*

Two participants stated that they do provide performance feedback to their employees. They were seemingly conscious of the benefits they and their employees could realise by providing such recognition. However, one participant admitted that her organisation did not always provide its employees with recognition:

*“Yes they are recognised – and motivated in one-to-one sessions with their manager. Employees are happy with their manager if he/she gives them guidance and recognition”.*

*“Not always in my company unfortunately”.*

Management believed that their employees’ jobs consisted of high levels of task identity. Their perception was that task identity allows employees to take ownership of a problem and see a task through, thus providing them with responsibility:

*“Yes all tasks need to be completed – this is very important in later project management work when they are required to meet deadlines – a beginning always needs an end”.*

*“The majority of our work is ticket/defect based. It allows them (employees) take a task from start to finish and see it through. It is their responsibility and gives them the benefit of ownership for the resolution”.*

Two of the participants stated that their employees actively partake in the process of goal-setting, although one manager's perception was that employees did so reluctantly. The third participant stated that members of her organisation do not partake in the goal-setting process, whether at management level or otherwise. That is, the goals/targets are set solely by the managing director:

*“Eighty percent partake because they have to”.*

*“Organisational goals are honestly not set with anyone but the Managing Director – it is not a bi-directional process”.*

A similar line of questioning aimed to identify whether organisational and employee goals are aligned. Again two participants believed that their employees' goals and that of the organisation were not aligned while the third believed they were:

*“I wish this alignment was given time in my present company. The company goal is to make money; hence the employee goal is to have as many hours chargeable weekly to a customer – even above thirty-nine hours is expected”.*

*“Yes – the goal of the company is to meet customer requirements and satisfying these requirements is part of the employees' daily targets”.*

### Stress

This section will present the perceptions of those managers and supervisors regarding the sources, levels and consequences of stress affecting their employees.

Two of the managers/supervisors interviewed did not have a stress policy in their organisation while the third participant's organisation had a stress policy included as part of their health and safety plan. This stress policy had recently undergone a revision and dealt with stress and bullying in the work-place. Examples of external and internal stressors, as well as eustress and distress were illustrated in the document. These stressors were subsequently rated according to the level of stress they inflict on a scale ranging from low to high. Examples of physiological,

psychological and behavioural consequences of stress were also portrayed, similar to those described during the present literature review in Chapter Three. Finally, the stress policy also described “*stress controls*”, that is, guidelines to combat stress levels. These guidelines included enforcement of current stress legislation, setting attainable goals and resolving environmental workplace issues. The role of management in reducing their employees’ stress was acknowledged, as was their responsibility in creating a culture of open dialogue with their employees while leading by example.

Although all three organisations do not have any form of stress management techniques, employees of the two organisations that do not have a stress policy had raised stress concerns with their employers in the last year. While the organisation which had a stress policy (included in their health and safety plan) did not have any employees raise stress concerns with them. All three organisations witnessed some form of restructuring in the last year. Consequently, their employees may have experienced some level of increased stress as a result. The employees’ sources, levels and consequences of stress as perceived by their employers are now presented.

A wide range of opinions emerged with regard to the dimension job security as a source of stress. The employers’ perception of job security covered three possibilities. That is, their responses ranged from viewing job security as a source to not a source of stress for their employees.

Interpersonal relationships with colleagues and superiors were regarded by one participant as a source of stress for their employees while the remainder believed that their employees are indifferent to the social dimension as a source of stress. Interestingly, an identical pattern emerged to that of the social dimension for the dimensions fiscal equity, skill variety, autonomy and advancement. Worryingly, these results suggest that the employers are unaware of the daily stressors faced by their employees. Even more unsettling is the belief of the manager of the organisation which has a stress policy that her subordinates were unaffected by these dimensions.



An inverse result emerged to that of the above dimensions for recognition. That is to say, one of the managers/supervisors believed that his/her employees are indifferent to a lack of recognition as a source of stress while the remainder believed that lowered recognition is a source of stress amongst their employees. Once more, a similar result materialised for the feedback dimension.

The employers unanimously agreed that the task identity dimension is not a source of stress for their employees/subordinates. This result is consistent with the result provided by the respondents of the questionnaire. Issues arising out of low task identity are generally ones faced by employees working on assembly lines. In general the tasks associated with the role of a computing professional vary considerably, thus issues arising out of a lack of task identity do not pose an acute source of stress.

The perceptions of management of the levels of stress experienced by their employees followed a similar pattern to those of the sources of stress for their employees. The answers ranged from a low through to a high level of stress.

The association between the employers' responses to the employees' responses for job security for both the sources and levels of stress is unclear. That is, the three supervisors/managers believed that their employees levels of stress range from a low, neutral and high level of stress respectively, while the respondents of the questionnaire rated job security as a significant source and level of stress respectively.

Three groups of single responses emerged among the remaining dimensions. That is, these respective groups of dimensions all rated identical in terms of the level of stress the participants believed their employees experience.

The first of these groups includes social relationships with colleagues and superiors and advancement opportunities. One of the participants felt that their employees experience a low level of stress as a result of these dimensions while the remaining two believe that these dimensions bring about a high level of stress for their employees.

The second observed grouping consists of fiscal equity, autonomy, task identity and feedback. The majority of the employers believe that these dimensions cause no stress for their employees while only one acknowledged that their employees suffer a high level of stress as a result. Unfortunately, these perceptions are at odds with those provided by the respondents of the questionnaire.

The final group consists of the dimensions skill variety and recognition. The majority of the participants felt that their employees experienced considerable stress levels as a result of these dimensions while one participant's perception was that his/her employees did not experience any stress as a result of low skill variety and a lack of recognition. Although these results are somewhat consistent with those provided by the respondents of the questionnaire, one must be cautious of the fact that one participant did not acknowledge that these dimensions acted as a source of stress for their employees. While it did act as a source of stress it did not appear to create a level of stress for these employees.

The consequences of stress for employees as perceived by those interviewed include productivity and financial issues. It was felt that the consequences of stress would include a decline in work quality, productivity and team morale, in addition to increased levels of absenteeism and pressure resulting in physiological disorders:

*“Stressed employees will not be productive ... quality of work will be affected ... increased absenteeism from work ... team spirit will be reduced – negative affect on other team members ... could cause stress for other employees”.*

Although one participant did acknowledge that employees would experience additional pressure from their normal duties when under stress, his belief was that this pressure was seemingly fabricated by employees:

*“Employees will experience extra pressure (often perceived) when under stress and may suffer headaches, eye strain and other physical illness symptoms caused or exacerbated by stress”.*

### Interrelationship between Motivation and Stress

The perceptions of the managers/supervisors interviewed on the interrelationship between motivation and stress in the computing industry are presented in this section. The two main themes emerging from the employers' aspect of the interrelationship between motivation and stress are firstly, that a high level of stress results in reduced performance, thus lowered motivation, and secondly, motivation is self-applied. Interestingly the former theme is in contrast to the employees' predominant view of a high level of motivation leading to increased stress. In addition, the three participants in the interview schedule deviated somewhat from this question, instead opting to include performance issues above motivational issues when responding. In contrast, the respondents of the questionnaire did not digress from the question, but remained focused in their responses. This issue was noted by one of the participants who stated that:

*“Employers are not yet fully aware of the affects that motivation, especially the negative affects, can have on employees”.*

Employees under stress are believed to not perform to their full potential, thus performance issues arise:

*“Employees under stress will not perform to their full potential and will as a consequence suffer a decrease in motivation”.*

The second theme emerged as the view that motivation is self-applied and as a result:

*“I.T. professionals more often than not strive to be the ‘Superstars’”.*

However, this view of motivation as self-applied may not hold true when employees work on projects with substantial resources:

*“The motivation to meet or exceed project timelines and/or to come in under budget are enormous on projects for thousands of dollars versus millions of dollars”.*

Perhaps employee motivation on smaller projects derives from this lack of resources in comparison to those working on projects with substantial budgets. That is, computing professionals involved in large projects with substantial budgets/resources may be assigned to one particular area and remain working within that area for the remainder of the project. Conversely, those working in project groups with limited resources may find themselves involved in numerous aspects of the project. Equally, the stress arising out of maintaining target deadlines in smaller projects may be more substantial than larger projects, as overruns in time and budget may not be as easily absorbed as is often the case in larger multi-national organisations.

In conclusion, the majority of the participants of the interview schedule were not fully aware of the motivators or stressors faced by their employees, yet they acknowledged that performance issues arise out of a lack of motivation in addition to their employees experiencing physiological, psychological and behavioural symptoms as a result of increased stress levels.

### Summary and Conclusion

This chapter presented the results of the qualitative aspect of the study. A structured interview schedule was adopted to identify the perception of management of the sources of motivation and the sources, levels and consequences of stress experienced by their employees. Finally, the perception of management on the interrelationship between motivation and stress was presented.

A discussion based on the qualitative results of this chapter and that of the quantitative results of the previous chapter will be presented in the next and final chapters.

## **Chapter Eight**

### **Discussion and Conclusion**

#### Introduction

This chapter concludes this study on the interrelationship between employee motivation and stress in the Information Technology industry. The results presented in Chapters Six and Seven are amalgamated and discussed. The consequences of the research findings for both employee and employer are examined and discussed. The limitations of the research are presented along with the specific needs for future research into the interrelationship between employee motivation and stress.

#### Aims and Objectives

In response to the lack of systematic attention, this research sought to explore the interrelationship between motivation and stress for employees in the computing industry. Many businesses are unaware of the sources and levels of stress experienced by their computing professionals (Thong and Yap, 2000). A factor that has contributed to this unawareness is the limited empirical research that has examined the concept of stress among computing professionals (Thong and Yap, 2000; Riolli and Savicki, 2003). Elangovan and Xie (1999) stated that the concepts of motivation and stress are central to the understanding of behaviour in organisations. Thus, the present study aims to determine if there exists an interrelationship between motivation and stress, specifically within the computing industry. Six primary objectives outline the attempt to demonstrate this relationship. They are: 1) to identify and describe the factors that motivate and demotivate recently employed computing graduates, 2) to examine the implications of these motivational and demotivational factors/levels for both the computing graduate and their employing organisation, 3) to identify and describe the factors that create stress among recently employed computing graduates, 4) to examine the implications of these stress factors/levels for both the computing graduates and their employing organisation, 5) to examine the interrelationships between motivation and stress for

both parties to the employment relationship and finally 6) to examine the consequences of this interrelationship for both parties to the employment relationship.

### Discussion

This discussion is divided into two sections, both of which outline the interrelationship between motivation and stress. The first section will follow a structure based on the main themes identified by the respondents of the questionnaire in Chapter Six (see Figure 6.4). Since these themes were identified by the respondents, it is important to discuss further their perceptions of this interrelationship, whilst also including the dimensions consistently used throughout both aspects (employee questionnaire and interview schedule) of the study. In addition, the employees noted that the interrelationship between motivation and stress presented in the questionnaire and interview schedule could be utilised as a framework for the interrelationship, thus it is important to discuss the interrelationship between motivation and stress in terms of these dimensions. Recommendations based on these findings for both the computing graduate and their employing organisation are also presented throughout the chapter.

### Themes

The final question of the questionnaire aimed to determine the employees' perceptions of the interrelationship between motivation and stress in the computing industry. Most indicated that either a high or low level of motivation would result in either a high or low level of stress and visa versa. Others felt that this interrelationship was a result of various factors in their work life, that is, the dimensions used in both measurement instruments, while others felt that these two concepts are entirely separate entities that do not have any impact on each other. These themes are now presented and discussed according to the frequency and sample response size.

The predominant theme emerging from the views of the employees was that a high motivation level leads to a high stress level. Eighty-one percent of the employees

who outlined this theme were male employees in a variety of work roles, ranging from new hires and majority workers to managers, with a similar pattern emerging in the age group, that is, between the ages twenty to thirty-four. Interestingly, the employee demographics of the other themes were relatively steadfast in comparison. This would suggest that, in comparison to the other themes, a diverse range of employees felt that high motivation would eventually lead to increased stress in their work life. Indeed, 23.5% of the sample reported that a high level of motivation leads to a high level of stress. The principle grievance of those respondents reporting this theme was of their work-load. That is, they felt trapped because the more tasks they performed the more they were given and expected to do, thus they would inevitably reach “*breaking point*”. This viewpoint is supported in the literature and is in keeping with previous research by Longenecker *et al.* (1999), who stated that I.T. personnel in various sectors of their industry experienced high levels of stress as a result of increased workload. The relationship between work overload/underload and stress is explained by the Yerkes-Dodson Law (1908), which states that substantial deviations either side of this optimal band are likely to bring about stress. Thus management should ensure that graduates are not overwhelmed by a substantial work load. This theme is consistent with some reports (Burisch, 1989; Maslach, Schaufeli and Leiter, 2001; Pines, 1993; Schaufeli and Enzmann, 1998) in the literature, which claim that in order for one to develop burnout a high level of motivation is necessary. Indeed Morley *et al.* (1998, p. 55) stated that “*the experience of stress is linked to motivation in that the drive and commitment created by high levels of motivation may also contribute to high stress levels in individuals and groups at work*”. Ordinarily organisations strive for high levels of motivation among their employees, yet without previous research into the relationship between motivation and stress they do not consider the stress levels that are incurred from increasing motivation. Thus, organisations need to further consider the ill-effects of stress when attempting to increase the motivation of their employees.

The theme emerging as the second most predominant among the employees of the questionnaire is a high level of stress leading to reduced motivation. Unlike the previous theme the respondents were primarily female, aged between twenty-five and thirty years of age working in a new hire position. The performance implications as a result of reduced motivation and increased stress was a major concern for this

demographic. They stated that they were apprehensive about reductions in their performance due to constant stress and the subsequent time spent worrying about not performing to their abilities. Management need to play an important role in reducing their employees' stress, thereby increasing performance. One of the employers questioned in the present study did believe that a high level of motivation would result in increased stress levels, a finding supported by the literature. In fact most of the research conducted on the interrelationship between motivation and stress demonstrates that a high level of stress results in reduced motivation. Moore (2000) suggested that highly motivated I.T. personnel are most vulnerable to work exhaustion and burnout, thus they experience reduced motivation. Although some researchers (Proctor, 1993; Weiner, Akabas and Sommer, 1973) suggest that not all stress is detrimental, the ill-effects of stress are widely reported in the literature. At the organisational level stress manifests in the form of absenteeism, high levels of staff turnover and an overall reduction in productivity (Johnson, 1991). The ramifications of this interrelationship extend beyond the organisation to also affect the employee. The known effects of stress upon individuals include an inability to concentrate, lack of motivation, headaches and illness.

The third highest rated theme by the employees was that a high level of stress would result in increased motivation. A significant number of employees felt that a high level of stress resulted in a high level of motivation. Those who noted this interrelationship between motivation and stress were typically female employees in new hire roles aged between twenty-five and thirty years of age. There has been extensive discussion in the literature debating whether some instances of stress are beneficial. Schultz and Schultz (2006) stated that a certain amount of stress can be stimulating, invigorating and desirable. Generally such theorists presume that when an individual is under stress they may feel pressure, which can trigger feelings of underachievement resulting in them working harder to compensate for those feelings of underachievement. Utilising the inverted-U concept from the Yerkes-Dodson Law (1908), some stress is beneficial to performance, that is, until some optimum level is reached, after which performance will decline. Providing employees with challenges and enabling them to set difficult, but attainable, goals can be a form of stress for some employees. Some researchers believe that such stress inducing conditions are beneficial if they give rise to conditions that motivate creativity. In fact Katz (2005)



stated that technical professionals, regardless of the task difficulty, would strive to meet the demands of the job. These results support the literature in so far as some individuals may find challenge and goal-setting stressful and are thus motivated by this stress.

A number of respondents, primarily male in majority workforce roles aged twenty to twenty-four years of age, felt that a high level of motivation was essential to become more involved in the organisation, thus reducing stress levels. That is, they felt that a high level of motivation was essential in order to reduce one's stress. Very little empirical research exists in the literature to explain how a high level of motivation results in decreased stress levels. Indeed there is a dearth of studies investigating any form of relationship between these two concepts. Savery (1987) stated however that a high level of occupational stress factors within a person is inversely related to a feeling of low job satisfaction, thus he concluded that motivation may help to increase employees' job satisfaction while reducing their perceived occupational stress.

An equal number of respondents to that of the above theme felt that a low level of motivation leads to a high level of stress. Those who identified this theme were predominantly male employees, aged between twenty-five to thirty years of age, working in new hire roles. Although they identified this theme as the main association between motivation and stress, some were unsure whether this association was definitive. That is, they felt that this connection between motivation and stress is not always an overtly obvious one. It is important for management to sustain motivation in their employees by providing them with challenging work that utilises their skills. Johnson (1991) reported that graduates often experience qualitative underload after entering employment for the first time. This is often due to the expectation of working on challenging projects. The concept of Expectancy in Vroom's V.I.E. theory can be defined as "*a momentary belief concerning the likelihood that a particular act will be followed by a particular outcome*" (Vroom, 1964, p. 17). Vroom and Deci (1992) stated that a person will exert little motivation if their expectancy of attaining an outcome is zero. Thus, when graduates expectations of working on challenging projects do not materialise they will not strive to achieve high performance. However, Vroom (1964) stated that how an

employee perceived these outcomes is more important than the reality of the outcome or whether their perceptions were accurate or not. Thus, close supervision, guidance and reaffirming a graduate's expectancies may help to modify their perceptions of their outcomes, thus helping to reduce stress and increase motivation. Reporting from job-attitude data Herzberg (1966) stated that after the first year of a new job, job satisfaction plummets to the lowest level experienced by employees throughout their working career. Thus it is important that graduates are provided with some semblance of interesting work in (and beyond) their first year, particularly given that the present sample rated skill variety as the second highest source of motivation.

The final theme identified as an association between motivation and stress was of a low level of motivation resulting in reduced stress. This theme was noted by only a single male respondent aged twenty-five to thirty years of age, working in a majority workforce role. It is interesting to note however that the same respondent also stated that a high level of motivation leads to a high level of stress, that is, the theme identified by the majority of the employees. This response is plausible however, given that these two themes are essentially the reverse of each other. Thus, these two themes could be amalgamated into one, as a circular loop. The same cannot be said however of the remaining themes. Acting as one theme it can be seen that as motivation decreases so too does stress and as motivation increases so too does stress. Thus management need to ensure that their employees' motivation is sustained above a level where employees are motivated but also below the level at which they begin to experience stress.

Aside from whether stress has motivational properties, Ganster and Schaubroeck (1991) reported that employee stress leads to significant costs for the organisation by adversely affecting employee performance and prompting withdrawal behaviour, as reflected in increased absenteeism, tardiness and turnover. A vast literature exists demonstrating that the consequences of high stress for employees can manifest in the form of physiological, psychological and behavioural issues. Vasilaki (1992) discovered that these manifestations include peptic ulcers or cardiovascular diseases (physiological), depression or anxiety (psychological) and deteriorations in work performance and interpersonal relationships (behavioural). These reports in the

literature are supported by the present results, with a near equal number of respondents reporting that they experience physiological, psychological and behavioural effects as a result of increased stress levels.

The next section will discuss the employees' perceptions of the interrelationship between motivation and stress pertaining to the dimensions used in both measurement instruments. The results illustrate that these factors produce negative motivation and stress that ultimately affects both the organisation and the employee alike.

### Dimensions

The second section of this chapter will present the major themes identified from the transcripts of the respondents of the questionnaire. That is, some of the employees felt that the interrelationship between motivation and stress could be identified by the dimensions used in the measurement instruments in the present study (i.e., job security, social relationships, fiscal equity, skill variety, advancement, recognition, feedback, autonomy and task identity). A more thorough introduction and discussion of these dimensions can be seen in Chapter Five and Appendix A. These dimensions are now discussed in terms of this interrelationship, from both employers' and employees' perspectives.

### Job Security

The job security dimension was rated by the employees as the second least form of motivation, although it rated second and third highest as a source and level of stress respectively. Although the managers and supervisors interviewed did not believe that job security was a motivator for their younger employees in contract positions, they did acknowledge that those with familial and mortgage commitments would favour job security more so than those without such commitments. Thus, as almost eighty percent of the sample were under thirty years of age and according to the Central Statistics Office (CSO) the average age for first time parents within marriage is 32.9 years, it may be that job insecurity is not a motivator for this group, given that only 5.9% had children and only 20% were over thirty years of age in the present sample.

A widespread literature (Buckley, 2001; Sias, Kramer and Jenkins, 1997) investigating the effects of job insecurity and the prevalence of temporary employment contracts suggests that temporary employees seek out opportunities to gain permanent entry into an organisation. This is consistent with Maslow's (1943) concept of needs, where adults express safety needs in the desire for such things as a job with tenure. However it has been argued in the literature that some individuals "*require minimal levels of security*" (Payne, 2000), a view which supports the above statements that job security is a motivator for older and more senior members of staff while younger employees are not motivated by job security. Although not necessarily motivated by job security, it is evident that job insecurity is a cause of stress that ultimately leads to a high level of stress.

The managers' view of job security not acting as a motivator or stressor for younger employees is not however consistent with the responses of the participants of the questionnaire. Although one may not be motivated by job security, job insecurity can be a significant cause of stress for employees (Wiley, 1997), as is the case in the present study. Such threats often come from the expectation among employees of further downsizing and organisational change. Ito and Brotheridge (2006) stated that these expectations may develop from frequent re-organisations and public statements to that effect. It is logical that while job security is not a motivator for the current sample it is a stressor, given that many studies (Mohr, 2000; Probst, 2000; Roskies and Louis-Guerin, 1990) report that job insecurity, particularly for I.T. professionals (Thong and Yap, 2000), reduces psychological well-being. Indeed the employers in the present study stated that their organisation had, within the last year, witnessed some form of restructuring, which resulted in increased work-load or responsibilities for their employees.

The job security dimension for both the sources of stress and motivation is positively related. That is, job security is not regarded by the sample as a motivator but is a cause of stress for them. In the computing industry, where technological change and short contracts are customary, the lack of job security is a significant stressor for its employees. This result provides partial support to a study conducted by Watson and Wyatt in 2006. They reported that one in five employees in the United Kingdom feel insecure in their job because of the risk it will be "*offshored*" to a low-cost country

such as India or China. However, they also discovered that the negative impact of job insecurity as a result of “*offshoring*” on employee motivation and stress was less strong. Nevertheless, the impact on motivation in Watson and Wyatt’s study was less pronounced than on stress, as is the case in the present study. It is anticipated that organisations will continue “*offshoring*” to low cost countries as labour and service costs continue to increase in both Ireland and the United Kingdom. Much of the literature recognises that job insecurity is a chronic condition which affects the general workforce. As uncertainty plays a central role as a stressor it has been suggested in the literature that uncertainty regarding continued employment is a stressor. This may explain why the present sample is not motivated by the presence of job security, but job insecurity for them is a stressor. Thus, organisations should refrain from continuously stressing the need to maintain a competitive edge and from publishing statements of anticipated re-organisation unless they are in no doubt about its occurrence. That is not to say however that they should entirely understate the importance of remaining competitive but rather employees themselves are aware of this necessity without constant reminders.

Just over half of the employees in the present sample entertained thoughts of leaving their current organisation, while close to half were actively searching for alternative employment. Some of the literature however suggests that turnover intentions are behavioural in nature (e.g., planning to search for another job) rather than representing emotional reactions (e.g., feeling like quitting a job). Thus, continued organisational statements of re-organisation and an awareness of potential layoffs may cause employees to modify their career goals and plans in managing future risks (Kahn and Byosiére, 1992), further supporting the view that organisations should refrain from such practices. Although some perspectives (Kahn and Byosiére, 1992) in the literature suggest that job insecurity may be advantageous for employees, given that it can cause them to modify their career goals and increase their mobility by developing their knowledge, skills and abilities in order to cope with threats and take advantage of opportunities (e.g., Hall, 1996; London and Smither, 1999), the present results illustrate that job insecurity is a cause of stress for computing graduates. An extensive literature on the coping methods adopted by individuals suggests that employees with an internal locus of control are more likely than those with an external locus of control to feel able to cope with job transitions such as

loosing a job and seeking new employment (Latack, Kinicki and Prussia, 1995). The inability of some employees to readjust when faced with a lack of job security should be considered by technical managers. Given the prevalence of studies in the literature that state the importance of job security, the present results illustrate that the dependence on job security as a motivator for computing graduates is decreasing, yet its role as a stressor is increasing. Employees can overcome this by seeking mobility. Indeed Rosikies, Lousin-Guerin and Fournier (1993) discovered that employability, that is, the prospect of finding another job if the present one is terminated, was negatively related to psychological distress.

### Social Relationships

The social dimension was rated by the majority of the employees as the highest source of motivation, yet it was rated as the third least source of stress. These results are not consistent with the majority of the studies (Couger 1988; Buckley, Jonathon, Halbseleben, Wheeler and Stauffer, 2002) reported in the literature review, which suggest that social relationships with colleagues and superiors are a relatively unimportant aspect of an I.T. professional's work. Cougar and Zawacki (1978) concluded from a survey of 2,500 I.T. professionals that they were significantly different from people in other professions, in that their need to interact with others was almost insignificant. However, the present result demonstrates that social relationships are the most important motivator for computing graduates. This result supports many other reports (Katz, 1980; Louis, 1980; Mansfield, 1972; Mortimer and Lorence, 1979; Van Maanen and Schein, 1979) which suggest that the importance of the socialisation process experienced by graduates entering the workforce should not be underestimated, as it has a great influence on their occupational autonomy. The importance of the need for social relationships for graduates is consistent with Abraham Maslow's (1943) social needs in his Hierarchy of Needs theory and David McClelland and his colleagues' (1953) need for affiliation. However, given the numerous studies reporting the unimportance of social relationships for I.T. professionals, it may be that the initial importance placed on this need by graduates gives way to more pertinent needs, a concept similar to Maslow's (1943) hypothesis that the basic human needs are organised into a hierarchy of relative prepotency. This would explain the overwhelming number of

reports which note the lack of importance placed on social relationships by I.T. professionals. Thus, technical managers must, when designing induction programmes, take into account the importance of the socialisation process for graduates. I.T. managers need to acknowledge the differences between their technical subordinates and those in other professions. The use of outdated and old-fashioned management practices, originally conceived mainly for shop-floor workers is a cause of major tension in the technical-management relationship (Bigliardi, Petroni and Dormio, 2005). Although both supervisors and subordinates should take a proactive role in establishing appropriate working relationships, previous studies have tended to focus mainly on supervisors' initiation of establishing appropriate relationships with each subordinate, without prior bias and stereotypes (Graen and Uhl-Bien, 1995; Lam, Huang and Snape, 2007). Management should behave in an autonomy-supportive manner rather than an authoritarian manner. It has been shown that when managers behave in such a manner, their employees display high levels of intrinsic motivation (Pelletier, 1996). This method of supervising computing professionals is by no means a panacea, management should compensate for the individualistic personality of each employee. Graduates are one such group of employees who management should more closely supervise than their more senior counterparts. This is the conundrum, too much involvement and the manager/supervisor is meddling, not enough and they are not enabling (Marvel, Griffin, Hebda and Vojak, 2007). Thus management should provide more senior personnel with autonomy, whilst (at the outset at least) providing graduates with an environment that fosters support from colleagues and management.

Interestingly, the majority of the employers felt that their employees were motivated by the need for social relationships at work, although one did believe that older employees were less motivated by social relationships than their younger colleagues, thus reaffirming the suggestion that computing graduates initial need for social relationships eventually weakens. The employers did however feel that their employees experience high stress levels as a result of inadequate social support. In this regard, clear differences emerge regarding both the employees' and employers' perceptions of the social relationship dimension. It is clear that the employers do not fully comprehend the stressors faced by their employees, given that the majority felt that their employees experience significant stress levels arising out of the lack of

social relationships, whilst also stating that social relationships, with colleagues and superiors, do not act as a stressor for their employees. Conflicting results such as these illustrate the need for I.T. managers to more fully understand the stressors faced by their subordinates. Studies (Baird, 1977; Ilardi, 1993) indicate that the ramifications of the level of differences between the employees' and employers' perceptions concerning stress and motivation are relatively common. Thus management should solicit regular input from their employees to determine their perceptions on specific motivators and stressors. All management should maintain an open-door policy, allowing employees to know that they are willing to listen and provide help or solutions with their problems. This method may be effective given that computing professionals welcome a lesser degree of guidance from supervisors, yet they are aware that, when needed, they can call upon the support and guidance of their respective supervisor/manager.

The social relationship dimension for both the sources of stress and motivation is positively related. That is, a lack of social support from colleagues and superiors produced stress for the sample. It is interesting to note that the contingent who reported this interrelationship were predominantly female. That is, female computing graduates were more likely to experience stress due to a lack of social support from either their co-workers or superiors. Studies (Igbaria and Wormley, 1992; Loscosso and Spitze, 1990; Vivien and Thompson, 1996) show that female I.T. personnel experience significantly higher stress from a lack of social support in the workplace and a lack of encouragement from their superiors. The stress coping strategies of male employees can be categorised as avoidance/withdrawal (McDonald and Korabik, 1991), while female employees tend to seek social support in order to cope with stressful situations (Davidson and Cooper, 1983). Thus, perhaps the male respondents of the present study tend not to perceive a lack of social relationships as a source of stress since they may use avoidance/withdrawal coping strategies. This result is consistent with others in the literature which state that female computing professionals experience higher levels of stress than their male counterparts, although others have suggested that it may be more a case that female employees accept stress, given that they seek social support in stressful situations, while their male colleagues utilise avoidance/withdrawal strategies. In accordance with the coping methods mentioned in the Transactional Model of Stress in Chapter Three, individuals who



use active coping strategies, such as seeking social support, show greater adjustment to stress, whereas those who utilise avoidance-coping strategies are at far greater risk of developing adverse responses to stress. Although male computing professionals who adopt avoidance-coping strategies may experience reduced stress, Love and Irani (2007) noted that the consequences of utilising such strategies include an inability to overcome the more enduring stress emotions of depression and anxiety.

Although the results presented in Table 6.7 and 6.8 illustrate that social relationships are not a source of motivation and stress for computing employees when analysed independently, a finding which is consistent with the literature, the present study also demonstrated that social relationships for both motivation and stress are positively related when viewed interdependently. This finding is not reported in the literature, given that no study has examined this interrelationship, thus the present results demonstrate that a lack of social support from colleagues and superiors is a cause of stress, especially for the female graduate respondents of the present study. Thus, implementing the suggestions above to provide computing employees with social support should reduce the resultant stress level.

### Fiscal Equity

The sample rated fiscal equity as the third least form of motivation in their work, while it was rated as the fourth and second highest sources and levels of stress respectively. The managers and supervisors interviewed stated that their employees expressed their concerns over the inequity of their pay. That is, the employees on permanent contracts were dissatisfied with their rewards and pay when compared to that of their counterparts in temporary contracts. Indeed, Rainbird (1991) and Kunda, Barley and Evans (2002) discovered that contractors earned significantly more than if they were in permanent positions. Two of the employers did feel that the payment and reward system in their organisation was unfair, yet frustratingly they did not believe that this inequity was a source of stress, or in fact resulted in any stress for their employees. This is in direct contrast to the employees' view of inequity as a cause of stress for them. These perceptions of inequity tie in with Adams' (1963) equity theory seen in the literature review in Chapter Two. Adams (1963) suggested that employees who perceive their comparison with that of "*Other*" as inequitable

will seek to achieve equity. Those who have researched Adams' (1963) equity theory have demonstrated that an employee's desire to seek equity will affect not only their work performance or behaviour (Lawler, 1973), but also creates tension/distress in him/her. Although some have noted that employees respond with different experiences to disadvantageous inequity, agreement has been reached in the literature that the presence of inequity motivates the employee to reduce that inequity. Thus technical managers' current stance on reward schemes must change, given that they are aware of the inequity of the reward system, yet they justify this inequity by stating that it is an integral part of their industry. The current preference for paying "*contract rates*" to temporary employees and comparatively lower rates for those in permanent positions, who are often as equally skilled, is, as the present results indicate, leading to decreases in motivation and increases in stress. Adams (1963) stated that in cases of prolonged inequity the employee may leave the organisation. Although Adams (1963) stated that this was a relatively drastic approach, Jacques (1961, p. 26) reported that if an organisation failed to respond in sufficient time to inequity, employees underpaid by 10% felt "*an active desire to change jobs*". This may be in part why employee turnover is so high in the computing industry.

Numerous studies (Dunnette, 1967; Maidani, 1991; Porter and Lawler, 1968; Raudsepp, 1980), as outlined in the literature review in Chapter Two, suggest that elements of reward that have the strongest influence on employee behaviours are intrinsic, rather than the traditional financial rewards. A report conducted by Watson and Wyatt in 2005, the largest of its kind undertaken, illustrated that intrinsic rewards only successfully support employee commitment levels, job satisfaction and reduce turnover if they are underpinned by a competitive financial package.

The fiscal equity dimension for both the sources of stress and motivation is positively related. Thus when fiscal equity is regarded as a demotivator, it produces stress for the sample. The aforementioned study conducted by Watson and Wyatt demonstrated that the fairness and transparency of an organisation's reward system are key issues which H.R. managers must address in both Ireland and the United Kingdom. Although the majority of the present sample reported fiscal equity as the third least motivator, an equal number of employees rated fiscal equity as causing them significant levels of stress in their work, thus it appears that the majority of the

sample are not motivated by fiscal equity, yet their respective organisations are failing to successfully implement schemes to reward their employees, given the levels of stress this dimension causes. This result lends partial support to Watson and Wyatt's discovery that incentives were rated the third most important element affecting motivation yet only thirty-eight percent of those they questioned reported that they felt the incentive scheme within their organisation had motivated them. Thus, the present results and those of Watson and Wyatt appear to cast doubt on the appropriateness of current incentive arrangements given that fiscal equity is rated in both instances as the highest level of stress respectively.

In order to increase employees' motivation and decrease their stress sources/levels technical managers need to design and implement reward schemes that emphasise factors such as advancement and status. As mentioned in the literature review, Raudsepp (1980) pointed out that when a technical professional demands a certain level of pay, they seek these increases more for the recognition that they believe their qualification, performance and professional contribution entitles them. As discussed in the literature, McClelland *et al.* (1963) discovered that people with a low desire for achievement seek monetary rewards, whereas high-need achievers use monetary rewards as maintenance factors, as they are already highly motivated. In view of the fact that advancement opportunities were rated by the employees as a motivator, we can conclude that they are not motivated by fiscal rewards per se but rather seek such rewards in recognition of their achievements. This has significant implications for management, given that they tend to assume that financial rewards by themselves act as a motivator and simply increasing a technical employee's pay is sufficient enough to increase their motivation. Other issues however warrant consideration such as job security, autonomy, advancement and recognition. Marvel, Griffin, Hebda and Vojak (2007) believe that providing technical professionals with individualised rewards may itself be seen as creating inequities in the organisation. Nevertheless, significant research suggests that technical professionals expect rewards different to those of others in the organisation and providing tailored rewards can reinforce desired behaviour. The negative outcomes of this expectation, if not realised, are widely reported in the extensive literature on Victor Vroom's (1964) Expectancy-Instrumentality Theory. Thus management must provide computing employees with positively valent rewards while ensuring that they understand that those rewards are

associated with improved job performance. It is likely that redesign of reward schemes is beyond the remit of most technical managers, thus collaboration between senior management, technical managers/supervisors and H.R. personnel would allow for the establishment of a somewhat more individualised reward system for technical professionals. These reward schemes must however balance the needs of the business with the expectations of the employee. Consideration must be given to ensure that there is a fit between each individual reward. The literature consistently reports that the motivation of technical professionals can be achieved through career advancement opportunities and increased reward flexibility, thus these elements should be incorporated into reward schemes. It is anticipated that implementing such strategies will motivate technical professionals whilst also significantly reducing their stress levels.

### Skill Variety

Skill variety was rated by the employees as the second highest motivator and was only regarded as a minor source of stress. Similarly, the level of stress experienced by the employees with regard to skill variety was comparatively low. Conflicting reports in the literature suggest that skill variety is neither a form of motivation nor of stress for I.T. professionals (Farmer and Campbell, 1997), whilst others (Aryee, 1991; Pazy, 1994) have suggested that skill variety can be both a motivator and a stressor for I.T. professionals. The fear of technological obsolescence due to the constant change in technology is one of the reasons why the lack of skill variety is a source of stress for some computing professionals. Various explanations reported in the literature state otherwise, such as the suggestion that some computing personnel have no desire to keep up with advances in their industry. Additionally, Farmer and Campbell (1997) have suggested that skill variety is not a source of stress for computing professionals because they are perceived as being the skills in which computing personnel are uniquely specialised. Inevitably however, some computing professionals find the constant technological changes a threat. If technical managers initiate adequate training programmes upon introduction of such technologies, then potentially stressful situations can be averted. Regardless of the conflicting reports in the literature suggesting that technological obsolescence is perceived by some computing professionals as a stressor (Cooper *et al.*, 2001), while not by others

(Longenecker *et al.*, 1999), the introduction of new technologies may put added pressure on computing personnel, such as time constraints, resulting in them experiencing work overload if they do not receive adequate guidance and supervision. Thus, as Hall (1976) suggested, managers need to pay particular attention to the structuring of a new hire's expectancy beliefs when entering a new work setting by not exposing them to work overload. It is crucial that these expectancy beliefs result in successful experiences which are, as the literature suggests, essential for developing a new hire's belief system.

The majority of the employers stated that their employees were unaffected by skill variety, or a lack of it, as a source of stress. However, they did acknowledge that a lack of skill variety would result in significant levels of stress for their employees. One participant believed that his/her younger employees were more interested in working on newer technologies, while the more long standing employees were content with simply being kept busy. This result again stresses the necessity for management to hold consultations with their computing graduates, and their computing professionals, to determine what needs their employees find most salient, rather than merely assuming that a particular need is a motivator or a stressor.

The sources of motivation and stress are positively related with regard to the dimension skill variety. That is, the lack of skill variety is a cause of stress for the sample. Clearly, technical professionals who feel their skills are mis-utilised and underexploited by their organisation experience increased stress levels. This interrelationship is consistent with other reports (Badawy, 1978; Bigliardi, Petroni, Dormio, 2005) in the literature which suggest that the task itself is the primary source of motivation for technical professionals and that computing employees become frustrated when their technical expertise is not challenged. In addition, qualitative overload and underload is regarded in the literature as a source of stress for employees, particularly computing graduates (Johnson, 1991). Role overload, as reported by Johnson (1991), is a particular issue for graduates. Burnstein (1963) felt that this role overload stemmed from a graduate's "*fear of failure*" which leads them to accept too much work and work exceptionally long hours. The literature states that continued acceptance of more and more work, compounded by longer working hours culminates in excessive fatigue, leading to poor performance. Qualitative overload

occurs when an individual perceives themselves as having a lack of skills or capabilities to satisfactorily perform their work, but qualitative underload too is regarded in the literature as a source of stress, as employees are not given the opportunity to use their skills or develop further their abilities. Extensive research exists, which states that some level of stress can be stimulating, invigorating and desirable, thus management need to strike a balance between work overload and underload if their employees are to perform and remain in good health. Graduates, and indeed all computing professionals, should be placed where they feel their skills are being utilised and where they are most productive to the organisation. The present study illustrates that by providing a computing professional with skill variety in their work, their stress level is reduced. The importance of decreasing this stress level can be seen in empirical studies (Agarwal and Ramaswami, 1993; Hunt, Chonko and Wood, 1985) which have demonstrated that a higher degree of organisational commitment is attributed to more skill variety.

### Advancement

The employees rated advancement opportunities as the fifth highest motivator. The majority of the sample who rated advancement opportunities thus were male employees working in new hire and majority workforce roles, aged between twenty and thirty years of age. This result is consistent with other reports in the literature (Buckley *et al.*, 2002; Couger, 1988), which identified technical professionals as high achievers. A surprising result however was that the advancement dimension was rated as the highest source of stress for the sample and was also the cause of the highest level of stress respectively. Yeh and Lai (2001) discovered that many young technical professionals indicated that they had no clear ideas about their career preferences, therefore as the demographic of the sample rated advancement opportunities thus, it may be that they are uncertain of their future career preferences, given that they are recent graduates. However, a survey by Raudseep (1989) indicated that some technical professionals lack the assertiveness necessary to get ahead. Bailyn (1980) noted however that technical professionals often plan to stay in a technical position for five to ten years before making an explicit attempt to move into management. Thus, further longitudinal research is needed to identify the career progression of computing graduates for the first ten years after graduation.

The employers on the other hand stated that the need for advancement among their employees was dependent on the individual. That is, some are motivated by advancement opportunities while others are content to remain at the same hierarchical level without ever expressing a desire for promotion. These views are consistent with other research (Allen and Katz, 1986, 1995; Hesketh, Gardener and Lissner, 1992) which suggests that a large proportion of technical professionals neither desire nor expect to move up the managerial or technical ladder. Instead they prefer a steady-state career evolving from project to project. Only one of the participants believed that the lack of advancement opportunities for his/her employees was a source of stress, with the majority believing that their employees were indifferent to the lack of advancement opportunities in their organisation. These views are again contrary to those of the employees’.

A significant interrelationship between motivation and stress was identified for the advancement dimension. That is, those employees deprived of advancement opportunities experienced significant levels of stress. Clearly the computing graduates and professionals in the present study are motivated by advancement yet the lack of such opportunities in their respective organisations is a cause of stress for them. Indeed, Garden (1990) suggested that to technical professionals, merely moving from one project to another without gaining increased technical or managerial responsibility would be a sign of failure.

The concept of Instrumentality in Victor Vroom’s (1964) Expectancy-Instrumentality theory (see Chapter Two) is of a “*perceived contingency that one outcome has for another*” (Campbell and Pritchard, 1976, p. 74). That is, Vroom’s theory suggests that employees will increase their performance if they perceive it as instrumental for avoiding unwanted outcomes. Thus, if computing professionals believe that increased performance is instrumental in the attainment of a promotion they will be motivated to strive for high performance. Much of the literature supports this view but also notes that an employee’s level of performance is dependent on whether they value these outcomes. This is consistent with the views reported by the employers in the present sample who stated that some employees would rather remain in their present level in the organisation. However, for those computing professionals who value opportunities for promotion, McClelland *et al’s.* (1953)

Achievement Motivation theory suggests that individuals who possess high levels of *nAch* (need for Achievement) characteristically tend to work alone, and if the task necessitates they tend to work with others based on competence rather than friendship. In addition, they tend to set difficult goals and have a strong desire for feedback based on their performance. Indeed there exists an extensive literature which rates achievement motivation as a primary motive for computing professionals. Thus, management can motivate graduates by helping them plan and set career goals. Garg and Rastogi (2005) noted the importance of technical managers showing an interest in their team members' career growth and by discovering what each employee needs to excel in their job. In order to facilitate advancement opportunities management should assist their technical graduates in setting career goals and provide feedback to ensure that graduates are aware of whether they are achieving these goals. Similarly, the organisation's reward scheme should reward those individuals who make advances in their work, regardless of whether those advances are to management level, as not all computing professionals have a desire for promotion to managerial level. Indeed Herzberg (1966) stated that providing employees with advancement without a change in rank would still provide an employee with a high-level task.

### Recognition

Recognition from management was the fourth highest form of motivation as rated by the sample. Although the sample reported that a lack of recognition did not act as a stressor, it was rated as the second highest (jointly with fiscal equity) level of stress. In a study conducted by Nelson (2004), he discovered that seventy-eight percent of employees indicated that it was "*very*" or "*extremely*" important for them to be recognised by their manager when they do good work, with seventy-three percent of employees stating that they expected that recognition to occur either "*immediately*" or "*soon thereafter*".

The majority of the employers' observations indicated that they were aware that their employees felt that a lack of recognition was a source of stress in their work, while only one employer stated that his/her employees did not experience stress due to a lack of recognition. Simultaneously, the majority of the employers felt that their



employees experienced a high level of stress due to a lack of recognition, with only one employer stating otherwise. Petroni (2000) stated that development professionals (software sector) rely upon their supervisors for recognition rather than upon the organisation itself. The admission by the majority of the employers that their employees experienced stress from a lack of recognition may suggest that managers' and supervisors' recognition programmes are ineffective. It has been suggested that technical professionals who are promoted to managerial positions become ineffective managers, simply because they lack the necessary training. Thus, it may be that the managers and supervisors interviewed achieved their positions through promotion without appropriate management qualifications and therefore lack the necessary skills to provide sufficient and timely recognition to their employees

Although no evidence was found to support a significant relationship between motivation and the sources of stress for recognition, a significant relationship was observed between the sources of motivation and the levels of stress for this dimension. It is however a negative relationship, that is, when one's motivation is low, their stress levels are high. These results confirm those provided by the sample in the open-ended section of the questionnaire. Although the recognition dimension rated as the least source of stress amongst the sample, they rated it as the second highest (jointly with fiscal equity) level of stress. Thus a lack of recognition from supervisors is a cause of significant stress for the sample. Maslow (1943) stated that people need to be appreciated for what they do, they must experience feelings of worth where their competence is recognised and valued by significant others. These significant others are those whom the individual holds in high esteem, such as, in this instance, competent technical managers. Indeed Maslow emphasised that the healthiest self-esteem is based on earned respect from others. Many studies in the literature however suggest that technical professionals are not motivated by personal relationships and that recognition is not an important motivator for them. The present results illustrate however that recognition is a motivator for technical employees, certainly for computing graduates. Maslow stated that a lack of recognition produces feelings of inferiority, of weakness and helplessness, while satisfaction of this need engenders feelings of self-confidence, worth, strength and capability.

Some reports in the literature (e.g., Nelson, 2004) suggest that less formal methods of recognition are preferred over more formal recognition programmes that are less frequent, less personalised and which often have lost relevance, meaning and excitement for the employee. Some researchers recommend more personal “*here and now*” forms of recognition. Thus, it is recommended that managers adopt a combination of informal and formal recognition methods. Although the literature suggests that computing professionals are predominantly un-motivated by recognition, it is vital for the professional development of computing graduates. Employee recognition can be incorporated into the organisation’s reward system in order to make employee recognition an integral part of the organisation’s operation. It has been suggested in the literature that technical personnel only value recognition received from management who are at least as technically competent as the employees themselves are. Nevertheless, the aim of recognition is to acknowledge the contributions of the employee and to encourage them to further innovate.

### Feedback

Employees rated the feedback dimension as the fourth least source of motivation in their work, yet they rated this dimension as the third and fourth highest source and level of stress respectively. This dimension, as mentioned in Chapter Six, encompasses the concept of feedback and Locke *et al.*’s (1968) interpretation of goal-setting. In a qualitative study of the possible causes of ill-health in an I.T. professional, Dahlman (2004) discovered that “*impossible deadlines*” impaired the employee’s ability to perform a good job. In a study among a group of I.T. consultants in the United States, Brown (2002b) discovered that a job that provides autonomy, challenge, feedback and the ability to use one’s skills was important in promoting job satisfaction and work motivation.

The employers stated that their employees do receive performance feedback and their perception was that their employees were motivated by such feedback. The majority of the employers felt that a lack of feedback was a source of stress for their employees, with only one believing that a lack of feedback did not act as a stressor for his/her employees. However, the majority of the employers did feel that their employees experienced stress with regard to this dimension. Although not regarded

as a source of stress, it may be that the employers' perception of their employees suffering high stress from a lack of feedback is due to the belief that they regard feedback as a relatively high source of motivation. These perceptions are again however at odds with those provided by the employees. A further explanation as to why the employers felt that their employees experienced high stress levels as a result of this dimension could be that, in one organisation, the organisational goals are set only by the Managing Director, thus potentially frustrating the needs of those who wish to partake in the goal-setting process.

However, one employer felt that his/her employees only partake in goal-setting because it is part of their work duties. Nevertheless, it is argued in the literature that imposed goal-setting should be replaced with participative goal-setting. That is, a superior should not exclusively set a subordinate's objectives, the "*top down*" approach, but rather both should partake in the goal-setting process, a "*bottom up*" approach. Many studies demonstrate the benefits of including employees in the goal-setting process, such as, an increased quality of work. Results found in the literature also indicate that once employees have accepted hard goals they generate higher performance than they would if they set easier goals. Indeed, Katz (2005) reported that technical professionals, regardless of the degree of task difficulty, would strive to meet the demands of the job. Feedback however plays a vital role in sustaining employees' motivation to attain these goals. However, Katz (1998) stated that technical professionals only heard from their superiors on occasions where something was required of them. Thus, technical managers/supervisors should be provided with training to ensure that they are competent enough to provide their subordinates with feedback on a regular basis.

No significant relationship was identified between motivation and the sources of stress for the feedback dimension. Although no significant relationship emerged, this dimension is still important, given that the sample reported that a deficiency in this dimension can result in reduced motivation and increased stress. Indeed a negative significant relationship emerged between the sources of motivation and the levels of stress. That is, a lack of feedback and non-participation in the goal-setting process results in increased stress levels. It has been reported that computing personnel expect that their managers/supervisors be as technically competent as themselves.

Thus, feedback received from a manager who is not technically competent may likely be a cause of stress for the computing professional who would ordinarily expect only those as competent, or more so, as him/herself to provide them with performance feedback.

In order to increase the motivation of technical graduates, thereby reducing their stress levels, management should include them in the goal-setting process. Some employees however possess higher levels of autonomy than others do, thus one should not assume that all employees will either set or partake in the goal-setting process (Locke and Latham, 1984). Providing employees with further choices, such as the number and complexity of the goals they wish to set, as well as the process by which they set the goals should overcome this issue. Setting time constraints with specific deadlines, as well as stating how the objectives are to be accomplished will help employees strive to achieve those goals. Performance feedback should be provided throughout the course of the objective and not in any one session upon completion. Occasionally new information may arise that may change the course of the objective. However, if management provide their employees with this information as it becomes available, it will allow their employees to readjust their goals accordingly and in sufficient time. Much research exists on the concept of goal-setting and feedback, with some evidence indicating that the positive benefits of feedback may be limited to poor performers (Reilly, Smither and Vasilopoulos, 1996; Smither, London, Vasilopoulos-Reilly, Millsap and Salvemini, 1995). However, it is clear that a lack of feedback and participation in the goal-setting process is a cause of reduced motivation and increased stress for computing graduates.

### Autonomy

Although autonomy is rated as the least source of motivation by the sample, they regarded autonomy as the fourth highest (jointly with fiscal equity) source of stress in their work, yet it was also rated as one of the dimensions causing the least level of stress. Clearly the rating provided by the sample for autonomy in terms of motivation do not lend support to studies in the literature, which suggest that providing employees with task autonomy results in higher motivation and performance (Argote

and McGrath, 1993; Dywer, Schultz and Fox, 1992). However, predictions such as these which suggest that autonomy leads to increased performance and motivation have been shown by some researchers (Godard, 2001; Wall, Kemp, Jackson and Clegg, 1986) to be much more elusive in practice. Such inconsistent reports are primarily, as Langfred and Moye (2004) noted, due to the lack of a *“theoretical model to which practitioners or researchers can turn to identify and understand the effects (both positive and negative) of granting task autonomy to individuals in organisations”* (Langfred and Moye, 2004, p. 934).

Although no universally agreed model is available to determine the relationship between autonomy and motivation, the majority of the employers of this study reported that autonomy is a cause of stress for their employees, with only one employer believing that his/her employees experience stress as a result of autonomy. Perhaps this belief is a result of the employers’ inability to measure the relationship between the level of autonomy and motivation of their employees. Although all the employers agreed that the desire for autonomy was dependent on the individual employee, they felt that most of their employees would welcome more autonomous work roles. This result is consistent with other reports (Landeweerd and Boumans, 1994; Strain, 1999; Wageman, 1995). Alexander (1991) suggested that some employees may perceive increased autonomy as a subtle form of control. That is, with increased autonomy they become more accountable and responsible for their own performance. This accountability can, for some employees, lead to greater stress. This may explain why the present sample did not believe that autonomy was a motivator for them but did perceive it to be a cause of stress. Perhaps the idea of increased autonomy causes them stress, but until they achieve more autonomous roles they do not experience increased levels of stress. This is a plausible explanation given that the sample were relatively recent graduates, who may not initially seek more autonomy but rather prefer more structure and guidance until they are in a position to more successfully benefit from increased autonomy. In fact one of the employers felt that regardless of the level of autonomy, each employee should be monitored and guided. However, an investigation conducted by Mortimer and Lorence (1979) on male graduates up to ten years in their working lives shows that task autonomy was an important motivator for them. They discovered that task autonomy had positive effects on people oriented value – that is, a desire to work

with people over objects – and on intrinsic occupational value – a desire to express one's abilities and skills to be creative. Although task autonomy is not a motivator for the present sample, it appears that the results of Mortimer and Lorence's (1979) findings illustrate that autonomy increases in value as a motivator the longer the employees remain in their respective careers. Thus, longitudinal research is required to determine if the importance of task autonomy as a motivator changes the longer the graduate remains with the organisation. Nevertheless, autonomy was a source of stress for the current sample, thus it is important that graduates' jobs make provision for autonomy and challenge in their first years in order to increase motivation and decrease stress, a view supported by Hall (1971).

No significant difference emerged for the autonomy dimension between the sources of motivation and stress. This result does not support previous studies (Vivien and Thompson, 1996) which demonstrate that gratification of employees' autonomy need leads to decreases in instances of stress among employees. This may be the case for employees who have been working in their respective organisations for some time, as Katz (1978) noted that in the early months of a new job employees are either insensitive or react negatively to challenging characteristics such as autonomy and skill variety. Perhaps the lack of any identifiable interrelationship with regard to this dimension is a result of the computing industry steadily moving toward the use of contractors in place of traditional employment methods. It has been reported (Peel and Boxall, 2005) that contractors typically enjoy a greater degree of autonomy in how the work is done.

Although no significant relationship between motivation and stress for autonomy was observed in the present study, studies in the literature state that computing professionals tend to be self-motivated individuals who thrive on autonomy. However, it is also suggested that many factors, such as competitive markets, budget constraints and schedules, inhibit an employee's freedom to be creative. These factors ultimately produce negative motivation and stress (Hoyt and Gerloff, 1999). Many reports (Adler, 1991; Agarwal and Ramaswami, 1993; Morrison, Girardi and Payne, 2005) in the literature note the importance of providing employees with task autonomy. Managers who address the autonomy needs of their employees are likely to witness increased levels of motivation in their employees (Deci, Connell and

Ryan, 1989), which in turn can result in high levels of task performance and persistence (Kasser, Davey and Ryan, 1992).

### Task Identity

The employees rated task identity as the third highest motivator in their work. However, this dimension did not pose a high level of stress for the sample, as they rated it amongst the least sources of stress and as causing the least level of stress. This result is consistent with other reports in the literature, such as that of Brousseau (1978), who emphasised the importance of task identity for technical professionals. Herzberg *et al.*'s (1958) Two-Factor theory lists achievement, recognition for achievement, work itself, responsibility, advancement and the possibility for growth as “*job content*” factors. Herzberg *et al.* (1959) stated that gratification of these needs leads to job satisfaction and consequently employee motivation may be improved. According to the literature, Herzberg *et al.*'s Two-Factor theory has motivational and performance implications for organisations. That is, performance can be achieved when employees are utilised effectively (motivators) and treated well (hygienes). However, Herzberg (1966) argued against providing graduates with “*two or three meaningless activities*”, as exposure to a variety of assignments with little opportunity for mastering any one fails as a motivational system. Nevertheless, the significance of providing graduates with task identity in their first year of employment is argued in the literature and as reported by Hall (1971), who proposed the idea of the “*critical first year*”.

The employers stated that their employees' jobs consisted of task identity and they felt that this was a motivator for them as it provided their employees with responsibility and ownership of their work. In addition, the employers did not believe that task identity was a source of stress for their employees, while the majority felt that their employees experienced a low level of stress as a result of this dimension. These perceptions partially correspond to the results provided by the employees. It is however the only dimension where both the employer and employee provided relatively similar view-points as to whether the dimension acted as a source of motivation or stress respectively. This is unacceptable however, given that there are

eight other dimensions (job security, social relationships, fiscal equity, skill variety, advancement, recognition, feedback and autonomy) and relatively similar perceptions between both management and subordinates emerged in only this dimension. This result merely substantiates the necessity for management to consult with their employees to determine what factors they find motivating and stressful, even more so given that the employers felt that employees experience no stress with regard to this dimension.

Given the results reported above, it is surprising that a significant relationship did not emerge between employee motivation and stress with regard to this dimension. Perhaps these graduates have not yet faced a lack of task identity as most computing roles require employees to carry through a job from start to finish. Thus the importance of providing computing professionals with task identity in their work should not be underestimated. Computing professionals may become frustrated when they perceive that their skills and knowledge are so specialised that they are equipped to carry out only one job – the one they are already doing (Farmer and Campbell, 1997). Farmer and Campbell (1997) noted that these feelings of frustration are compounded even further by feelings that their competence is slipping away as the pace of technological change races on and they perceive themselves as failing to keep up, thus leading to demotivation.

Although not a source of stress for the current sample, Cooper *et al.* (2001) stated that stressors can include the variety of tasks performed, the amount of discretion and control that employees have over the pace and timing of their work and the physical environment in which the work is performed. In fact Pearson and Chong (1997) and Steers (1977), after conducting empirical investigations, discovered that a higher degree of organisational commitment is attributed to higher task identity. Thus, in order to provide graduates with task identity, technical managers should not continuously rotate assignments for new recruits, but rather allow them time to master tasks individually, provided they receive guidance from both colleagues and superiors. Generally speaking, work roles in the computing profession are stimulating and challenging, a necessity for motivating computing employees. Fortunately the perceptions of the managers interviewed were consistent with the results provided by the employees. Nevertheless, one could postulate that this is mere



coincidence given that the managers' views have been erroneous for all the other dimensions.

### Overall Recommendations

It is widely accepted in the literature that computing professionals are high need achievers. Characteristically, such individuals tend to set somewhat more difficult tasks than those in other professions, proof of which can be seen in the many technological advances in the industry. Other factors reported in the literature as motivators for technical professionals include the desire for feedback based on their performance, skill variety, task significance, autonomy, job security and compensation (Bassey, 2002). These factors are also reported in the literature as contributing to increased stress levels for computing professionals (Hoyt and Gerloff, 1999). Thus, a logical progression is the examination of these factors in terms of the affects they incur on both motivation and stress. An interrelationship between motivation and either the sources and/or levels of stress emerged for seven out of the nine dimensions used in the present study. Similarly, the perceptions of the managers interviewed differed on all but one of these dimensions (Task Identity) from those provided by the employees who filled out the questionnaire. Ilardi, Leone, Kasser and Ryan (1993) stated that disagreement between employees and their supervisors on motivation and performance ratings is relatively common.

Management need to, with the help of their employees, adopt, and indeed adapt, strategies that are tailored to the needs of their computing employees. Many suggestions have been provided in the above discussion, each of which were appropriate to the dimension at hand. This section will draw together these recommendations in a coherent manner. Although there remains a debate as to whether pay has any motivational properties, a reward programme which is tailored for each individual can satisfy most of a computing employee's needs, thus increasing their motivation and reducing their stress levels. Badawy (1998) and Gupta and Singhal (1993) stated that organisations which are able to implement appraisal systems, establish reward mechanisms and find ways to negotiate between the employees' career goals and the needs of the company are far more likely to be innovative – a necessity for all computing organisations to succeed.

This research illustrates that the existing assumption that one can focus solely on implementing strategies to either increase or decrease motivation and stress is inadequate. Management need to implement strategies which take into account both of these concepts. That is, one must consider, when attempting to increase employee motivation, what the implications of such a strategy are on employee stress, and visa versa. A reward programme which not only satisfies the need for job security and fiscal equity, but also satisfies the employees' need for achievement, recognition and advancement facilitates in both increasing motivation and decreasing stress. Indeed, Raudsepp (1980) discovered that technical professionals seek increases in pay more for the recognition that they believe their qualification, performance and professional contribution entitles them. However, reward programmes which provide increases in pay normally associated with promotion are themselves ineffective without a change in rank/authority or task. Goal-setting can also play a role in satisfying the advancement needs of graduates. Managers/Supervisors can help graduates set career goals, and support them in achieving their objectives. Employees should participate in goal-setting, certainly when deciding upon their own work, but also, if they so wish, at the organisational level, along with their immediate superiors and senior management. Providing employees with the autonomy to set these goals, within predefined boundaries, should ensure that they will strive to achieve them. However, feedback, whether positive or negative, should be provided to ensure that, if necessary, they can redefine their goals at the earliest possible stage. A lack of social support resulted in increased levels of stress for the sample, thus, management need to provide support to graduates, initially during their adjustment stage, but also thereafter, given that the present result after examining the interrelationship between motivation and stress for the first five years after graduation indicates so. Differing perspectives suggest that when managers attend to employees' experiences of autonomy, competence and relatedness in the work setting, employee motivation will be enhanced (Deci *et al.*, 1989), which in turn results in better psychological adjustment (Ilardi *et al.*, 1993),

The present study is however the first to investigate the interrelationship between these two phenomena in the computing industry, and thus demonstrates that when management do not attend to the motivation needs of their employees, stress

increases, to such an extent, that organisational productivity and employees' physiological, psychological and behavioural wellbeing suffer as a result.

### Limitations

A number of factors have limited this research project. These limitations are found in the methodology employed. The graduates of this study originated from only one Institute of Technology. This non-probability sampling approach limits the generalisability of the research findings. However, undertaking a completely random sample would have been beyond the scope of a single researcher, both temporally and financially, thus convenience sampling was identified as the most logical methodological approach. Thus, future research should adopt sampling approaches to identify whether differences exist with regard to the interrelationship between employee motivation and stress.

A further limitation, and one that is inherent in all survey designs, is the high rate of non-responses with postal questionnaires (Robson, 1995). A response rate of only twenty-one percent was achieved, even with a follow-up letter to each respondent. There may have been differences between the respondents and the non-respondents in terms of the factors that they perceive as motivators and stressors respectively. However, the degree to which a non-probability sample differs from the population remains unknown. Thus, the information gathered can still provide significant insights into the interrelationship between employee motivation and stress in the computing industry. However, given the small sample size of the present research, replication is warranted.

The implementation of a cross-sectional approach is a further limitation. That is, cause and effect cannot be separated between the variables of motivation and stress. Thus, the researcher was able to undertake analysis on the significance of the relationship (if any) between employee motivation and stress, but not on the exact nature of the interrelationship. This will need further longitudinal type research to explore and explain in detail the nature of this interconnection. Although this form of research was beyond the scope of the investigator due to time constraints and limited resources, Wiley (1997) compared the results of four motivation studies conducted

over a period of five decades and illustrated that employees' motivation needs changed over that period. However, Ryan (2000) stated that an inherent problem with longitudinal research is sample mortality, that is, the inaccessibility or non-availability through geographical moves and/or unwillingness to continue co-operating with the study, which could make the non-response problem even worse.

### Need for Future Research

The concepts of employee motivation and stress are well documented in the literature, yet no study to date has investigated the interrelationship between these two concepts. Thus, further research is needed to further analyse the interrelationship between these concepts, not just in the computing industry.

Further research should cover a wider population. That is, incorporate a larger random sample size by questioning employees from various industries. This would allow for further generalisability of the findings. Additionally, further longitudinal research (up to ten years after graduation) could investigate the relationship between these phenomena on an international scale, thus allowing for comparisons between computing graduates of various countries.

The present results illustrated a divide between those in permanent and contract positions, thus more research should examine this discrepancy in the computing industry. Differences in gender emerged with regard the need for social relationships at work. This difference appears to emerge in relation to the coping strategies adopted, thus more research should examine the differences between coping strategies used by female and male computing professionals.

### Conclusion

Given the explosive growth of the computing industry over the last few decades, computing personnel now constitute an important element of any organisation, given that their technological advancements often greatly influence the practices of all other members of the organisation. The concepts of employee motivation and stress have generated considerable research attention and are important facets of the work

life of any employee. The consequences of reduced motivation and increased stress for both the employee and the employing organisation have been widely reported, yet very few studies have fully investigated the interrelationship between them. This study has bridged a gap in the literature between employee motivation and stress by identifying and analysing the relationship between them, thus providing employees and employers alike with a knowledge base that currently does not exist, thereby allowing them to achieve and maintain an optimal balance between increased motivation and reduced stress.

Due to this study, employers and employees now have quantitative evidence of the interrelationship between employee motivation and stress in the computing industry. Their perceptions however of this relationship differ greatly, thus they need to act on the information presented in this thesis so they can construct an employment relationship which is both beneficial and desirable for both parties.

## References

- Aboulghassem, N. (1981). *A Cross-Cultural Study of the Motivational Determinants of Graduates' Occupational Choice and Performance*. Queen's University Belfast.
- Adams, J. S. (1962). The relationship of worker productivity to cognitive dissonance about wage inequities. *Journal of Applied Psychology* **46**(2): 161-164.
- Adams, J. S. (1963). Toward an understanding of inequity. *Journal of Abnormal and Social Psychology* **67**: 422-436.
- Adams, J. S. (1965). Inequity in social exchange. In Berkowitz (Ed.), *Advance in experimental social psychology*. New York: Academic Press.
- Adams, J. S., Freedman, S. (1976). Equity theory revisited: comments and annotated bibliography. *Advances in Experimental Social Psychology* **9**: 43-90.
- Adams, J. S., Jacobsen, P. R. (1964). Effects of wage inequities on work quality. *Journal of Abnormal and Social Psychology* **69**: 19-25.
- Adams, J. S., Rosenbaum, W. B. (1962). The relationship of worker productivity to cognitive dissonance about wage inequities. *Journal of Applied Psychology* **46**(161-164).
- Adler, A. (1927). *Understanding Human Nature*. New York: Chilton.
- Adler, N. J. (1991). *International Dimensions of Organizational Behavior*. Boston, MA.: PWS-Kent.
- Agarwal, S., Ramaswami, S. N. (1993). Affective organizational commitment of salespeople: An expanded model. *Journal of Personal Selling and Sales Management* **13**(2): 49-70.
- Aherne, D. (1998). *Understanding Student Stress: A Qualitative Study of the Stress Experienced by Third Level Students*. Unpublished Ph.D., University College Cork, Cork.
- Alderfer, C. P. (1966). *Differential importance of human needs as a function of satisfaction obtained in the organization*. Unpublished Doctoral dissertation, Yale University.
- Alderfer, C. P. (1967). Convergent and discriminant validation of satisfaction and desire measures by interviews and questionnaires. *Journal of Applied Psychology* **51**: 509-520.

Alderfer, C. P. (1969). An empirical test of a new theory of human needs. *Organizational Behaviour and Human Performance* **4**: 142-175.

Alderfer, C. P. (1972). *Existence, Relatedness, and Growth: Human needs in organisational settings*. New York: The Free Press.

Ali, S. (1998). Research Methodology: Back to Basics. *ABAC Journal* **18**(1).

Allen, T., Katz, R. (1995). The project-oriented career: a dilemma for human resource management. *R&D Management* **25**(2): 129-140.

Allen, T. J., Katz, R. (1986). The dual ladder: motivational solution or managerial delusion? *R&D Management* **16**(2): 185-197.

Altman, L. (1976). Environmental psychology and social psychology. *Personality and Social Psychology Bulletin* **2**: 96-113.

Amabile, T. M., Conti, R., Coon, H., Lazenby, J., Herron, M. (1996). Assessing the work environment for creativity. *Academy of Management Journal* **39**(5): 1154-1185.

Andrews, I. R. (1967). Wage inequities and job performance: An experimental study. *Journal of Applied Psychology* **51**: 39-45.

Appley, M., Trumbull, R. (1986). *Dynamics of Stress: Physiological, psychological and social perspectives*. New York: Plenum Press.

Argote, L., McGrath, J. E. (1993). Group process in organizations. In C. L. Cooper, Robertson, I. T. (Ed.), *International Review of Organizational Psychology* (pp. 333-389). New York: Wiley.

Argyris, C. (1964). *Integrating the individual and the organization*. New York: Wiley.

Arnold, J. H. (1981). A test of the validity of the multiplicative hypothesis of expectancy-valence theories of work motivation. *Academy of Management Journal* **24**: 128-141.

Arnolds, C. A., Boshoff, C. (2000). Does Higher Remuneration Equal Higher Job Performance? An Empirical Assessment of the Need-Progression Proposition in Selected Need Theories. *South African Journal of Business Management* **31**: 53-64.

Arnolds, C. A., Boshoff, C. (2002). Compensation, esteem valence and job performance: an empirical assessment of Alderfer's ERG theory. *Journal of Human Resource Management* **13**: 697-719.

Arrowood, A. J. (1961). *Some effects on productivity of justified and unjustified levels of reward under public and private conditions*. University of Minnesota.

Aryee, S. (1991). Combining obsolescence: predictors of technical updating among engineers. *Journal of Technology Management* **8**: 103-119.

Ashforth, B. E., Saks, A. M. (1996). Socialization tactics: longitudinal effects on newcomer adjustment. *Academy of Management Journal* **39**: 149-178.

Aspinwall, L. G., Taylor, S. E. (1992). Modelling and cognitive adaptation: A longitudinal investigation of the impact of individual differences and coping in college adjustment and performance. *Journal of Personality and Social Psychology* **63**: 989-1003.

Atkinson, J. W. (1958). Towards experimental analysis of human motivation in terms of motives, expectancies, and incentives. In J. W. Atkinson (Ed.), *Motives in fantasy, action, and society*. Princeton: Van Nostrand.

Atkinson, J. W. (1964). *An Introduction to Motivation*. Princeton New Jersey: Van Nostrand.

Atkinson, J. W., Miller, D. R. (1956). Parental experiences in child training: University of Michigan.

Austin, J. T., Bobko, P. (1985). Goal-setting theory: Unexplained areas and future research directions. *Journal of Occupational and Organizational Psychology* **58**: 289-308.

Austin, J. T., Vancouver, J. B. (1996). Goal constructs in psychology: Structure, Process, and Content. *Psychological Bulletin* **120**(33): 338-375.

Aziz, M. (2003). Organisational role stress among Indian information technology professionals. *Asian-Pacific Newsletter on Occupational Health and Safety* **10**(2): 31-33.

Badawy, M. (1998). What we've learnt managing human resources. *Research Technology Management* **31**(5): 19-35.

Badawy, M. K. (1978). One more time: how to motivate your engineers? *IEEE Transactions on Engineering Management* **25**(2): 37-42.

Bailyn, L. (1980). *Living with Technology*. Cambridge: MA.: MIT Press.

Baird, L. S. (1977). Self and superior ratings of performance: As related to self-esteem and satisfaction with supervision. *Academy of Management Journal* **20**(2): 291-300.



Ball, S. J. (1981). *Beachside Comprehensive: A Case-Study of Secondary Schooling*. Cambridge: CUP.

Bandura, A. (1977). Self-efficacy: Towards a unifying theory of behavioural change. *Psychological Review* **84**: 191-215.

Bandura, A. (1982). Self-efficacy mechanism in human agency. *American Psychologist* **37**: 122-147.

Bandura, A. (1986). *Social Foundations of Thought and Action: A social cognitive theory*. Englewood Cliffs, New Jersey: Prentice Hall.

Baron, R., Kenny, D. (1986). The moderator-mediator variable distinction in social psychological research: Conceptual, strategic and statistical considerations. *Journal of Personality and Social Psychology* **51**: 1173-1182.

Bartol, K. M., Martin, D. C. (1998). *Management*: McGraw Hill.

Baruch, Y., Winkelmann-Gleed, A. (2002). Multiple commitments: a conceptual framework and empirical investigation in a community health service trust. *British Journal of Management* **13**(4): 337-357.

Bass, B. M., Barrett, G. V. (1981). *People, Work and Organizations: An Introduction to Industrial and Organizational Psychology* (2 ed.). Boston, Massachusetts: Allyn and Bacon.

Bassey, M. (2002). Motivation and work: investigation and analysis of motivational factors at work. Linköping, Sweden: Linköping University, Department of Management and Economics: (<http://www.diva-portal.org/liu/abstract.xsql?dbid=1086>).

Bateman, T. S., Grant, M. J. (2003). Revisiting Intrinsic and Extrinsic Motivation. Seattle, W. A.: Academy of Management Annual Meeting.

Baum, A., Singer, J., Baum, C. (1981). Stress and the Environment. *Journal of Social Issues* **37**: 4-35.

Baumeister, R. F., Leary, M. R. (1995). The need to belong: Desire for interpersonal attachments as a fundamental human motivation. *Psychological Bulletin* **117**: 497-529.

Beehr, T., A., Walsh, J. T., Taber, T. D. (1976). Relationship of stress to individually and organizationally valued states: Higher order needs as a moderator. *Journal of Applied Psychology* **61**(1): 41-47.

- Beehr, T. A. (1998). An organisational psychology meta-model of occupational stress. In C. L. Cooper (Ed.), *Theories of Organisational Stress*: Oxford: Oxford University Press.
- Beehr, T. A., Franz, T. (1987). The current debate about the meaning of job stress. *Journal of Organisational Behaviour Management* **8**: 5-18.
- Benson, H., Allen, R. L. (1980). How much stress is too much? *Harvard Business Review* **58**(5): 86-92.
- Bernstein, B. (1987). *Centrality: An integrative theory of cognitive appraisal*. Unpublished manuscript, Wayne State University, Detroit, Michigan.
- Bielauskas, L. A., Webb, J. T. (1974). The social readjustment rating scale: Validity in a college population. *Journal of Psychosomatic Research* **18**: 115-123.
- Bigliardi, B., Petroni, A., Dormio, A. I. (2005). Status, role and satisfaction among development engineers. *European Journal of Innovation Management* **8**(4): 453-470.
- Bolton, G. M. (1969). *Graduates in Industry*. University of Sussex.
- Bond, S. (1993). Experimental research nursing: necessary but not sufficient. In A. Kitson (Ed.), *Nursing, Art and Science*. London: Chapman.
- Bowden, V. (1995). *Managing to Make a Difference: A Study of Career Diversity among Men and Women Research Scientists*. Manchester University, Manchester.
- Brewer, J., Hunter, A. (1989). *Multimethod Research: A Synthesis of Styles* (Vol. 175). California: Sage.
- Brief, A. P., Aldag, R. (1977). The Intrinsic-Extrinsic Dichotomy: Toward Conceptual Clarity. *Academy of Management Review* **2**(3): 496-500.
- Briner, R. B., Reynolds, S. (1993). Bad theory and bad practice in occupational stress: Sheffield University.
- Brockman, V. M. (1971). The Herzberg Controversy. *Personnel Psychology* **24**: 155-189.
- Bronowski, J. (1956). *The Common Sense of Science*. London: Pelican.
- Brosschot, J. F., Benschop, R. J., Godaert, G. L., Ollf, M., De Smet, M., Heijnen, C. J., Ballieux, R. E. (1994). Influence of life stress on immunological reactivity to mild psychological stress. *Psychosomatic Medicine* **56**: 216-224.

Brousseau, K. R. (1978). Personality and job experience. *Organizational Behaviour and Human Performance* **22**: 235-252.

Brown, G. W. (1974). Meaning, measurement and stress of life events. In B. S. Dohrenwend, Dohrenwend, B. P. (Ed.), *Stressful Life Events: Their Nature and Effects*. New York: Wiley.

Brown, G. W., Harris, T. O. (1989). *Life Events and illness*. London: Unwin Hyman.

Brown, G. W., Harris, T. O., Peto, J. (1973). Life Events and psychiatric disorder, Part 2. Nature and Causal Link. *Psychological Medicine* **3**: 159-176.

Brown, K. (2002a). *An examination of some factors in motivating religious behaviour in the light of Maslow's analysis of human psychological needs*. Keele University, Staffordshire.

Brown, M. M. (2002b). An exploratory study of job satisfaction and work motivation of a selected group of information technology consultant in the Delaware valley: Wilmington College, United States.

Bryan, J. F., Locke, E. A. (1967). Goal-setting as a means of increasing motivation. *Journal of Applied Psychology* **51**: 274-277.

Bryman, A. (1988). *Quantity and Quality in Social Research*. London: Unwin.

Bryman, A. (1989). *Research Methods and Organisation Studies*. London: Unwin Hyman.

Bryman, A. (2004). *Social Research Methods* (2nd ed.). London: Oxford University Press.

Bryman, A., Cramer, D. (1995). *Quantitative Data Analysis for Social Scientists*. New York: Routledge.

Buckley, R. M., Johnathon, J. N., Halbesleben, R. B., Wheeler, A. R., Stauffer, J. (2002). The Daunting Task of Motivating Information Technology (IT) Professionals. *Oklahoma Business Bulletin* **69**(4): 5-13.

Burisch, M. (1989). *Das burnout-syndrom: Theorie der inneren erschöpfung*. Berlin: Verlag.

Burke, M. J., Brief, A. P., George, J. M. (1993). The role of negative affectivity in understanding relations between self-reports of stressors and strains: A comment on the applied psychology literature. *Journal of Applied Psychology* **78**: 402-412.

- Burke, R. J. (1966). Are Herzberg's motivators and hygienes unidimensional? *Journal of Applied Psychology* **50**: 317-321.
- Burnes, P. T. (2005). Voluntary turnover among information technology professionals. *Information Executive* **8**(8): 23.
- Burnstein, E. (1963). Fear of Failure, Achievement Motivation and Aspiring to Prestigious Occupation. *Journal of Abnormal and Social Psychology* **67**: 189-193.
- Calabrese, J., Kling, M., Gold, P. (1987). Alterations in immunocompetence during stress, bereavement and depression. *American Journal of Psychiatry* **144**: 1123-1134.
- Campbell, J. P., Dunnette, M. D., Lawler, E. E., Weick, K. E. (1970). *Managerial behaviour, performance, and effectiveness*. New York: McGraw-Hill.
- Campbell, J. P., Pritchard, R. D. (1976). Motivation theory in industrial and organizational psychology. In M. D. Dunnette (Ed.), *Handbook of Industrial and Organizational Psychology* (pp. 63-130). Chicago: Rand McNally.
- Cannon, W. B. (1914). The emergency function of the adrenal medulla in pain and the major emotions. *American Journal of Physiology* **33**: 356-372.
- Cannon, W. B. (1927). The James-Lange theory of emotions: A critical examination and an alternative theory. *American Journal of Psychology* **39**: 106-124.
- Cannon, W. B. (1929). *Bodily Changes in Pain, Hunger, Fear and Rage*. Boston: Branford.
- Carson, P. P., Lanier, P. A., Carson, K. D., Birkenmeier, B. J. (1999). A historical perspective on fad adoption and abandonment. *Journal of Management History* **5**(6): 320-333.
- Cartwright, S., Cooper, C. (1997). *Managing workplace stress*. Thousand Oaks, California: Sage.
- Carver, C. S., Scheier, M. F., Weintraub, J. K. (1989). Assessing Coping Strategies: A theoretical based approach. *Journal of Personality and Social Psychology* **56**: 267-283.
- Certo, S. C. (2003). *Supervision: Concepts and Skill Building*. New York: McGraw-Hill.
- Chamberlain, K., Zika, S. (1990). The minor events approach to stress: support for the use of daily hassles. *British Journal of Psychology* **81**: 469-481.

Christenfeld, R., Black, H. K. (1977). Mental health and the quiet campus. *Social Psychiatry* **12**: 117-125.

Cichon, D. J., Koff, R. H. (1989). The teaching events stress inventory. In M. Johnstone (Ed.), *Teaching, An overview of Research*. Paper presented to the American Education Research Association Annual Meeting: SCRE Publications.

Cohen, A. P. (1978). Ethnographic method in the real community. *Sociologia Ruralis* **18**(1): 1-22.

Cohen, F. (1979). Personality, stress, and the development of physical illness. In G. C. Stone, Cohen, F., Adler, N. E. (Ed.), *Health Psychology* (pp. 77-111). San Francisco: Josey Bass.

Cohen, F., Williamson, G. (1991). Stress and infectious disease in humans. *Psychological Bulletin* **109**: 5-24.

Cohen, L. H. (1988a). *Life Events and Psychological Functioning: Theoretical and methodological issues*. Beverly Hills, California: Sage Publication.

Cohen, L. H. (1988b). Measurement of life events. In L. H. Cohen (Ed.), *Life events and psychological functioning* (pp. 11-30). Beverly Hills, California: Sage Publication.

Cohen, S., Evans, G. W., Stokolos, D., Krantz, D. (1986). *Behavior, Health and Environmental Stress*. New York: Plenum Press.

Colborn, K. (1994). Grace under fire. *Computerworld*, 28, 105.

Comstock, L. K., Slome, C. (1973). A health survey of students: Prevalence of perceived problems. *Journal of the American College Health Association* **22**: 150-155.

Converse, J. M., Presser, S. (1988). *Survey Questions*. London: Sage Publications.

Cooper, C. (2005). Our survey says. you're stressed. *Travel Weekly*(1765): 4-5.

Cooper, C., Baglioni, A. (1988). A structural model approach toward the development of a theory of the link between stress and mental health. *British Journal of Medical Psychology* **61**: 87-102.

Cooper, C., Cooper, R., Eaker, L. (1988). *Living With Stress*. London: Penguin.

Cooper, C., Dewe, J., O'Driscoll, M. (2001). *Organisational Stress: A Review and Critique of Theory, Research and Applications*. London: Sage Publications.

- Cooper, C. L., Cartwright, S. (1994). Healthy mind, healthy organisation: a proactive approach to occupational stress. *Human* **47**: 455-471.
- Cooper, C. L., Marshall, J. (1976). Occupational sources of stress: A review of the literature relating to coronary heart disease and mental ill health. *Journal of Occupational Psychology* **49**(11).
- Cougar, J. D., Zawacki, R. A. (1978). What motivates DP professional. *Datamation*: 113-123.
- Cougar, D. J. (1988). Motivating I.S. personnel. *Datamation* **34**: 59-62.
- Cox, T. (1978). *Stress*. London: The Macmillan Press Ltd.
- Cox, T. (1988). Psychobiological factors in stress and health. In S. Fisher, Reason, J. (Ed.), *Handbook of Life Stress*. London: Wiley.
- Cox, T. (1990). The recognition and measurement of stress: Conceptual and methodological issues. In E. N. Corlett, Wilson, J. R. (Ed.), *Evaluation of Human Work*. London: Taylor and Francis.
- Cox, T. (1993). Stress research and Stress Management: Putting theory into work: HSE Contract Research Report.
- Cox, T., Mackay, C. J. (1976). A psychological model of occupational stress. In T. Cox (Ed.), *Stress*. Basingstoke, U.K.: Macmillan.
- Cox, T., Randall, R., Griffiths, A. (2002). Interventions to Control Stress at Work in Hospital Staff: The Institute of Work, Health and Organisations.
- Cronkite, R. C., Moos, R. H. (1984). The role of predisposing and moderating factors in the stress-illness relationship. *Journal of Health and Social Behaviour* **25**: 372-393.
- Crosier, R., Dalton, K. (1989). Equity theory examined. In D. Smith (Ed.), *Motivation and control in organisations*. New York: Baron Press.
- Crossan, F. (2003). Research philosophy: towards an understanding. *Nurse Researcher* **11**(1): 46-55.
- Cummings, L. L., Schwab, D. P., Rosen, M. (1971). Performance and knowledge of results as determinants of goal setting. *Journal of Applied Psychology* **55**: 526-530.
- Cummings, R. C. (1990). Job stress and the buffering effect of supervisory support. *Group and Organizational Studies* **8**: 92-104.

Cummins, P. C. (1967). T.A.T. Correlates of Executive Performance. *Journal of Applied Psychology* **51**: 78-81.

Dabney, J. (1998). *Sources of perceived stress for students in a college of higher education: Implications for learning*. University of Leicester, Leicester.

Dachler, H. P., Mobley, W. H. (1973). Construct validation of an instrumentality-expectancy-task-goal model of work motivation: Some theoretical boundary conditions. *Journal of Applied Psychology* **58**: 397-418.

Dahlman, I. (2004). *En studie av möjliga orsaker till ohälsa på en IT-arbetsplats. Examensarbete vid Arbetslivsinstitutets foretagsskolut-bildning*. Stockholm: National Institute for Working Life.

Davidson, D., Suppes, P., Siegel, S. (1957). *Decision making: An experimental approach*. Stanford: Stanford University Press.

Davidson, M., Cooper, C. (1983). *Stress and the Woman Manager*. Oxford: Martin Robertson & Company.

de Charms, R. (1968). *Personal Causation*. New York: Academic Press.

de Frank, R. S., Cooper, C. L. (1987). Worksite stress management interventions: Their effectiveness and conceptualisation. *Journal of Managerial Psychology* **21**(1): 4-10.

Deci, E. L. (1971). Effects of Externally Mediated Rewards on Intrinsic Motivation. *Journal of Personality and Social Psychology* **18**: 105-115.

Deci, E. L. (1972a). Intrinsic Motivation, Extrinsic Reinforcement, and Inequity. *Journal of Personality and Social Psychology* **22**: 113-120.

Deci, E. L. (1972b). The Effects of Contingent and Noncontingent Rewards and Control on Intrinsic Motivation. *Organizational Behavior and Human Performance* **8**: 217-229.

Deci, E. L. (1975). *Intrinsic Motivation*. New York: Plenum.

Deci, E. L., Connell, J. P., Ryan, R. M. (1989). Self-determination in a work organization. *Journal of Applied Psychology* **74**: 580-590.

Denzin, N. K., Lincoln, Y. S. (1998). *The Landscape of Qualitative Research*. London: Sage.

Denzin, N. K., Lincoln, Y. S. (2000). *Handbook of Qualitative Research*. Thousand Oaks, California: Sage.

Dewe, P., Cox, T., Ferguson, E. (1993). Individual strategies for coping with stress and work: A review. *Work and Stress* **7**: 5-15.

Dewsbury, D. A. (1978). *Comparative animal behavior*. New York: McGraw-Hill.

Dey, M. K., Kaur, G. (1965). Facilitation of performance by experimentally induced ego motivation. *Journal of General Psychology* **73**: 237-247.

Deyer, L., Parker, D. F. (1975). Classifying outcomes in work motivation research: An examination of the intrinsic-extrinsic dichotomy. *Journal of Applied Psychology* **60**: 455-458.

DiCesare, J., Sadri, G. (2003). Do All Carrots Look The Same? Examining the Impact of Culture on Employee Motivation. *Management Research News* **26**(1): 29-40.

Dietch, J. (1978). Love, Sex Roles, and Psychological Health. *Journal of Personality Assessment* **42**(6): 626-634.

Dimitrelis, G. (2003). *Is Maslow's Hierarchy of Needs' and concept of Self-Actualisation relevant today? A cross-cultural study*. University of Newcastle-U-Tyne.

Donovan, S. B., Kleiner, B. H. (1994). Effective stress management. *Managerial Auditing Journal* **9**(6): 31-34.

Dougherty, D., Hardy, C. (1996). Sustained innovations in large, mature organizations: Overcoming innovation-to-organization problems. *Academy of Management Journal* **39**(5): 1065-1083.

Drazin, R., Schoonhoven, C. B. (1996). Community, population, and organization effects on innovation: A multilevel perspective. *Academy of Management Journal* **39**(5): 1065-1083.

Drucker, P. (1954). *The Practice of Management*. New York: Harpers and Row.

Dugan, S. S. (1999). *Effects of personality, life stress, and social support upon psychological distress among undergraduate students*. Unpublished D. Phil, University of Sussex.

Dunne, E. (1985). *Longitudinal Studies of an Index of General Physiological Arousal and some Subjective and Performance Indices of the Physiological Stress Response*. Unpublished Ph.D., University College Cork, Cork.

Dunnette, M. D. (1967). The Motives of Industrial Managers. *Organizational Behaviour and Human Performance* **2**: 176-181.



Dunnette, M. D., Campbell, J. D., Hakel, M. D. (1967). Factors Contributing to Job Satisfaction and Job Dissatisfaction in Six Occupational Groups. *Organizational Behaviour and Human Performance* **2**: 143-174.

Dwyer, D. J., Schwartz, R. H., Fox, M. L. (1992). Decision-making autonomy in nursing. *Journal of Nursing Administration* **22**: 17-23.

Edwards, J. M., Endler, N. S. (1989). Appraisals of stressful situations. *Personality and Individual Differences* **10**: 7-10.

Edwards, W. (1954). The theory of decision making. *Psychological Bulletin* **51**: 380-417.

Edworthy, A. (2000). *Managing Stress*. Buckingham: Open University Press.

Elangovan, A. R., Xie, J. L. (1999). Effects of perceived power of supervisor on subordinate stress and motivation: The moderating role of subordinate characteristics. *Journal of Organizational Behavior* **20**(3): 359-374.

Endler, N. S. (1975). A person-situation interaction model of anxiety. In C. D. Spilberger, Sarason, I. G. (Ed.), *Stress and anxiety* (Vol. 1). Washington, D.C.: Hemisphere.

Endler, N. S. (1980). Person-situation interaction and anxiety. In I. L. Kutash, Schlesinger, L. B. (Ed.), *Handbook on Stress and Anxiety: Contemporary Knowledge, Theory, and Treatment*. San-Francisco: Jossey-Bass.

Endler, N. S., Edwards, J. (1978). Person by treatment interactions in personality research. In L. A. Perrow, Lewis, M. (Ed.), *Perspectives in Interactional Psychology*. New York: Plenum.

Endler, N. S., Edwards, J. (1982). Stress and personality. In L. Goldberger, Breznitz, S. (Ed.), *Handbook of Stress: Theoretical and Clinical Aspects*. New York: Free Press.

Endler, N. S., Parker, J. (1989). Coping with frustrations to self-realizations: Stress, anxiety, crisis and adjustment. In E. Kraus (Ed.), *Self-realization, success and adjustment* (pp. 153-164). New York: Praeger.

Endler, N. S., Parker, J. (1990). Multidimensional assessment of coping: A critical evaluation. *Journal of Personality and Social Psychology* **58**: 844-854.

Engler, N. (1995). IS managers under stress. *Open Computing* **12**: 44-48.

Estes, R. (1973). Determinants of differential stress levels among university students. *Journal of the American College Health Association* **21**: 470-476.

Farmer, J., Campbell, F. (1997). Information professionals, CPD and transferable skills. *Library Management* **18**(3): 129-134.

Fesinger, L., Aronson, E. (1960). The arousal and reduction of dissonance in social contexts. In D. Cartwright, and Zander, A. (Ed.), *Group Dynamics* (pp. 214-231). Evanston: Row, Peterson.

Festinger, L. (1957). *A theory of cognitive dissonance*. Evanston: Row, Peterson.

Fineman, S. (1986). *White Collar Unemployment - Impact and Stress*. Chichester: Wiley.

Fletcher, B. (1991). *Work, Stress, Disease, and Life Expectancy*. Chichester: John Wiley.

Folkard, S. (1996). Body rhythms and shift work. In P. Warr (Ed.), *Psychology at work* (4 ed., pp. 39-72). New York: Penguin.

Folkman, S. (1984). Personal control and stress and coping processes: A theoretical analysis. *Journal of Personality and Social Psychology* **46**: 839-852.

Folkman, S., Lazarus, R. S. (1980). An analysis of coping in a middle-aged sample. *Journal of Health and Social Behaviour* **21**: 219-239.

Folkman, S., Lazarus, R. S. (1985). If it changes it must be a process. Study of emotion and coping during three stages of a college examination. *Journal of Personality and Social Psychology* **45**: 150-170.

Folkman, S., Lazarus, R. S. (1988). Coping as a mediator of emotion. *Journal of Personality and Social Psychology* **54**: 466-475.

Folkman, S., Lazarus, R. S., Dunkel-Schetter, C., DeLongis, A., Gruen, R. (1986). The dynamics of a stressful encounter. *Journal of Personality and Social Psychology* **50**: 992-1003.

Folkman, S., Lazarus, R. S., Gruen, R., DeLongis, A. (1986). Appraisal, coping, health status, and psychological symptoms. *Journal of Personality and Social Psychology* **50**: 571-579.

Fontaine, K. R. (1992). *Personality, Appraisal, and Coping with Stress*. Unpublished Ph.D., University of Manchester.

Forbes, D. A., King, K. M., Eastlick, K., Kushner, K., Letourneau, N. L., Myrick, A. F., Profetto-McGrath, J. (1999). Warrantable evidence in nursing science. *Journal of Advanced Nursing* **29**(2): 373-379.

Ford, C. H. (1979). MBO: An Idea Whose Time Has Gone? *Business Horizons* **22**(6): 48-55.

Fox, J. B., Scott, K. D., Donohue, J. M. (1993). An Investigation into Pay Valence and Performance in a Pay-for-Performance Field Setting. *Journal of Organizational Behaviour* **14**(17): 687-693.

Frankenhaeuser, M. (1971). Behaviour and circulating catecholamines. *Brain Research* **31**: 241-262.

Frankenhaeuser, M., Gardell, B. (1976). Underload and overload in working life: Outline of a multidisciplinary approach. *Journal of Human Stress* **2**: 35-46.

Franklin, J. C., Schiele, B. C., Brozek, J., Keys, A. (1948). Observation on Human Behaviour in Experimental Semistarvation and Rehabilitation. *Journal of Clinical Psychology* **4**: 28-45.

French, J. R., Kay, E., Meyer, H. H. (1966). Participation and the appraisal system. *Human Relations* **19**: 3-20.

French, J. R. P., Caplan, R. D. (1973). Organisational stress and individual strain. In J. Marrow (Ed.), *The Failure of Success*. New York: AMACOM.

Frese, M. (1985). Stress at work and psychosomatic complaints: A causal interpretation. *Journal of Applied Psychology* **70**: 214-238.

Friedmann, G. (1961). *The Anatomy of Work*. Glencoe: Free Press.

Furnham, A. (1992). *Personality at work*. London: Routledge.

Furnham, A. (2006). *The Psychology of Behaviour at Work: The Individual in the Organization* (2 ed.). Sussex: Psychology Press.

Ganster, D. C., Schaubroeck, J. (1991). Role stress and worker health: An extension of the plasticity hypothesis of self-esteem. *Journal of Social Behaviour and Personality* **6**: 349-360.

Garg, P., Rastogi, R. (2006). New model of job design: motivating employees' performance. *Journal of Management Development* **25**(6): 572-587.

Garner, R. (1997). Gimme some respect! *Computerworld*, 31, 86-91.

Ghuri, P., Grnhaug, K., Kristianslund, I. (1995). *Research Methods in Business Studies: A Practical Guide*. Hemel Hempstead: Prentice Hall.

Glowinkowski, S. P., Cooper, C. L. (1985). Current issues in organizational stress research. *Bulletin of the British Psychological Society*.

Glynn, M. A. (1996). Innovative genius: A framework for relating individual and organizational intelligences to innovation. *Academy of Management Journal* **21**(4): 1081-1111.

Godard, J. (2001). High performance and the transformation of work? The implications of alternative work practices for the experience and outcomes of work. *Industrial and Labour Relations Review* **54**: 776-805.

Goldstein, K. (1939). *The Organism: A holistic approach to biology*. New York: The American Book Company.

Goodell, H., Wolf, S., Rogers, F. (1986). Historical perspective. In S. Wolf, Finestone (Ed.), *Occupational Stress, Health and Performance at Work*. Littleton, MA: PSG Inc.

Goodman, P. S., Friedman, A. (1971). An examination of Adam's theory of inequity. *Administrative Science Quarterly* **16**: 271-288.

Goodman, P. S., Friedman, A. (1968). An examination of the effect of wage inequity in the hourly condition. *Organizational Behaviour and Human Performance* **3**: 340-352.

Graen, G. B., Uhl-Bien, M. (1995). Relationship-based approach to leadership: Development of leader-member exchange (LMX) theory of leadership over 25 years: Applying a multi-level multi-domain perspective. *Leadership Quarterly* **6**: 219-247.

Graham, W., Balloun, J. (1973). An Empirical Test of Maslow's Need Hierarchy. *Journal of Humanistic Psychology* **13**: 97-108.

Gratton, L. C. (1981). *An Empirical Validation of Maslow's Need Hierarchy in the Work and Non-Work Setting*, University of Liverpool.

Gray, J. (1971). *The Psychology of Fear and Stress*. London: Weidenfeld and Nicholson.

Greenberg, J. (1980). Stress, relaxation and the health educator. *The Journal of School Health* **47**: 522-525.

Greenberg, J., Baron, R. A. (1997). *Behavior in Organisations: Understanding and Managing the Human Side of Work*. New Jersey: Prentice Hall, Inc.

Greenhaus, J. H., Callanan, G. A., Kaplan, E. (1995). The role of goal setting in career management. *The International Journal of Career Management* **7**(5): 3-12.

- Gupta, A., Singhal, A. (1993). Managing human resources for innovation and creativity. *Research Technology Management* **36**(3): 41-48.
- Hackman, J. R., Lawler, E. E. (1971). Job characteristics and Employee Motivation: An Empirical Investigation. *Journal of Applied Psychology*.
- Hackman, J. R., Oldham, R. G. (1975). Development of the job diagnostic survey. *Journal of Applied Psychology* **2**: 159-170.
- Hackman, J. R., Oldham, R. G. (1976). Motivation through the design of work: test of a theory. *Organizational Behaviour and Human Performance* **16**: 250-279.
- Hackman, J. R., Porter, L. W. (1968). Expectancy Theory Predictions of Work Effectiveness. *Organizational Behaviour and Human Performance* **3**: 417-426.
- Hafner, H. (1968). Psychological disturbance following prolonged persecution. *Social Psychiatry* **3**(3): 80-88.
- Hakim, C. (1987). *Research Design: Strategies and Choices in the Design of Social Research*. London: Allen and Unwin.
- Hall, D. T. (1971). A theoretical model of career sub-identity development in organizational settings. *Organizational Behaviour and Human Performance* **6**: 50-76.
- Hall, D. T. (1976). *Careers in Organizations*. Pacific Palisades, California: Goodyear.
- Hall, D. T. (1996). Protean careers of the 21st century. *Academy of Management Executive* **10**(4): 8-16.
- Hall, D. T., Nougaim, K. K. (1968). An examination of Maslow's need hierarchy in an organisational setting. *Organizational Behaviour and Human Performance* **3**: 12-35.
- Hammen, C. (1988). Depression and cognitions about personal stressful life events. In L. B. Alloy (Ed.), *Cognitive processes in depression*. New York: Guildford Press.
- Hammer, A. L., Marting, S. (1988). *Manual for the Coping Resources Inventory*: Consulting Psychologists Press, Inc.
- Harrell, A., Stahl, M. J. (1986). Additive information processing and the relationship between expectancy of success and motivational force. *Academy of Management Journal* **29**: 424-433.

- Head, J., Hill, F., Maguire, M. (1996). Stress and the post graduate secondary school trainee teacher: A British case study. *Journal of Education for Teaching* **22**: 71-84.
- Heins, M., Fahey, S. N., Ledien, L. I. (1984). Perceived stress in medical, law and graduates students. *Journal of Medical Education* **59**: 169-179.
- Heneman, H. G., Schwab, D. P. (1972). Evaluation of research on expectancy theory prediction of employee performance. *Psychological Bulletin* **72**: 1-9.
- Herman, J. B., Hulin, C. L. (1973). Managerial Satisfaction and Organizational Roles: An Investigation of Porters Need Deficiency Scale. *Journal of Applied Psychology* **57**(2): 188-124.
- Hersen, M. (1972). Nightmare behavior: a review. *Psychological Bulletin* **78**(1): 37-78.
- Herzberg, F. (1966). *Work and the Nature of Man*. New York: Crowell.
- Herzberg, F. (1966). Work and the Nature of Man. In V. H. Vroom, Deci, E. L. (Ed.), *Management and Motivation*. London: Penguin Education.
- Herzberg, F. (1968). One more time: how do you motivate employees? *Harvard Business Review* **46**: 53-62.
- Herzberg, F. (1974). The Wise old Turk. *Harvard Business Review* **52**: 70-80.
- Herzberg, F., Mausner, B., Peterson, R., Capwell, D. (1957). *Job Attitudes: Review of Research and Opinion*. Pittsburgh: Psychological Service of Pittsburgh.
- Herzberg, F., Mausner, B., Snyderman, B. B. (1959). *The Motivation to Work* (2 ed.). New York: Wiley.
- Hesketh, B., Gardener, D., Lissner, D. (1992). Technical and managerial career paths: an unresolved dilemma. *International Journal of Career Management* **4**(3): 9-16.
- Higgins, M. C., Kram, K. E. (2001). Reconceptualising mentoring at work: a developmental network perspective. *Academy of Management Review* **26**(2): 264-288.
- Hinkle, L. E. (1961). The psychological state of the interrogation subject as it affects brain function. In A. D. Biderman, Zimmer, H. (Ed.), *The Manipulation of Human Behaviour*. New York: Wiley.
- Hinkle, L. E. (1973). The concept of "stress" in the biological and social sciences. *Social Science and Medicine* **1**: 31-48.

Hobfoll, S. (1989). Conservation of Resources: A new attempt at conceptualizing stress. *American Psychologist* **44**: 513-524.

Hoffman, E. (1996). *Future Visions: The Unpublished Papers of Abraham Maslow*. London: Sage Publications.

Holahan, C. J., Moos, R. H. (1987). Personal and contextual determinants of coping strategies. *Journal of Personality and Social Psychology* **52**: 946-955.

Holmes, T. H., Rahe, R. H. (1967). The Social Readjustment Rating Scale. *Journal of Psychosomatic Research* **11**: 219-225.

Holroyd, K., Lazarus, R. S. (1982). Stress coping and somatic adaptation. In L. Goldberger, Breznitz, S. (Ed.), *Handbook of Stress: Theoretical and clinical aspects*. New York: Free Press.

Homans, G. C. (1953). Status among clerical workers. *Human Organizations* **12**: 5-10.

Horowitz, M., Wilner, N., Alvarez, W. (1979). Impact of stress scale: A measure of subjective stress. *Psychosomatic Medicine* **41**: 209-218.

House, J. J. (1981). *Work Stress and Social Support*. Reading, MA.: Addison Wesley.

House, R. J. (1971). Status among clerical workers. *Human Organizations* **12**: 5-10.

House, R. J., Shapiro, H. J., Wahba, M. A. (1974). Expectancy Theory as a Predictor of Work Behaviour and Attitudes: A Re-Evaluation of Empirical Evidence. *Decisions Sciences* **January**: 481-506.

House, R. J., Wigdor, L. A. (1967). Herzberg's dual-factor theory of job satisfaction and motivation. *Personnel Psychology* **20**: 369-390.

Houston, D. J. (2000). Public service motivation: A multivariate test. *Journal of Public Administration Research and Theory* **10**(4): 713-727.

Howard, G. (1995). Occupational stress and the law: Some current issues for employers. *Journal of Psychosomatic Research* **39**(6): 707-719.

Howard, J., Cunningham, D., Rechnitzer, P. (1978). *Rusting Out, Burning Out, Bowing Out: Stress and Survival on the Job*. Toronto, Canada: Financial Post Books.

Howe, K. R. (1985). Two dogmas of educational research. *Educational Researcher* **14**(8): 10-18.

Howe, K. R. (1988). Against the quantitative-qualitative incompatibility thesis or dogmas die hard. *Educational Researcher* **17**(8): 10-16.

Hoyt, J., Gerloff, E. A. (1999). Organizational environment, changing economic conditions, and the effective supervision of technical personnel: A management challenge. *Journal of High Technology Management Research* **10**(2): 275.

Hunt, S. D., Chonko, L. B., Wood, V. R. (1985). Organizational commitment and marketing. *Journal of Marketing* **49**(1): 112-126.

Huseman, R. C., Hatfield, J. D., Miles, E. W. (1987). A new perspective on equity theory. *Academy of Management Review* **12**: 222-234.

Igbaria, M., Greenhaus, J. H. (1992). Determinants of M.I.S. employees turnover intentions: A structural equation model. *Communications of the ACM* **35**(2): 35-49.

Igbaria, M., Wormley, W. M. (1992). Organizational experiences and career success of MIS professionals and managers: an examination of race differences. *Management Information Systems Quarterly*(December): 507-529.

Ilardi, B. C. (1993). Employee and supervisor ratings of motivation. *Journal of Applied Social Psychology* **23**(21): 1789-1895.

Ilardi, B. C., Leone, D., Kasser, T., Ryan, R. M. (1993). Employee and Supervisor Ratings of Motivation: Main Effects and Discrepancies Associated with Job Satisfaction and Adjustment in a Factory Setting. *Journal of Applied Social Psychology* **23**(21): 1789-1805.

Ito, J. K., Brotheridge, C. M. (2006). Exploring the predictors and consequences of job insecurity's components. *Journal of Managerial Psychology* **22**(1): 40-64.

Ivancevich, J. M., Matteson, M. T. (1999). *Organizational Behaviour and Management*. Singapore: McGraw-Hill.

Jacques, E. (1961). *Equitable Payment*. New York: Wiley.

Jamal, M., Baba, V. (1992). Shiftwork and department-type related to job stress, work attitudes and behavioural intentions: A study of nurses. *Journal of Organisational Behaviour* **13**: 449-464.

Jankowicz, A. D. (1995). *Business Research Projects* (2nd ed.). London: Chapman and Hall.

Jayarathne, S., Himble, D., Chess, W. A. (1988). Dealing with work stress and strain: Is the perception of support more important than its use? *The Journal of Applied Behavioural Science* **24**(2): 191-202.



Jemmott, J. B., Locke, S. E. (1984). Psychosocial factors, immunologic mediation and human susceptibility to infectious diseases: How much do we know? *Psychological Bulletin* **95**(1): 78-108.

Jenkins, C. D. (1997). Type A/B behaviour pattern. In J. M. Stellman (Ed.), *ILO Encyclopaedia of Occupational Health and Safety* (Vol. 34, pp. 41-42). Geneva, Switzerland: International Labour Office and Chicago: Rand McNally.

Jerkes, R. M., Dodson, J. D. (1908). The relation of strength of stimulus to rapidity of habit-formation. *Journal of Comparative Neurology and Psychology* **18**: 459.

Johnson, D. (1991). Stress among graduates working in the SME sector. *Journal of Managerial Psychology* **6**(5).

Johnson, D., Sargeant, A. (1998). Motives for transition: An exploratory study of engineering managers. *Human Resource Management Journal* **83**(3): 41-53.

Jones, F., Bright, J. (2001). *Stress: Myth, Theory, and Practice*. Harlow: Prentice Hall.

Jurkiewicz, C. L. M., T. K., Brown, R. G. (1998). Motivation in public and private organizations: A comparative study. *Public Productivity and Management Review* **21**(3): 230-250.

Kahn, R. L. (1974). Conflict, ambiguity, and overload: three elements in job stress. In A. Maclean (Ed.), *Occupational Stress*. Springfield, Illinois: Charles C. Thomas.

Kahn, R. L., Byosiére, P. (1992). Stress in Organizations. In M. D. Dunnette, Hough, L. M. (Ed.), *Handbook of Industrial and Organizational Psychology* (2nd ed., pp. 571-650). Palo Alto, California: Consulting Psychologists.

Kahn, R. L., Wolfe, D. M., Quinn, R. P., Snoek, J. D., Rosenthal, R. A. (1964). *Organisational Stress: Studies in Role Conflict and Ambiguity*. New York: Wiley.

Kanner, A. D., Coyne, J. C., Schaefer, C., Lazarus, R. S. (1981). Comparison of two models of stress management: Daily hassles and uplifts versus major life events. *Journal of Behavioral Medicine* **4**(1): 1-28.

Kanter, R. M. (2001). *eValue: Succeeding in the Digital Culture of Tomorrow*. Boston: Harvard Business School Press.

Karl, K. A., Sutton, C. L. (1998). Job values in today's workforce: A comparison of public and private sector employees. *Public Personnel Management* **27**(4): 515-527.

Kasser, T., Davey, J., Ryan, R. M. (1992). Motivation and employee-supervisor discrepancies in a psychiatric vocational rehabilitation setting. *Rehabilitation Psychology* **37**: 175-187.

Katz, R. (1978). Job longevity as a situational factor in job satisfaction. *Administrative Science Quarterly* **23**: 204-223.

Katz, R. (1980). Time and work: Toward an integrative perspective. In B. M. Staw, Cummings, L. L. (Ed.), *Research in Organizational Settings* (Vol. 2). Greenwich, Conn.: JAI Press.

Katz, R. (1998). Motivation leads to innovation. *Information Week* **700**: 294.

Katz, R. (2003). Organizational Socialization and the Reduction of Uncertainty. In R. Katz (Ed.), *The Human Side of Managing Technological Innovation* (2nd ed.). New York: Oxford University Press.

Katz, R. (2005). Motivating technical professionals today. *Research Technology Management* **48**(6): 19.

Kearns, J. L. (1973). *Stress in Industry*. London: Priory Press.

Kessler, R. C., Price, R. H., Wortman, C. B. (1985). Social factors in psychopathology: Stress, social support and coping processes. *Annual Review of Psychology* **36**: 531-572.

Keys, A., Brozek, J., Henschel, A., Mickelsen, O., Taylor, H. (1950). *The biology of human starvation*. Minneapolis: University of Minnesota Press.

Kidder, L. H., Judd, C. M. (1986). *Research Methods in Social Relations* (5th ed.). New York: Holt, Rinehart and Winston.

Kipnis, D. (1974). The Powerholder. In J. T. Tedeschi (Ed.), *Perspectives in Social Power* (pp. 82-123). Chicago: Aldine.

Klein, H. J. (1989). An Integrated Control Theory Model of Work Motivation. *Academy of Management Review* **14**.

Kleinginna, P. R. J., Kleinginna, A. M. (1981). A categorised list of motivation and definitions, with a suggestion for a consensual definition. *Motivation and Emotions* **5**: 263-291.

Koch, S. (1956). Behavior as 'Intrinsically' Regulated: Work Notes Towards a Pre-Theory of Phenomena Called 'Motivational'. In M. R. Jones (Ed.), *Nebraska Symposium on Motivation*. Lincoln: University of Nebraska Press.

- Komaki, J. (1982). Managerial effectiveness: Potential contributors of the behavioral approach. *Journal of Organizational Behavior Management* **3**: 71-83.
- Kondo, Y. (1996). Are Creative Ability and Work Standardization in Contradictory Relationship. *Training for Quality* **4**(3): 35-39.
- Koningsveld, E. A. P., Mossink, J. C. M. (2004). *Occupational Safety and Health Report*. Netherlands: Ministry of Social Affairs and Employment.
- Kopelman, R. E. (1977). Across-individual, within-individual and return on effort versions of expectancy theory. *Decisions Sciences* **8**: 651-662.
- Korman, A. K. (1970). Toward a hypothesis of work behaviour. *Journal of Applied Psychology* **54**: 31-41.
- Korman, A. K. (1976). Hypothesis of work behaviour revisited and an extension. *Academy of Management Review* **1**: 50-63.
- Kunda, G., Barley, S., Evans, J. (2002). Why do contractors contract? The experience of highly skilled technical professionals in a contingent labour market. *Industrial and Labour Relations Review* **55**(2): 234-261.
- Kyriacou, C., Sutcliffe. (1978). Teacher stress: prevalent sources and symptoms. *British Journal of Educational Psychology* **48**: 159-167.
- Lam, W., Haung, Xu., Snape, E. (2007). Feedback-Seeking Behaviour and Leader-Member Exchange: Do Supervisor-Attributed Motives Matter? *The Academy of Management Journal* **50**(2): 348-363.
- Landeweerd, L. A., Boumans, N. P. G. (1994). The effect of work dimensions and need for autonomy on nurses' work satisfaction and health. *Journal of Occupational and Organizational Psychology* **67**: 207-217.
- Landy, F. J., Becker, W. S. (1987). Motivation theory reconsidered. *Research in Organizational Behaviour* **9**: 1-38.
- Lane, I. M., Messe, L. A. (1972). Distribution of insufficient, sufficient, and over-sufficient rewards: A clarification of equity theory. *Journal of Personality and Social Psychology* **21**(2): 228-233.
- Lane, I. M., Messe, L. A. (1971). Equity and the distribution of rewards. *Journal of Personality and Social Psychology* **20**: 1-17.
- Langfred, C. W., Moye, N. A. (2004). Effects of Task Autonomy on Performance: An Extended Model Considering Motivational, Informational, and Structural Mechanisms. *Journal of Applied Psychology* **89**(6): 934-945.

- Larson, L. (2004). Internal auditors and job stress. *Managerial Auditing Journal* **19**(9): 1119-1130.
- Latack, J. C., Kinicki, A., Prussia, G. E. (1995). An integrative process model of coping with job loss. *Academy of Management Review* **20**(2): 311-342.
- Latham, G. P., Baldes, J. J. (1975). The 'practical significance' of Locke's theory of goal setting. *Journal of Applied Psychology* **60**(1): 122-124.
- Latham, G. P., Kinne, S. B. (1974). Improving job performance through training in goal setting. *Journal of Applied Psychology* **59**: 187-191.
- Latham, G. P., Saari, L. M. (1979). Importance of Supportive Relationships in Goal Setting. *Journal of Applied Psychology* **64**(2): 151-156.
- Latham, G. P., Yukl, G. A. (1975). A review of research on the application of goal setting in organizations. *Academy of Management Journal* **18**: 824-845.
- Latham, G. P., Yukl, G. A. (1976). Effects of Assigned and Participative Goal Setting on Performance and Job Satisfaction. *Journal of Applied Psychology* **61**(2): 166-171.
- Laughlin, A. (1984). Teacher stress in an Australian setting: the role of biographical mediators. *Education Studies* **101**: 7-22.
- Lawler, E. E. (1966). Ability as a moderator of the relationship between job attitudes and job performance. *Personnel Psychology* **19**: 153-164.
- Lawler, E. E. (1968). Effects of hourly overpayment on productivity and work quality. *Journal of Personnel and Social Psychology* **10**: 306-313.
- Lawler, E. E. (1973). *Motivation in Work Organizations*. California: Brooks/Cole.
- Lawler, E. E., Suttle, J. L. (1972). A causal correlational test of the need hierarchy concept. *Organizational Behaviour and Human Performance* **7**: 265-287.
- Lazarsfeld, P. F. (1958). Evidence and inference in social research. *Daedalus* **87**(4): 99-130.
- Lazarus, R. S. (1966). *Psychological stress and the coping process*. New York: McGraw-Hill.
- Lazarus, R. S. (1976). *Patterns of Adjustment* (3rd ed.). New York: McGraw-Hill.
- Lazarus, R. S. (1990). Theory-based stress measurement. *Psychological Inquiry* **1**: 3-13.

Lazarus, R. S. (1991a). Psychological stress in the workplace. *Journal of Social Behaviour and Analysis* **6**: 1-13.

Lazarus, R. S. (1991b). *Emotion and adaptation*. New York: Oxford University Press.

Lazarus, R. S., Folkman, S. (1984). *Stress, Appraisal, and Coping*. New York: Springer.

Lazarus, R. S., Folkman, S. (1986). Cognitive theories of stress and the issue of circularity. In M. H. Appley, Trumbull, R. (Ed.), *Dynamics of stress: Physiological, psychological and social perspectives* (pp. 63-79). New York: Plenum Press.

Lazarus, R. S., Folkman, S. (1987). Transactional theory and research on emotions and coping. *European Journal of Personality* **1**: 141-169.

Lazarus, R. S., Launier, R. (1978). Stress related transactions between person and environment. In L. A. Pervin, Lewis, M. (Ed.), *Perspectives on International Psychology*. New York: Plenum.

Le Fevre, M., Kolt, G. S., Matheny, J. (2006). Eustress, distress and their interpretation in primary and secondary occupational stress management interventions: which way first? *Journal of Managerial Psychology* **21**(6): 547-565.

Lee, D. M. S., Katz, R. (1992). Guest editorial special issue on managing technical professionals. *IEEE Transactions on Engineering Management* **39**(3): 210.

LeFevre, M., Matheny, J., Kolt, G. S. (2003). Eustress, distress and interpretation in occupational stress. *Journal of Managerial Psychology* **18**: 726-744.

Leventhal, G. S., Michaels, J. W. (1969). Extending the equity model: Perceptions of inputs and allocation of reward as a function of duration and quantity of performance. *Journal of Personality and Social Psychology* **12**: 303-309.

Leventhal, H., Tomarken, A. (1987). Stress and illness: Perspectives from health psychology. In S. V. Kasl, Cooper, C. L. (Ed.), *Stress and illness: Perspectives from health psychology* (pp. 27-55). New York: Wiley and Sons.

Levin, R., Chein, I., Murphy, G. (1942). The relation of the intensity of the need to the amount of perceptual distortion: A preliminary report. *Journal of Psychology* **13**: 283-293.

Lewin, K. (1938). *The conceptual representation and the measurement of psychological force*. Durnham, N.C.: Duke University Press.

Likert, R. (1961). *New Patterns of Management*. New York: McGraw-Hill.

Likert, R. (1967). *The human organization: Its management and value*. New York: McGraw-Hill.

Lim, V., Teo, T. (1999). Occupational stress and IT personnel in Singapore: Factorial dimensions and differential effects. *International Journal of Information Management* **19**(4): 277-291.

Lindsay, C. A., Marks, E., Gorlow, L. (1967). The Herzberg Theory: A Critique and Reformulation. *Journal of Applied Psychology* **51**: 330-339.

Locke, E. A. (1968). Toward a theory of task motivation and incentives. *Organizational Behaviour and Human Performance* **3**: 157-189.

Locke, E. A. (1970). Job satisfaction and job performance: A theoretical analysis. *Organizational Behaviour and Human Performance* **5**: 484-500.

Locke, E. A. (1975). Personnel attitudes and motivation. *Annual Review of Psychology* **26**: 457-480.

Locke, E. A. (1976). The nature and causes of job satisfaction. In M. D. Dunnette (Ed.), *Handbook of industrial and organizational psychology* (pp. 1297-1349). Chicago: Rand McNally.

Locke, E. A. (1991). The motivation sequence, the motivation hub, and the motivation core. *Organizational Behaviour and Human Decision Processes* **50**: 288-299.

Locke, E. A. (1997). The motivation to work: What we know. In M. L. Maehr, Pintrich, P. R. (Ed.), *Advances in motivation and achievement* (Vol. 10, pp. 375-412). Greenwich, CT: JAI Press.

Locke, E. A., Bryan, J. F. (1969b). Knowledge of score and goal level as determinants of work rate. *Journal of Applied Psychology* **53**: 59-65.

Locke, E. A., Bryan, J. F. (1969a). The directing function of goals in task performance. *Organizational Behaviour and Human Performance* **4**: 35-42.

Locke, E. A., Cartledge, N., Kneer, C. S. (1970). Studies of the relationship between satisfaction, goal-setting, and performance. *Organizational Behaviour and Human Performance* **5**: 135-158.

Locke, E. A., Cartledge, N., Koeppel, J. (1968). The motivational effects of knowledge of results: A goal-setting phenomenon? *Psychological Bulletin* **70**: 474-485.

Locke, E. A., Latham, G. P. (1990). *A theory of goal setting and task performance*. Upper Saddle River, New Jersey.: Prentice-Hall.

Locke, E. A., Latham, G. P. (2002). Building a practically useful theory of goal setting and task motivation: A 35-year odyssey. *American Psychologist* **57**: 705-717.

Locke, E. A., Latham, G. P. (1984). *Goal Setting: A motivational technique that works*. Englewood, New Jersey: Prentice-Hall.

Locke, E. A., Latham, G. P. (2004). What should we do about motivation theory? Six recommendations for the twenty-first century. *Academy of Management Journal* **29**(3): 388-403.

London, M., Smither, J. W. (1999). Empowered self-development and continuous learning. *Human Resource Management* **38**(1): 3-15.

Longenecker, C. O., Schaffer, C. J., Scazzero, J. A. (1999). Cause and Consequences of Stress in the IT Profession. *Information Systems Management* **16**(3): 71-80.

Loscosso, K. A., Spitze, G. (1990). Working conditions, social support and the well-being of female and male factory workers. *Journal of Health and Social Behavior*(31): 313-327.

Louis, M. R. (1980). Surprise and sense making: what newcomers experience in entering unfamiliar organizational settings. *Administrative Science Quarterly* **25**: 226-251.

Love, P. E. D., Edwards, D. J. (2005). Taking the pulse of U.K. construction project managers' health: influence of job demands, job control and social support on psychological well-being. *Construction, and Architectural Management* **12**(1): 88-101.

Love, P. E. D., Irani, Z. (2007). Coping and psychological adjustment among information technology personnel. *Industrial Management and Data Systems* **107**(6): 824-844.

Lu, L. (1999). Work Motivation, Job Stress and Employees' Well-Being. *Journal of Applied Management Studies* **8**(1): 61-72.

Lussier, R. N. (2002). *Human Relations in Organizations: Applications and Skill Building* (5th ed.). New York: McGraw-Hill.

Luthans, F. (1998). *Organizational Behaviour*. Singapore: McGraw-Hill.

Magnusson, D. (1982). Interaktionales Modell des verhaltens. In H. N. Horjert (Ed.), *Person und Situation Interaktions Psychologische. Untersuchungen*. Gotigen.: Vorlag fur psychologie Hogreje.

Maidani, E. A. (1991). Comparative study of Herzberg's two-factor theory of job satisfaction among public and private sectors. *Personnel Management* **20**(4): 441-448.

Mansfield, R. (1972). The initiation of graduates in industry. *Human Relations* **25**: 77-86.

Marvel, M. R., Griffin, A., Hebda, J., Vojak, B. (2007). Examining the Technical Corporate Entrepreneurs' Motivation: Voices from the Field. *Entrepreneurship Theory and Practice*: 753-768.

Marx, M. B., Garrity, T. F., Bowers, F. R. (1975). The influence of recent life experience on the health of college freshman. *Journal of Psychosomatic Research* **19**: 87-98.

Maslach, C., Schaufeli, W. B., Leiter, M. P. (2001). Job Burnout. *Annual Review of Psychology* **52**: 397-422.

Maslow, A. H. (1943). A theory of human motivation. *Psychological Review* **50**: 370-397.

Maslow, A. H. (1954). *Motivation and Personality*. New York: Harper and Row.

Maslow, A. H. (1955). *Deficiency motivation and growth motivation*. Lincoln: University of Nebraska Press.

Maslow, A. H. (1968). *Toward a theory of being*. New York: Van Nostrand Reinhold.

Maslow, A. H. (1970). *Motivation and Personality* (3 ed.). New York: Harper Collins Publishers.

Mason, J. (1996). *Qualitative Researching*. England: SAGE Publications Ltd.

Mason, J. W. (1968). A review of psychoendocrine research on pituitary-adrenal cortical system. *Psychosomatic Medicine* **30**: 576-607.

Mason, J. W. (1971). A re-evaluation of the concept of "Non-Specificity" in stress theory. *Journal of Psychiatric Research* **8**: 323-333.

Mason, J. W. (1975). A historical view of the stress field. *Journal of Human Stress* **1**(6-12, 22-36).



Matteson, M. T., Ivancevich, J. M. (1987). *Controlling Work Stress: Effective Human Resource and Management Strategies*. San Francisco, California: Jossey-Bass.

Maudgalya, T., Wallace, S., Daraiseh, N., Salem, S. (2006). Workplace stress factors and 'burnout' among information technology professionals: a systematic review. *Theoretical Issues in Ergonomics Science* **7**(3): 285-297.

Mays, N., Pope, C. (1995). Researching the parts that other methods cannot reach; an introduction to qualitative methods in health and health services research. *British Medical Journal* **311**: 42-45.

McClelland, D. C. (1961). *The Achieving Society*. Princeton, New Jersey: Van Nostrand.

McClelland, D. C. (1967). The Urge to Achieve. *New Society* **229**: 229.

McClelland, D. C. (1987). *Human Motivation*. New York: Cambridge University Press.

McClelland, D. C., Atkinson, J. W., Clark, R. A., Lowell, E. L. (1953). *The Achievement Motive*. New York: Appleton-Century-Crofts.

McClelland, D. C., Burnham, D. H. (1976). Power is the great motivator. *Harvard Business Review* **54**(2): 100-110.

McClelland, D. C., Winter, D. (1969). *Motivating Economic Achievement*. New York: Free Press.

McDonald, L. M., Korabik, K. (1991). Sources of stress and ways of coping among male and female managers. In P. L. Perrewe (Ed.), *Handbook on Job Stress* (pp. 185-199). New York: Select Press.

McGrath, J. E. (1970). A conceptual formulation for research on stress. In J. E. McGrath (Ed.), *Social and Psychological Factors in Stress*. New York: Holt, Rinehart and Winston, Inc.

McGrath, J. E. (1976). Stress and behaviour in organisations. In M. D. Dunnette (Ed.), *Handbook of Industrial and Organisational Psychology*. Chicago: Rand-McNally College Publishing Co.

McGrath, J. E., Martin, J., Kulka, R. A. (1982). *Judgements Calls in Research*. London: Sage.

McGregor, D. (1960). *The human side of enterprise*. New York: McGraw-Hill.

- McHugh, M. (1993). Stress at Work: Do Managers Really Count the Costs? *Employee Relations* **15**(1): 18-32.
- McMeekin, A., Coombs, R. (1999). Human Resources Management and the Motivation of Technical Professionals. *International Journal of Innovation Management* **3**(1): 1-26.
- McNally, A. (2007). *SFA Absenteeism Report 2007*. Dublin: Small Firms Association.
- McNamara, S. (2000). *Stress in Young People: What's New and What Can We Do?* London: Continuum.
- Mechanic, D., Greenley, J. R. (1976). The prevalence of psychological distress and help seeking in a college student population. *Social Psychiatry* **11**: 1-14.
- Meyer, A. (1951). The life chart and the obligation of specifying positive data in psychopathological diagnosis. In E. E. Winters (Ed.), *The Collected Papers of Adolf Meyers*. Baltimore: John Hopkins Press.
- Meyer, A. (1958). *Psychobiology: A Science of Man*. Springfield, Illinois: Charles Thomas.
- Meyer, J. P., Vandenberghe, C., Becker, T. E. (2004). Employee Commitment and Motivation: A Conceptual Analysis and Integrative Model. *Journal of Applied Psychology* **89**(6): 911-1007.
- Meyers, M. S. (1964). Who are your motivated workers. *Harvard Business Review* **42**: 73-88.
- Meyers, M. S. (1992). Technology Today and Tomorrow: Motivating High Tech Workers. *Best's Review* **93**: 64-88.
- Middlemist, R. D., Peterson, R. B. (1976). Test of Equity Theory by Controlling for Comparison Co-workers' Efforts. *Organizational Behaviour and Human Performance* **15**: 335-354.
- Mikhail, A. (1981). Stress: A psychophysiological conception. *Journal of Human Stress* **7**: 9-15.
- Miles, M. B., Huberman, A. M. (1994). *Qualitative Data Analysis* (2 ed.). Thousand Oaks, C.A.: Sage Publications.
- Miller, S. I., Fredericks, M. (1991). Some notes on the nature of methodological indeterminacy. *Synthese* **88**: 359-378.

- Miner, J. B. (1965). *Studies in Management Education*. New York: Springer.
- Miner, J. B. (1980). *Theories of organizational behaviour*. Hinsdale: Dryden Press.
- Miner, J. B. (1992). *Industrial/Organizational Psychology*. New York: McGraw-Hill.
- Miner, J. B. (2003). Organizational behaviour theories: A quantitative review. *Academy of Management Learning and Education* **2**: 250-268.
- Miner, J. B., Dachler, H. P. (1973). Personnel attitudes and motivation. *Annual Review of Psychology* **24**: 379-402.
- Mitchell, T. R. (1974). Expectancy models of satisfaction, occupational preference and effort: A theoretical methodological and empirical appraisal. *Psychological Bulletin* **81**: 1053-1077.
- Mitchell, T. R. (1982). Motivation: new directions for theory, research and practice. *Academy of Management Review* **7**(1): 80-88.
- Mitchell, T. R., Albright, D. W. (1972). Expectancy theory predictions of satisfaction, effort, performance, and retention of naval officers. *Organizational Behaviour and Human Performance* **8**: 1-20.
- Mitchell, V. F., Moudgill, P. (1976). Measurement of Maslow's Need Hierarchy. *Organizational Behaviour and Human Performance* **16**: 334-349.
- Mobley, W. H. (1971). *An Inter-organizational Test of a Task-Goal Expectancy Model of Work Motivation and Performance*. University of Maryland, College Park.
- Mobley, W. H. (1982). *Employee turnover: Causes, consequences, and control*. Reading, Mass: Addison-Wesley.
- Mobley, W. H., Griffeth, R. W., Hand, H. H., Meglino, B. M. (1979). Review and conceptual analysis of the employee turnover process. *Psychological Bulletin* **86**: 493-522.
- Moccia, P. (1998). A critique of compromise: beyond the methods of debate. *Advances in Nursing Science* **10**(4): 1-9.
- Mohr, G. B. (2000). The changing significance of different stressors after bankruptcy: a longitudinal investigation with special emphasis on job insecurity. *Journal of Organizational Behaviour* **21**(3): 337-359.

- Monk, E. L. (1996). *Student mental health: a study of the relationship between stressors and the mental health of students*. Unpublished Ph.D., Glasgow Caledonian.
- Monroe, S. M. (1983). Major and minor life events as predictors of psychological distress: Further issues and findings. *Journal of Behavioural Medicine* **6**: 189-205.
- Moore, J. E. (2000). One road to turnover: An examination of worker exhaustion in technology professionals. *MIS Quarterly* **24**(1): 141-168.
- Morgan, C. D., Murray, H. H. (1935). A method for investigating fantasies: the thematic appreciation test. *Archives of Neurology and Psychiatry* **34**: 289-306.
- Morley, M., Moore, S., Hearty, N., and Gunnigle, P. (1998). *Principles of Organisational Behaviour: An Irish Text*. Dublin: Gill and Macmillan Ltd.
- Morrison, D., Cordery, J., Girardi, A., Payne, P. (2005). Job design, opportunities for skill utilization, and intrinsic job satisfaction. *European Journal of Work and Organizational Psychology* **14**(1): 59-79.
- Mortimer, J. T., Lorence, J. (1979). Work experience and occupational value socialisation: A longitudinal study. *American Journal of Sociology* **84**: 1361-1385.
- Moser, C. A., Kalton, G. (1979). *Survey Methods in Social Investigation*. London: Gower Publishing.
- Motowidlo, S., Packard, J., Manning, M. (1986). Occupational stress: Its causes and consequences for job performance. *Journal of Applied Psychology* **71**: 618-629.
- Mumford, E. (1972). *Job Satisfaction. A study of Computer Specialists*. London: Longman.
- Murray, H. A. (1938). *Explorations in Personality*. New York: Oxford University Press.
- Nachmias, C., Nachmias, D. (1996). *Research Methodology in Social Sciences* (5 ed.). London: Edwards Arnolds.
- Nalepka, C. D. (1985). *Job satisfaction among nurses in hospitals having collective bargaining in the State of Ohio*. The University of Akron, Akron, Ohio.
- Narayanan, L., Menon, S., Spector, P. (1999). Stress in the workplace: A comparison of gender and occupations. *Journal of Organisational Behaviour* **20**: 63-74.
- Nelson, B. (2004). Formal Recognition Programs do not Work. *Industrial and Commercial Training* **36**(6): 243-246.

- Newman, C. W. (1948). *The Influence of Dissatisfaction upon what workers want in their jobs*. Unpublished Master's Thesis, Stanford University.
- Newtown, T. (1989). Occupational stress and coping with stress: A critique. *Human Relations* **42**: 441-461.
- Newtown, T. (1995). *Managing Stress: Emotion and Power at Work*. London: Sage.
- Nohria, N., Berkley, J. D. (1994). Whatever happened to the take-charge manager? *Harvard Business Review*: 128-137.
- Novacek, J., Lazarus, R. (1990). The structure of personal commitments. *Journal of Personality* **58**: 693-715.
- Nutty, B. (2006). *An Empirical Investigation of the Relationship between Part-Time Employment and Third Level Student Stress*. Unpublished Ph.D., University of Ulster.
- O'Bryan, B. B., Pick, R. A. (1995). Keeping information systems staff (happy). *International Journal of Career Management* **7**(2): 17-20.
- O'Malley, M. (2000). *Creating Commitment: How to attract and retain talented employees by building relationships that last*. New York: Wiley and Sons, Inc.
- O'Neil, B., Mone, M. (1998). Investigating equity sensitivity as a moderator of relations between self-efficacy and workplace attitudes. *Journal of Psychology* **83**: 805-816.
- Oppenheim, A. N. (1994). *Questionnaire Design, Interviewing and Attitude Measurement*. London: Pinter Publishers.
- Orpen, C. (1994). Interactive Effects of Work Motivation and Personal Control on Employee Job Performance and Satisfaction. *The Journal of Social Psychology* **134**(6): 855-856.
- Ouellette, S. (1997). Hardiness. In J. M. Stellman (Ed.), *ILO Encyclopaedia of Occupational Health and Safety* (Vol. 34, pp. 42-43). Geneva, Switzerland: International Labour Office and Chicago: Rand McNally.
- Parahoo, A. K. (1997). *Nursing Research, Principles, Process, and Issues*. London: MacMillan.
- Parker, L. D., Ritson, P. (2005). Fads, stereotypes and management gurus: Fayol and Follett today. *Management Decision* **43**(10): 1335-1357.

- Parrot, J. (1971). The measurement of stress and strain. In W. T. Stingleton, Fox, J. G., Whitfield, D. (Ed.), *Measurement of Man at Work*. London: Taylor and Francis.
- Paykel, E. S., Prusoff, B. A., Uhlenhuth, E. H. (1971). Scaling of life events. *Archives of General Psychiatry* **25**: 340-347.
- Payle, J. F. (1995). Humanism and positivism in nursing. *Journal of Advanced Nursing* **22**: 979-984.
- Payne, R. L. (1970). Factor analysis of a Maslow-type need satisfaction questionnaire. *Personnel Psychology* **23**: 251-268.
- Payne, R. L. (2000). Eupsychian management and the millennium. *Journal of Managerial Psychology* **15**: 219-226.
- Payne, S. (1951). *The Art of Asking Questions*. Princeton, N.J.: Princeton University Press.
- Pazy, A. (1994). Cognitive schemata of professional obsolescence. *Human Relations* **47**(10): 1167-1199.
- Peak, H. (1955). Attitude and Motivation. In M. R. Jones (Ed.), *Nebraska Symposium on Motivation* (Vol. 3, pp. 149-188). Lincoln: University of Nebraska Press.
- Peak, H. (1960). The effect of aroused motivation on attitudes. *Journal of Abnormal and Social Psychology* **61**: 463-468.
- Pearson, C. A. L., Chong, J. (1997). Contributions of job content and social information on organizational commitment and job satisfaction: An exploration in Malaysian nursing context. *Journal of Occupational and Organizational Psychology* **70**(4): 357-374.
- Peel, S., Boxall, P. (2005). When is Contracting Preferable to Employment? An Exploration of Management and Worker Perspectives. *Journal of Management Studies* **42**(8): 1675-1697.
- Pelletier, L. G. (1996). Supervisor beliefs and subordinates. *Journal of Personality and Social Psychology* **71**(2): 331-340.
- Pennebaker, J. (2000). *Opening Up: The healing power of confiding in others*. New York: Morrow.
- Perlin, L. J., Schooler, C. (1978). The structure of coping. *Journal of Health and Social Behaviour* **19**(3): 2-21.

- Peters, T. (1997). Setting goals for employees. *Incentive* **171**(5): 61-62.
- Peterson, R. A. (1982). *Marketing Research*. Plano, Texas: Business Publications, Inc.
- Petroni, A. (2000). Myths and misconceptions in current engineers' management practices. *Team Performance Management: An International Journal* **6**(1/2): 15-24.
- Philips, D. (1990). Post-positivistic science myths and realities. In E. Guba (Ed.), *The Paradigm Dialog*. Newbury Park: Sage.
- Pierce, J. L., Gardner, D. G., Dunham, R. B., Cummings, L. L. (1993). Moderation by organization based self-esteem of role condition-employee response relationships. *Academy of Management Journal* **36**: 271-288.
- Pinder, C. C. (1998). *Work Motivation and Organizational Behaviour*. Upper Saddle River, N.J.: Prentice-Hall.
- Pines, A. M. (1993). *An Existential Perspective*. Washington D.C.: Taylor and Francis.
- Polit, D. F., Beck, C. T., Hungler, B. P. (2001). *Essentials of Nursing Research: Methods, Appraisal and Utilisation*. Philadelphia: Lippincott.
- Pollock, K. (1988). On the nature of social stress: production of modern mythology. *Social Science and Medicine* **26**: 381-392.
- Popper, K. (1959). *The Logic of Scientific Discovery*. London: Hutchinson.
- Porter, L. W., Lawler, E. E. (1968). *Managerial Attitudes and Performance*. Homewood, Illinois: Richard D. Irwin Inc.
- Poulton, E. (1978). Blue collar stressors. In C. Cooper, Payne, R. (Ed.), *Stress at work*. New York: Wiley.
- Pritchard, R. D. (1969). Equity theory: A review and critique. *Organizational Behaviour and Human Performance* **4**: 176-211.
- Pritchard, R. D., Curtis, M. L. (1973). The influence of goal setting and financial incentives of task performance. *Organizational Behaviour and Human Performance* **10**: 175-183.
- Probst, T. M. (2000). Wedded to the job: moderating effects of job involvement on the consequences of job insecurity. *Journal of Occupational Health Psychology* **5**(1): 63-73.

Proctor, J. L. (1993). *Occupational Stress Among Primary Teachers: Individuals in Organizations*. Unpublished Ph.D., University of Aberdeen.

Quick, J. C., Joplin, J. R., Nelson, D. L., Mangelsdorff, A. D., Fiedler, E. (1996). Self reliance and military service training outcomes. *Journal of Military Psychology* **8**: 279-293.

Rahe, R. H. (1969). Life crisis and health change. In P. R. May, Winterborn, J. R. (Ed.), *Psychotropic drug response: Advances in prediction* (pp. 92-125). Springfield, Illinois: Charles C. Thomas.

Rahe, R. H. (1974). The pathway between subjects' recent life changes and their near-future illness reports: Representative results and methodological issues. In B. S. Dohrenwend, Dohrenwend, B. P. (Ed.), *Stressful Life Events*. New York: John Wiley and Sons.

Rainbird, H. (1991). The self-employed: small entrepreneurs or disguised wage labourers? In A. Pollert (Ed.), *Farewell to Flexibility* (pp. 200-214). Oxford: Basil Blackwell.

Rainey, H. G. (1982). Reward preferences among public and private managers: In search of the service ethic. *American Review of Public Administration* **16**(4): 288-302.

Raudsepp, E. (1980). Managing and Motivating Technical Professionals. *Manage* **32**: 28-30.

Raudsepp, E. (1989). How engineers get ahead and avoid obsolesce. *Machine Design*(January): 107-111.

Rauthankoon, R., Ogunlana, O. S. (2003). Testing Herzberg's two-factor theory in the Thai construction industry. *Engineering, Construction and Architectural Management* **10**: 333-341.

Reichardt, C. S., Cook, T. D. (1979). Beyond qualitative versus quantitative methods. In T. D. Cook, Reichardt, C. S. (Ed.), *Quantitative methods in evaluation research* (pp. 7-32). Beverly Hills, C.A: Sage.

Reilly, R. R., Smither, J. W., Vasilopoulos, N. L. (1996). A longitudinal study of upward feedback. *Personnel Psychology* **49**: 599-612.

Rioli, L., Savicki, V. (2003). Information system organizational resilience. *Omega, The International Journal of Management Science* **31**(227-233).

Ritchie, J., Lewis, E. (2003). *Qualitative Research Practice: A Guide for Social Science Students and Researchers*. Thousand Oaks, California: Sage.



- Robbins, S. P. (1993). *Organizational Behaviour* (6 ed.). Englewood Cliffs, New Jersey: Prentice-Hall.
- Robbins, S. P. (1998). *Organizational Behaviour: Concepts, Controversies, Applications*. Upper Saddle River, New Jersey: Prentice-Hall.
- Roberts, K. H., Walter, G. A., Miles, R. E. (1971). A factor analytic study of job satisfaction items designed to measure Maslow's need categories. *Personnel Psychology* **24**: 205-220.
- Robson, C. (1995). *Real World Research*. Oxford, U.K.: Blackwell Publishing.
- Robson, C. (2002). *Real World Research* (2 ed.). Oxford: Blackwell Publishing.
- Rollinson, D., Broadfield, A. (2002). *Organisational Behaviour and Analysis: An Integrated Approach* (2 ed.). Harlow: Prentice-Hall.
- Ronan, W. W., Latham, G. P., Kinne, S. P. (1973). Effects of Goal Setting and Supervision on Worker Behaviour in an Industrial Situation. *Journal of Applied Psychology* **58**: 302-307.
- Roskies, E., Louis-Guerin, C. (1990). Job insecurity in managers: antecedents and consequences. *Journal of Organizational Behaviour* **11**: 345-359.
- Roskies, E., Louis-Guerin, C., Fournier, C. (1993). Coping with job insecurity: How does personality make a difference? *Journal of Organizational Behavior* **14**(617-630).
- Ross, M., Thibaut, J., Evenbeck, S. (1971). Some determinants of the intensity of social protest. *Journal of Experimental Social Psychology* **7**: 401-418.
- Rotter, J. B. (1955). The role of psychological situation in determining the direction of human behaviour. In M. R. Jones (Ed.), *Nebraska Symposium on Motivation* (pp. 245-268). Lincoln: University of Nebraska Press.
- Rowan, J. (1998). Maslow amended. *Journal of Humanistic Psychology* **28**: 81-92.
- Ruthankoon, R., Ogunlana, O. S. (2003). Testing Herzberg's Two-Factor theory in the Thai construction industry. *Engineering, Construction and Architectural Management* **10**: 333-341.
- Ryan, F. (2000). *Organisational Commitment and Withdrawal Behaviour: A comparative analysis of full and part-time lecturing staff*. Waterford Institute of Technology.

- Ryan, T. A. (1970). *Intentional Behaviour: An Approach to Human Motivation*. New York: Ronald.
- Sarafino, E. P. (1990). *Health Psychology: Biopsychosocial Interactions*. New York: Wiley.
- Savery, L. K. (1987). Effects of Motivators on Job Satisfaction. *Journal of Managerial Psychology* **2**(3): 28-31.
- Savery, L. K., Luks, J. A. (2001). The relationship between empowerment, job satisfaction and reported stress levels: some Australian evidence. *Leadership and Organizational Development Journal* **22**(3): 97-104.
- Sayles, L. R. (1958). *Behaviour of industrial work groups: Prediction and control*. New York: Wiley.
- Schaufeli, W. B., Enzmann, D. (1998). *The Burnout Comparison to Study and Practice, A Critical Analysis*. London: Taylor and Francis.
- Schein, E. H. (1965). *Organizational Psychology*. Englewood Cliffs, New Jersey: Prentice-Hall.
- Schein, E. H. (1971). The Individual, the Organization, and the Career. *Journal of Behavioural Science* **7**: 401-426.
- Schneider, B., Alderfer, C. P. (1973). Three studies of measures of need satisfaction in organizations. *Administrative Science Quarterly* **18**: 489-505.
- Schultz, D., Schultz, S. E. (2006). *Psychology and Work Today* (9 ed.). Upper Saddle River, New Jersey: Pearson Education.
- Schwab, D. P., Devitt, H. W., Cummings, L. L. (1971). A test of the adequacy of the two-factor theory as a predictor of self-report performance effects. *Personnel Psychology* **24**: 293-303.
- Seijts, G. H. (2001). Setting goals: When performance doesn't matter. *Ivey Business Journal* **65**(3): 40-45.
- Seligman, M. (1972). *Helplessness: On Depression, Development and Death*. San Francisco: Freeman and Company.
- Selye, H. (1946). The general adaptation syndrome and the diseases of adaptation. *Journal of Endocrinology and Metabolism* **2**: 117-130.
- Selye, H. (1950). *The Physiology and Pathology of Exposure to Stress*. Montreal: Acta.

- Selye, H. (1956). *The Stress of Life*. New York: McGraw-Hill.
- Selye, H. (1964). *From Dream to Discovery*. New York: McGraw-Hill.
- Selye, H. (1973). The evolution of the stress concept. *American Scientist* **61**: 692-699.
- Selye, H. (1974). *Stress without Distress*. London: Hodder and Stoughton.
- Selye, H. (1976). *The stress of life* (rev. ed.). New York: McGraw-Hill.
- Selye, H. (1980). *Selye's Guide to Stress Research*. New York: Van Nostrand Reinhold.
- Selye, H. (1982). History and present status of the stress concept. In L. Goldberger, Breznitz, S. (Ed.), *Handbook of Stress: Theoretical and Clinical Aspects*. New York: Free Press.
- Sethi, V., King, R. C., Campbell Quick, J. (2004). What causes stress in information system professionals? *Communications of the ACM* **47**(3): 99-102.
- Seymour, F., Buscherhof, J. (1991). Sources and consequences of satisfaction and dissatisfaction in nursing: Findings from a national sample. *International Journal of Nursing Studies* **28**: 109-124.
- Shenkar, O., von Glinow, M. A. (1994). Paradoxes of organisational theory and research: using the case of China to illustrate national contingency. *Management Science* **40**: 56-71.
- Sheridan, J. E., Slocum, J. W. Jr., Min, B. (1975). Motivational determinants of job performance. *Journal of Applied Psychology* **60**(1): 119-121.
- Sherif, M., Cantril, H. (1947). *The Psychology of ego-involvements: Social attitudes and identification*. New York: Wiley.
- Sias, P. M., Kramer, M. W., Jenkins, E. (1997). A comparison of the communication behaviours of temporary employees and new hires. *Communication Research* **24**(6): 731-754.
- Siegal, S., Fouraker, L. E. (1960). *Bargaining and group decision making*. New York: McGraw-Hill.
- Smith, L. J. (2003). *Evaluating the applicability of Maslow's theory of motivation to ancillary staff*. The University of Sheffield.
- Smith, M. J. (1998). *Social Science in Question*. London: Sage.

Smith, V. V. (1983). *A study of motivational factors contributing to job satisfaction for nurses: an examination of Herzberg's two-factor theory*. Unpublished Dissertation, Oklahoma State University, Oklahoma.

Smither, J. W., London, M., Vasilopoulous-Reilly, R. R., Millsap, R. E., Salvemini, N. (1995). An examination of the effects of an upward feedback program over time. *Personnel Psychology* **48**: 1-34.

Snygg, D., Combs, A. (1949). *Individual Behaviour: A New Frame of Reference for Psychology*. New York: Harper and Row.

Sonnentag, S., Brodbeck, F. C., Heinbokel, T., Stolte, W. (1994). Stressor-burnout relationship in software development teams. *Journal of Occupational and Organizational Psychology* **67**(4): 327-341.

Sorcher, M. (1967). *Motivating the hourly employee*. General Electric: Behavioural Research Service.

Sparks, K., Cooper, C., Fried, Y., Shirom, A. (1997). The effects of work hours on health: A meta-analytic review. *Journal of Occupational and Organizational Psychology* **70**: 391-408.

Stahl, S., Grim, C., Donald, C., Neikirk, A. (1975). A model for the social sciences and medicine: The case for hypertension. *Social Science and Medicine* **9**: 31-38.

Stavroula, L., Griffiths, A., Cox, T. (2003). *Work Organisation and Stress: Systematic Problem Approaches for Employers, Managers, and Trade Union Representatives*. Nottingham: Institute of Work, Health and Organisations.

Stedman's Pocket Medical Dictionary. (1993). London: Williams and Wilkins.

Stedry, A. C. (1960). *Budget control and cost behaviour*. Englewood Cliffs, New Jersey: Prentice-Hall.

Steers, R. M. (1977). Antecedents and outcomes of organizational commitment. *Administrative Science Quarterly* **22**(1): 46-56.

Steers, R. M., Black, J. S. (1994). *Organizational Behaviour* (5 ed.). New York: HarperCollins College.

Steers, R. M., Porter, L. W. (1991). *Motivation and Work Behaviour* (5 ed.). New York: McGraw-Hill.

Steers, R. M., Porter, L. W., Bigley, G. A. (1996). *Motivation and Leadership at Work* (6 ed.). New York: McGraw-Hill.

- Strain, C. R. (1999). Perceived autonomy, need for autonomy, and job performance in retail salespeople. *Journal of Social Behavior and Personality* **14**: 259-265.
- Strange, R. E., Brown, D. (1970). Home from the war: a study of psychiatric problems in Vietnam returnees. *American Journal of Psychiatry* **127**(4): 488-492.
- Strauss, M. (1973). A general systems theory approach to a theory of violence between family members. *Social Science Information* **12**: 105-125.
- Surtees, P. G., Ingham, J. C. (1980). Life stress and depressive outcome: Application of a dissipation model of life events. *Social Psychiatry* **15**: 21-31.
- Sutherland, V., Cooper, C. (1990). *Understanding Stress*. London: Chapman and Hall.
- Swap, W., Leonard, D., Shields, M., Abrams, L. (2001). Using mentoring and storytelling to transfer knowledge in the workplace. *Journal of Management Information Systems* **18**(1): 95-114.
- Talaq, J. (2004). *Antecedents and Consequences of Motivation: An examination of motivation as mediator to human and organisational performance*. University of Wolverhampton.
- Taylor, S. J., Bogdon, R. (1998). *Introduction to Qualitative Research* (3rd ed.). New Jersey: Wiley.
- Thacker, C. (1991). *The Development and Evaluation of a new scale to measure motivation*. Polytechnic South West.
- Theorell, T. (1974). Life events before and after the onset of a premature myocardial infarction. In B. S. Dohrenwend, Dohrenwend, B. P. (Ed.), *Stressful Life Events*. New York: John Wiley and Sons.
- Thong, J. Y. L., Yap, C. S. (2000). Information systems and occupational stress: A theoretical framework. *Omega* **28**(6): 681-692.
- Tolman, E. C. (1932). *Purposive behaviour in animals and men*. New York: Century.
- Tolman, E. C. (1959). Principles of purposive behaviour. In S. Kock (Ed.), *Psychology: A study of science* (Vol. 2, pp. 92-157). New York: McGraw Hill.
- Tornow, W. W. (1971). The development and application of an input-outcome moderator test on the perception and reduction of inequity. *Organizational Behaviour and Human Performance* **6**: 614-638.

Toterdell, P., Spelten, E., Smith, L., Barton, J., Folkard, S. (1995). Recovery from work shifts: How long does it take? *Journal of Applied Psychology* **80**: 43-57.

Tourangeau, R., Rips, L., Rasinski, K. (2000). *The Psychology of Survey Response*. Cambridge: Cambridge University Press.

Tsai, H. Y., Compeau, D., Haggerty, N. (2007). Of races to run and battles to be won: Technical skill updating, stress, and coping of I.T. professionals. *Human Resource Management Journal* **46**(3): 395-409.

Tyrrell, J. L. (1992). Sources of stress among psychology undergraduates. *The Irish Journal of Psychology* **13**(2): 184-192.

Tyrrell, J. L. (1994). *Factors Affecting Student Mental Health*. Unpublished Ph.D., Trinity College Dublin.

Valencia, J. P. (2005). *Experience and the Brand*: London Business School.

van der Hek, H., Plomp, H. N. (1997). Occupational stress management programmes - a practical overview of published effect studies. *Occupational Medicine* **47**: 133-141.

van der Klink, J. J. L., Blonk, R. W. B., Schene, A. H., van Dijk, F. J. H. (2001). The benefits of interventions for work-related stress. *American Journal of Public Health* **91**: 270.

Van Maanen, J., Schein, E. H. (1979). Towards a theory of organizational socialisation. In B. M. Staw (Ed.), *Research in Organizational Behaviour* (Vol. 1). Greenwich, Conn.: JAI Press.

Vasilaki, E. (1992). *Stress and Anxiety in Scottish and Greek High School Pupils*. Unpublished Ph.D., University of Dundee.

Veroff, J., Atkinson, J. W., Feld, S., Gurin, G. (1960). The use of thematic appreciation to assess motivation in a nationwide interview study. *Psychological Monographs*.

Vinokur, A., Selzer, M. L. (1975). Desirable versus undesirable life events: their relationship to stress and mental distress. *Journal of Personality and Social Psychology* **32**: 329-337.

Vivien, K. G. L., Thompson, S. H. T. (1996). Gender differences in occupational stress and coping strategies among IT personnel. *Women in Management Review* **11**(1): 30-28.

- Vossel, G. (1987). Stress conceptions in life events research: Towards a person centred perspective. *European Journal of Personality* **1**: 123-140.
- Vowler, J. (1995, January 19). Under pressure? (Survey of senior IT managers). *Computer Weekly*, 32-33.
- Vroom, V. H. (1964). *Work and Motivation*. New York: Wiley.
- Vroom, V. H. (1965). *Motivation in Management*. New York: American Foundation for Management Research, Inc.
- Vroom, V. H., Deci, E. L. (1970). *Management and motivation: selected readings*. Harmondsworth: Penguin.
- Vroom, V. H., Deci, E. L. (1992). *Management and Motivation* (2 ed.). London: Penguin.
- Wageman, R. (1995). Interdependence and group effectiveness. *Administrative Science Quarterly* **40**: 145-180.
- Wahba, M. A., Bridwell, L. G. (1976). Maslow Reconsidered: A Review of Research on the Need Hierarchy Theory. *Organizational Behaviour and Human Performance* **15**: 212-240.
- Wall, T. D., Kemp, N. J., Jackson, P. R., Clegg, C. W. (1986). Outcomes of autonomous workgroups: A long-term field experiment. *Academy of Management Journal* **29**: 280-304.
- Walster, E., Bercheid, E., Walster, G. W. (1976). New directions in equity research. In L. Berkowitz, Walster, E. (Ed.), *Advances in experimental social psychology* (Vol. 9, pp. 1-42). New York: Academic Press.
- Wanous, J. P., Keon, T. L., Latack, J. C. (1983). Expectancy theory and occupational/organizational choices: a review and test. *Organizational Behaviour and Human Performance* **32**(66-86).
- Warr, P., Wall, T. (1975). *Work and Well-being*. Harmondsworth, Middlesex: Penguin Books.
- Warshay, L. H. (1975). *The Current State of Sociological Theory: A Critical Interpretation*. New York: Macmillan.
- Webb, E. J., Campbell, D. T., Schwartz, R. D., Sechrest, L. (1966). *Unobtrusive Measures: Nonreactive Research in the Social Sciences*. Chicago: Rand McNally.

- Weick, K. E. (1966). The concept of equity in the perception of pay. *Administrative Science Quarterly* **11**: 414-439.
- Weick, K. E., Nasset, B. (1968). Preferences among forms of equity. *Organizational Behaviour and Human Performance* **3**: 400-416.
- Weiner, H. J., Akabas, S. H., Sommer, J. J. (1973). *Mental Health Care in the World of Work*. New York: Association Press.
- Werimount, P. F. (1966). Intrinsic and Extrinsic Factors in Job Satisfaction. *Journal of Applied Psychology* **1**: 41-50.
- Westman, M., Eden, D. (1996). The Inverted-U relationship Between Stress and Performance: A Field Study. *Work and Stress* **10**(2): 165-173.
- Westman, M., Eden, D. (1992). Excessive role demand and subsequent performance. *Journal of Organisational Behaviour* **13**: 519-529.
- Wheaton, B. (1983). Stress, personal coping resources and psychiatric symptoms: An investigation of interactive models. *Journal of Health and Social Behaviour* **24**: 208-229.
- Wheeler, A. R., Buckley, R. M. (2001). Examining the motivation process of temporary employees. *Journal of Managerial Psychology* **16**(5): 339-354.
- White, F. M., Locke, E. A. (1981). Perceived Determinants of High and Low Productivity in three Occupational Groups: A Critical Incident Study. *Journal of Management Studies* **18**: 375-387.
- Whitset, D. A., Winslow, E. K. (1967). An analysis of studies critical of the motivation-hygiene theory. *Personnel Psychology* **20**: 391-416.
- Whyte, W. F. (1984). *Learning from the Field: A Guide from Experience*. Beverly Hills, Calif.: Sage.
- Wiersma, U. J. (1992). The effects of extrinsic rewards in intrinsic motivation: a meta-analysis. *Journal of Occupational and Organizational Psychology* **65**(2): 101-114.
- Wiley, C. (1997). What motivates employees according to over 40 years of motivation surveys. *International Journal of Manpower* **18**(3): 263.
- Wofford, J. C. (1971). The Motivational bases of job satisfaction and job performance. *Personnel Psychology* **24**: 501-518.



Wolf, A. V. (1958). *Thirst: Psychology of the urge to drink and problems of water lack*. Springfield: Charles C. Thomas.

Wolf, M. G. (1970). Need Gratification theory: A theoretical reformulation of job satisfaction/dissatisfaction and job motivation. *Journal of Applied Psychology* **54**: 87-94.

Wolfe, S. G. (1986). Common and grave disorders identified with occupational stress. In S. G. Wolfe, Finestone, A. J. (Ed.), *Occupational Stress: Health and Performance at Work* (pp. 47-53). Littleton: PSG Publishing.

Wood, C. G., Lawler, E. E. (1970). Effects of piece-rate overpayment on productivity. *Journal of Applied Psychology* **54**: 234-238.

Woods, P. (1979). *The Divided School*. London: Routledge and Kegan Paul.

Wright, L. W. (1995). Qualitative International Management Research. In B. J. Punnett, Shenkar, O. (Ed.), *Handbook for International Management Research*. Oxford: Blackwell.

Wright, P. M. (1994). Goal setting and monetary incentives: Motivational tools that can work too well. *Compensation and Benefits* **26**(2): 41.

Wyatt, W. (2005). European Total Reward Survey 2005: Understanding what makes the real differences.

Yandrick, R., Freeman, M. (1996). *Behavioral Risk Management: How to Avoid Preventable Losses from Mental Health Problems in the Workplace*. San Francisco, C.A.: Jossey Bass Publishers.

Yeh, Q. J., Meng, K. L. (2001). Advancement intentions and job attitudes - a study on the career setting of high-tech engineers in Taiwan. *R&D Management* **31**(1): 51-62.

Yin, R. K. (1984). Case study research: Design and methods. *Applied Social Research Methods Series* **5**.

Young, D. (2002). Communication, workload balance keys to averting staff burnout. *Tech Republic*.

Yucelt, U. (1982). Job Satisfaction, Absenteeism, and Worker's Choice in the Turkish Industrial Sector. *The Journal of Psychology* **111**: 247-254.

Yukl, G. A. (1989). *Leadership in organizations*. Englewood Cliffs, N. J.: Prentice-Hall.

Zimmerman, M. (1983). Methodological issues in the assessment of life events: A review of issues and research. *Clinical Psychology Review* **3**: 339-370.

Zitzow, D. (1984). The college adjustment rating scale. *Journal of College Student Personnel* **25**(2): 160-164.

## **APPENDIX A**

### **Questionnaire Scales and Reliabilities**

## **Motivation Scale**

### **Intrinsic**

#### *Social:*

- Q2. I do things in which I have the opportunity to develop close friendships
- Q11. Working with a group is better than working alone
- Q20. I enjoy the relationships I have with other people at work
- Q27. I pay a good deal of attention to the feelings of others at work
- Q30. It's easy to talk to my boss about my job

#### *Skill Variety:*

- Q4. I do not have the authority to do challenging things at work
- Q13. The job requires me to use a number of complex high level skills
- Q22. I have the opportunity to use many skills at work

#### *Autonomy:*

- Q5. In my work assignments I try to be my own boss
- Q14. I have the authority to make decisions that improve the quality of my work
- Q23. There is little opportunity in my job for participation in the determination of methods, procedures and goals

#### *Advancement:*

- Q6. I try very hard to improve on my past performance
- Q15. Those who do well on the job stand a fair chance of being promoted
- Q24. In my organisation there is little opportunity for advancement

#### *Task Identity:*

- Q8. My job provides me with the chance to completely finish the piece of work I begin
- Q17. The job is arranged so that I do not have the chance to do an entire piece of work from beginning to end

## Extrinsic

### *Security:*

- Q1. I am satisfied with the level of employment security that my job offers me
- Q10. I do not make enough money from my job to live comfortably
- Q19. The fringe benefit program here gives me all the security I want

### *Fiscal Equity:*

- Q3. In my organisation people are rewarded according to their job performance and accomplishments
- Q12. I am paid fairly by my organisation for the work I perform
- Q21. I don't feel my efforts are rewarded the way they should be
- Q28. I am not satisfied with the amount of pay I get
- Q31. I am not satisfied with the benefits I receive

### *Recognition:*

- Q7. I do not feel the work I do is appreciated
- Q16. My boss takes account of my wishes and desires
- Q25. I do things for which my accomplishments are recognised
- Q29. My boss gives me credit when I do good work
- Q32. I do things that allow me to realise my full potential

### *Feedback:*

- Q9. I am involved in decisions that affect my work
- Q18. My boss regularly discusses my job performance with me
- Q26. In my organisation management do not willingly share information with employees

### *V.I.E. (Valence, Instrumentality and Expectancy):*

- Q33. In my organisation, if I work hard at my job I will do well
- Q34. In my organisation, if I do well at my job I will be rewarded
- Q35. If my organisation rewards me for the work I do, I will get the rewards I want

## Organisational Stress Sources Scale

### Intrinsic

#### *Social:*

- Q2. Concern about the impression I am making with co-workers
- Q11. Maintaining co-worker relationships
- Q17. Competition with colleagues
- Q23. Inadequate support in difficult situations
- Q27. Lack of respect from superiors
- Q31. Lack of respect from co-workers

#### *Skill Variety:*

- Q4. Concern about my ability to cope with my work load
- Q13. The repetitive nature of my work
- Q18. The lack of challenge in my work

#### *Autonomy:*

- Q5. Not being able to make my own decisions
- Q14. Time pressure due to heavy workloads
- Q28. Having to consult my supervisor when apparently insignificant changes are needed

#### *Advancement:*

- Q6. Thinking about my future career
- Q15. Fear of falling behind at work
- Q19. Poor job promotion prospects

#### *Task Identity:*

- Q8. Not being able to do a job from start to finish
- Q20. Failing to complete my work assignments

## Extrinsic

### *Security:*

- Q1. Budgeting money
- Q10. Having enough money to socialise
- Q16. Not having enough money
- Q22. Poor job security
- Q26. Inadequate salary/income

### *Fiscal Equity:*

- Q3. My pay when consider with my peers
- Q12. The benefits I receive
- Q24. Unfair treatment at work

### *Recognition:*

- Q7. Lack of any form of recognition from my boss
- Q25. Feeling confident enough to speak up for what I believe in

### *Feedback:*

- Q9. Lack of feedback from my supervisor about my abilities
- Q29. Not being consulted on changes affecting my job

### *Miscellaneous:*

- Q21. Introduction of new technologies
- Q30. Pressure to work overtime

## **Organisational Stress Consequences Scale**

### *Physiological:*

- Q1. Lost much sleep over work worries?
- Q2. Had difficulty staying asleep?
- Q3. Felt constantly under strain?
- Q4. Been kept awake at night due to problems associated with your work?
- Q5. Experienced health issues as a result of your job?

### *Psychological:*

- Q6. Been thinking of yourself as a worthless person?
- Q7. Felt that life is entirely hopeless?
- Q8. Found at times you couldn't do anything because your nerves are too bad?
- Q9. Found yourself wishing you were away from it all?
- Q10. Felt that on the whole you were doing things well?
- Q11. Found everything getting on top of you?
- Q12. Felt capable of making decisions about things?

### *Behavioural:*

- Q13. Been taking longer over the things you do?
- Q14. Been feeling nervous and strung up all the time?
- Q15. Thinking about work problems as soon as you get up in the morning?
- Q16. Been managing to keep yourself busy and occupied?
- Q17. Get frustrated when your work is not appreciated?
- Q18. Find it hard to relax and forget about work when you get home?
- Q19. Take home your work in order to keep on top of things?
- Q20. Put your work before your family and personal life?
- Q21. Think about work when you go to bed?
- Q22. Find it hard to sleep if you put work off that needs to be done?



| Theory   | Dimension            | Employee Questionnaire | Interview Schedule |
|--|----------------------|------------------------|--------------------|
| Hierarchy of Needs                                   | Job Security         | 1, 10 and 19           | 1 and 10           |
| Hierarchy of Needs and Existence, Relatedness Growth | Social Relationships | 2, 11, 20, 27 and 30   | 2, 11 and 20       |
| Equity Theory  | Fiscal Equity        | 3, 12, 21, 28 and 31   | 3, 12, 19 and 21   |
| Two-Factor   | Skill Variety        | 4, 13 and 22           | 4, 13 and 22       |
| Achievement Motivation and Two-Factor                | Autonomy             | 5, 14 and 23           | 5, 14 and 23       |
| Achievement Motivation and Two-Factor                | Advancement          | 6, 15 and 24           | 6, 15 and 24       |
| Two-Factor   | Task Identity        | 8 and 17               | 8, 17 and 26       |
| Existence, Relatedness Growth                        | Recognition          | 7, 16, 25, 29 and 32   | 7, 16 and 25       |
| Goal-Setting   | Feedback             | 9, 18 and 26           | 9, 18 and 27       |
| Expectancy-Instrumentality                           | V.I.E.               | 33, 34 and 35          | N/A                |

*Table A.1. Dimensions Relating to Motivation Theories*

### Employee Attitudinal Scale Reliabilities

| Scale               |               | Number<br>of items<br>in Scale | Cronbach's<br>Alpha<br>Reliability | Lowest<br>Possible<br>Score | Highest<br>Possible<br>Score |
|---------------------|---------------|--------------------------------|------------------------------------|-----------------------------|------------------------------|
| Motivation          | Extrinsic     | 21                             | .725                               | 21                          | 105                          |
|                     | Intrinsic     | 14                             | .820                               | 14                          | 70                           |
| Stress Sources      | Extrinsic     | 15                             | .715                               | 15                          | 75                           |
|                     | Intrinsic     | 16                             | .742                               | 16                          | 80                           |
| Stress Consequences | Physiological | 5                              | .871                               | 5                           | 25                           |
|                     | Psychological | 7                              | .645                               | 7                           | 35                           |
|                     | Behavioural   | 10                             | .855                               | 10                          | 50                           |

*Table A.2. Attitudinal Scale Reliabilities*

## **APPENDIX B**

### **Employee Questionnaire**

## **Part 1**

The first part of the survey is designed to obtain basic demographic information about yourself, as well as examining aspects of the work you undertake in your organisation.

The decision to answer each question is your own. However, we would greatly appreciate your help in providing us with this important information.

Please respond to each of the following questions by writing your answer in the space provided or by circling the appropriate response alternative.

1. Which sex are you?
  1. Male
  2. Female
2. What is your marital status?
  1. Single living with parents
  2. Single not living with parents
  3. Married / Cohabiting
  4. Divorced / Separated
  5. Widowed
3. Into which age group do you fall?
  1. 20 to 24
  2. 25 to 30
  3. 31 to 34
  4. 35 to 40
  5. 41 to 50
  6. 51 and over
4. Do you have children?
  1. Yes
  2. No
5. What is your highest level of formal education?
  1. Degree or equivalent
  2. Higher postgraduate Degree
6. Are you currently working on a full-time or part-time basis?
  1. Full-time
  2. Part-time

7. How many hours a week do you work?

---

8. At what level in the organisation do you see yourself?

1. New hire
2. Majority workforce
3. Junior management
4. Senior management
5. Executive

9. How long have you been in your present position with your organisation?

1. Less than ½ yr
2. ½-1 yr
3. 1-2 yrs
4. 2-3 yrs
5. 3-4yrs
6. 4-5yrs
7. More than 5 yrs

10. Have you been working in this position since starting with your organisation?

1. Yes
2. No

11. Have you experienced any of the following career changes since starting work in your organisation?

1. Increased pay
2. Promotion
3. More specialised job in the same occupation
4. A new occupation
5. Achieved management status
6. None
7. Other (please specify)

---

12. What is your total time spent working with your organisation?
1. Under 1 yr
  2. 1-2 yrs
  3. 2-4 yrs
  4. 4-6 yrs
  5. 6-10 yrs
  6. More than 10 yrs
13. Do you work a regular pattern of hours?
1. Yes
  2. No
  3. Sometimes
14. Would you prefer to work a regular pattern of hours?
1. Yes
  2. No
15. Do your working hours include working a night shift?
1. Yes
  2. No
  3. Sometimes
16. Have you received training, other than induction, during your time with your organisation?
1. Yes
  2. No
17. Of the following, where was your organisation established?
1. America
  2. Europe
  3. Ireland
  4. Other (Please specify)
-

18. How many employees are there in your organisation?

1. Less than 25
2. 25-100
3. 101-500
4. 501-1,000
5. More than 1,000

19. To what extent do you work closely with other people?

1. Never
2. Always
3. Intermittently
4. Sometimes

20. Which of the following best describes your organisation?

1. Computer Hardware/Related Products
2. Computer Software Development/Services
3. Telecommunications
4. Electrical Engineering
5. I.T. Support/Contractors
6. Banking and Finance
7. Research and Development
8. Other

If Other, Please state which sector

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21. In the last year have you thought about leaving your job?

1. Yes
2. No

If Yes, have you looked around for an alternative job?

1. Yes
2. No

22. If you did leave your present job, what would be your main reason?

---

23. In five years times, do you anticipate:

1. Doing the same type of work at the same rank as present
2. Doing the same type of work at a higher rank than at present
3. Doing a different type of job
4. Being self-employed
5. Not being employed
6. Don't know
7. Other (please specify)

---

24. Do you receive fringe benefits? (Benefits which are provided in addition to your salary paid wholly or in part by the employer, such as medical insurance, company car, pensions, etc.).

1. Yes
2. No

25. Which three benefits *currently received* are the most important to you?

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

26. Which three benefits would you *ideally like to receive* (please do not include any already received)?

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_



27. Please tick each of the following items, in terms of their importance to you in your job:

|     |  | Very<br>Important |   | Not at all<br>important |   |   |
|-----|--|-------------------|---|-------------------------|---|---|
|     |  | 5                 | 4 | 3                       | 2 | 1 |
| 1.  | Job Security                                 |                   |   |                         |   |   |
| 2.  | Cooperative relations with co-workers        |                   |   |                         |   |   |
| 3.  | Fair pay                                     |                   |   |                         |   |   |
| 4.  | Making full use of my abilities              |                   |   |                         |   |   |
| 5.  | Opportunity for independent thought/action   |                   |   |                         |   |   |
| 6.  | Promotion/Advancement                        |                   |   |                         |   |   |
| 7.  | Recognition                                  |                   |   |                         |   |   |
| 8.  | Opportunity to do a job from start to finish |                   |   |                         |   |   |
| 9.  | Feedback from my supervisor                  |                   |   |                         |   |   |
| 10. | The opportunity for setting goals in my job  |                   |   |                         |   |   |
| 11. | Fringe benefits                              |                   |   |                         |   |   |

28. Do you feel that your current job provides you with these items?  
Please tick the appropriate box:

|     |  | <i>Job does<br/>provide item</i> |   | <i>Job does<br/>not provide item</i> |   |   |
|-----|--|----------------------------------|---|--------------------------------------|---|---|
|     |  | 5                                | 4 | 3                                    | 2 | 1 |
| 1.  | Job Security                                 |                                  |   |                                      |   |   |
| 2.  | Cooperative relations with co-workers        |                                  |   |                                      |   |   |
| 3.  | Fair pay                                     |                                  |   |                                      |   |   |
| 4.  | Making full use of my abilities              |                                  |   |                                      |   |   |
| 5.  | Opportunity for independent thought/action   |                                  |   |                                      |   |   |
| 6.  | Promotion/Advancement                        |                                  |   |                                      |   |   |
| 7.  | Recognition                                  |                                  |   |                                      |   |   |
| 8.  | Opportunity to do a job from start to finish |                                  |   |                                      |   |   |
| 9.  | Feedback from my supervisor                  |                                  |   |                                      |   |   |
| 10. | The opportunity for setting goals in my job  |                                  |   |                                      |   |   |
| 11. | Fringe benefits                              |                                  |   |                                      |   |   |

**Please turn to the next section. Thank You.**

## Part 2

The questions in this section of the questionnaire are concerned with what motivates or demotivates you in the work you undertake.

You will be presented with a series of statements, you should indicate the extent to which you agree or disagree with each of them.

Please tick the box that best describes the extent to which you agree or disagree with each of the following statements.

*Please do not spend too much time on each question, answer them as quickly as possible.*

|     |   | <i>Strongly<br/>Agree</i> |   |   |   | <i>Strongly<br/>Disagree</i> |
|-----|---|---------------------------|---|---|---|------------------------------|
|     |   | 5                         | 4 | 3 | 2 | 1                            |
| 1.  | I am satisfied with the level of employment security that my job offers me                    |                           |   |   |   |                              |
| 2.  | I do things in which I have the opportunity to develop close friendships                      |                           |   |   |   |                              |
| 3.  | In my organisation people are rewarded according to their job performance and accomplishments |                           |   |   |   |                              |
| 4.  | I do not have the opportunity to do challenging things at work                                |                           |   |   |   |                              |
| 5.  | In my work assignments, I try to be my own boss   |                           |   |   |   |                              |
| 6.  | I try very hard to improve on my past performance at work                                     |                           |   |   |   |                              |
| 7.  | I do not feel the work I do is appreciated  |                           |   |   |   |                              |
| 8.  | My job provides me with the chance to completely finish the piece of work I begin             |                           |   |   |   |                              |
| 9.  | I am involved in decisions that affect my work  |                           |   |   |   |                              |
| 10. | I do not make enough money from my job to live comfortably                                    |                           |   |   |   |                              |
| 11. | Working with a group is better than working alone   |                           |   |   |   |                              |
| 12. | I am paid fairly by my organisation for the work I perform                                    |                           |   |   |   |                              |
| 13. | The job requires me to use a number of complex high level skills                              |                           |   |   |   |                              |
| 14. | I have the authority to make decisions that improve the quality of my work                    |                           |   |   |   |                              |
| 15. | Those who do well on the job stand a fair chance of being promoted                            |                           |   |   |   |                              |

|     |   | <i>Strongly Agree</i> |   | <i>Strongly Disagree</i> |   |   |
|-----|---|-----------------------|---|--------------------------|---|---|
|     |   | 5                     | 4 | 3                        | 2 | 1 |
| 16. | My boss takes account of my wishes and desires  |                       |   |                          |   |   |
| 17. | The job is arranged so that I do not have the chance to do an entire piece of work from beginning to end      |                       |   |                          |   |   |
| 18. | My boss regularly discusses my job performance with me  |                       |   |                          |   |   |
| 19. | The fringe benefit program here gives me all the security I want  |                       |   |                          |   |   |
| 20. | I enjoy the relationships I have with other people at work  |                       |   |                          |   |   |
| 21. | I don't feel my efforts are rewarded the way they should be   |                       |   |                          |   |   |
| 22. | I have an opportunity to use many skills at work  |                       |   |                          |   |   |
| 23. | There is little opportunity in my job for participation in the determination of methods, procedures and goals |                       |   |                          |   |   |
| 24. | In my organisation there is little opportunity for advancement  |                       |   |                          |   |   |
| 25. | I do things for which my accomplishments are recognised   |                       |   |                          |   |   |
| 26. | In my organisation management do not willingly share information with employees                               |                       |   |                          |   |   |
| 27. | I pay a good deal of attention to the feelings of others at work  |                       |   |                          |   |   |
| 28. | I am not satisfied with the amount of pay I get   |                       |   |                          |   |   |
| 29. | My boss gives me credit when I do good work   |                       |   |                          |   |   |
| 30. | Its easy to talk to my boss about my job  |                       |   |                          |   |   |
| 31. | I am not satisfied with the benefits I receive  |                       |   |                          |   |   |
| 32. | I do things that allow me to realise my full potential  |                       |   |                          |   |   |
| 33. | In my organisation, if I work hard at my job I will do well   |                       |   |                          |   |   |
| 34. | In my organisation, if I do well at my job I will be rewarded   |                       |   |                          |   |   |
| 35. | If my organisation rewards me for the work I do, I will get the rewards I want.                               |                       |   |                          |   |   |

**Please turn to the next section. Thank You.**

### Part 3

The questions in this section of the questionnaire are concerned with the sources, levels and consequences of stress you experience at work.

You will be presented with a series of statements, you should indicate the extent to which you are concerned or not concerned with each of them.

Please tick the box that best describes the extent to which you are concerned or not concern with each of the following statements.

*Please do not spend too much time on each question, answer them as quickly as possible.*

1. Please read the following statements, which relate to potential sources of stress among computing professionals. For each of the statements, please indicate to what extent you may have been concerned with or worried about these issues.

|     |  | <i>Not at all<br/>concerned</i> |   |   |   | <i>Extremely<br/>Concerned</i> |
|-----|--|---------------------------------|---|---|---|--------------------------------|
|     |  | 5                               | 4 | 3 | 2 | 1                              |
| 1.  | Budgeting money  |                                 |   |   |   |                                |
| 2.  | Concern about the impression I am making with co-workers |                                 |   |   |   |                                |
| 3.  | My pay when considered with my peers                     |                                 |   |   |   |                                |
| 4.  | Concern about my ability to cope with my work load       |                                 |   |   |   |                                |
| 5.  | Not being able to make my own decisions                  |                                 |   |   |   |                                |
| 6.  | Thinking about my future career                          |                                 |   |   |   |                                |
| 7.  | Lack of any form of recognition from my boss             |                                 |   |   |   |                                |
| 8.  | Not being able to do a job from start to finish          |                                 |   |   |   |                                |
| 9.  | Lack of feedback from my supervisor about my abilities   |                                 |   |   |   |                                |
| 10. | Having enough money to socialise                         |                                 |   |   |   |                                |
| 11. | Maintaining co-worker relationships                      |                                 |   |   |   |                                |
| 12. | The benefits I receive                                   |                                 |   |   |   |                                |

*Not at all  
concerned*

*Extremely  
concerned*

|     |  | 5 | 4 | 3 | 2 | 1 |
|-----|--|---|---|---|---|---|
| 13. | The repetitive nature of my work   |   |   |   |   |   |
| 14. | Time pressure due to heavy workloads   |   |   |   |   |   |
| 15. | Fear of falling behind at work   |   |   |   |   |   |
| 16. | Not having enough money  |   |   |   |   |   |
| 17. | Competition with colleagues  |   |   |   |   |   |
| 18. | The lack of challenge in my work   |   |   |   |   |   |
| 19. | Poor job promotion prospects   |   |   |   |   |   |
| 20. | Failing to complete my work assignments  |   |   |   |   |   |
| 21. | Introduction to new technologies   |   |   |   |   |   |
| 22. | Poor job security  |   |   |   |   |   |
| 23. | Inadequate support in difficult situations                                       |   |   |   |   |   |
| 24. | Unfair treatment at work   |   |   |   |   |   |
| 25. | Feeling confident enough to speak up for what I believe in                       |   |   |   |   |   |
| 26. | Inadequate salary/income   |   |   |   |   |   |
| 27. | Lack of respect from superiors   |   |   |   |   |   |
| 28. | Having to consult my supervisor when apparently insignificant changes are needed |   |   |   |   |   |
| 29. | Not being consulted on changes affecting my job                                  |   |   |   |   |   |
| 30. | Pressure to work overtime  |   |   |   |   |   |
| 31. | Lack of respect from co-workers  |   |   |   |   |   |

2. On the following scale, please rate the level of stress each of the following items causes you in your work environment, with one indicating a low level of stress and five indicating a high level of stress.

|     |   | <i>High Stress</i> |   |   | <i>Low Stress</i> |   |
|-----|---|--------------------|---|---|-------------------|---|
|     |   | 5                  | 4 | 3 | 2                 | 1 |
| 1.  | Lack of job security  |                    |   |   |                   |   |
| 2.  | Poor relationships with colleagues                                |                    |   |   |                   |   |
| 3.  | Poor relationships with supervisors                               |                    |   |   |                   |   |
| 4.  | The financial benefits received                                   |                    |   |   |                   |   |
| 5.  | Skills required to do the job                                     |                    |   |   |                   |   |
| 6.  | The lack of independence to make decisions                        |                    |   |   |                   |   |
| 7.  | The lack of recognition received from management/supervisors      |                    |   |   |                   |   |
| 8.  | The lack of promotional opportunities available                   |                    |   |   |                   |   |
| 9.  | The repetitive nature of the work                                 |                    |   |   |                   |   |
| 10. | Being uninformed about how you are performing                     |                    |   |   |                   |   |
| 11. | If rewarded by the organisation, not getting the rewards you want |                    |   |   |                   |   |

3. We would like to know if you had any medical complaints and how your health has been in general, over the past few months. Tick the box corresponding to the answer which most nearly applies to you. Remember that we want to know about your present and recent complaints, not those you had in the past

*Have you recently:*

*More so than  
usual*

*Much less  
than usual*

|     |  | 5 | 4 | 3 | 2 | 1 |
|-----|--|---|---|---|---|---|
| 1.  | Lost much sleep over work worries?                                       |   |   |   |   |   |
| 2.  | Had difficulty staying asleep?   |   |   |   |   |   |
| 3.  | Felt constantly under strain?  |   |   |   |   |   |
| 4.  | Been kept awake at night due to problems associated with your work?      |   |   |   |   |   |
| 5.  | Experienced health issues as a result of your job?                       |   |   |   |   |   |
| 6.  | Been thinking of yourself as a worthless person?                         |   |   |   |   |   |
| 7.  | Felt that life is entirely hopeless?                                     |   |   |   |   |   |
| 8.  | Found at times you couldn't do anything because your nerves are too bad? |   |   |   |   |   |
| 9.  | Found yourself wishing you were away from it all?                        |   |   |   |   |   |
| 10. | Felt that on the whole you were doing things well?                       |   |   |   |   |   |
| 11. | Found everything getting on top of you?                                  |   |   |   |   |   |
| 12. | Felt capable of making decisions about things?                           |   |   |   |   |   |
| 13. | Been taking longer over the things you do?                               |   |   |   |   |   |
| 14. | Been feeling nervous and strung up all the time?                         |   |   |   |   |   |
| 15. | Thinking about work problems as soon as you get up in the morning?       |   |   |   |   |   |
| 16. | Been managing to keep yourself busy and occupied?                        |   |   |   |   |   |
| 17. | Get frustrated when your work is not appreciated?                        |   |   |   |   |   |
| 18. | Find it hard to relax and forget about work when you get home?           |   |   |   |   |   |

*More so than  
usual*

*Much less  
than usual*

|     |  | 5 | 4 | 3 | 2 | 1 |
|-----|--|---|---|---|---|---|
| 19. | Take home your work in order to keep on top of things?           |   |   |   |   |   |
| 20. | Put your work before your family and personal life?              |   |   |   |   |   |
| 21. | Think about work when you go to bed?                             |   |   |   |   |   |
| 22. | Find it hard to sleep if you put work off that needs to be done? |   |   |   |   |   |

**Please turn to the next section. Thank You.**



#### **Part 4**

This section of the questionnaire is interested in your perceptions of the relationship between motivation and stress.

Please respond by writing your answer in the space provided, or on a separate sheet of paper, if needed.

1. What relationship, if any, do you perceive between motivation and stress in the workplace?

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**Thank you for time and co-operation in the completion of this questionnaire.**

## **APPENDIX C**

### **Interview Schedule**

## **Part 1**

The questions in the first part of the interview are designed to obtain basic demographic information about your organisation.

The decision to answer each question is your own. However, we would greatly appreciate your help in providing us with this important information.

1. How many levels of management are there in your organisation?
  1. One
  2. Two
  3. Three
  4. More than three
  
2. In your estimation, what percentage of employees expect to work at this organisation for the next ten years?
  1. <10%
  2. 10-20%
  3. 20-50%
  4. More than 50%
  
3. How would you describe the corporate culture inherent in your organisation?

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**Please turn to the next section. Thank You.**

## **Part 2**

The questions in the second part of the interview are concerned with your perceptions of what motivates or demotivates your computing professionals.

You will be presented with a series of open-ended questions in the first section, and a series of statements in the second, where you should indicate which answer most distinctly matches your perception.

1. How important do you believe job security to be for your computing staff?

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2. To what extent do your computing employees rely on the social support of both their colleagues and their supervisors?

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3. Are your computing employees satisfied with the benefits (financial or otherwise) they receive; do they voice concerns over the benefits they receive?

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4. Do you feel that computing employees wish to make full use of their abilities, and thus express a desire to continually improve their skills/knowledge?

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5. Is it an important for computing employees to have the opportunity for independent thought in their job; or would they rather receive directions from management?

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6. Do you believe that your computing employees value the opportunity for promotion and the challenges that this would entail, or would they rather continue working at their current level?

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7. Are computing employees recognised when they achieve goals/targets. How do you believe such recognition programs are valued by employees?

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8. Does your computing employees work consist of completing the tasks they begin; If so, what benefits do you believe such a work structure provides them?

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9. Do computing employees partake in the setting of organisational goals (at a local or global level). If so, in your opinion do they take part willingly or merely because they have to?

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10. Are computing employee goals and company goals aligned, that is do they both have the same priorities?

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11. Are absenteeism levels high among your computing professionals. If so, what do you believe are the causes?

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You will now be presented with a series of statements, please indicate which answer most distinctly matches your perception.

12. Please read the following questions, and tick the box that most distinctly matches your perception.

|    |   |   |   |  |                          |
|----|---|---|---|--|--------------------------|
|    | <i>Virtually<br/>none</i>   | <i>Some</i>                               | <i>Substantial<br/>amount</i>               | <i>A great deal</i>                        |                          |
| a. | How much confidence and trust is shown to subordinates?           | <input type="checkbox"/>                  | <input type="checkbox"/>                    | <input type="checkbox"/>                   | <input type="checkbox"/> |
|    | <i>Not very free</i>  | <i>Somewhat<br/>free</i>                  | <i>Quite free</i>                           | <i>Very free</i>                           |                          |
| b. | How free do they feel to talk to superiors about their job?       | <input type="checkbox"/>                  | <input type="checkbox"/>                    | <input type="checkbox"/>                   | <input type="checkbox"/> |
|    | <i>Seldom</i>   | <i>Sometimes</i>                          | <i>Often</i>                                | <i>Very<br/>frequently</i>                 |                          |
| c. | How often are subordinate's ideas sought and used constructively? | <input type="checkbox"/>                  | <input type="checkbox"/>                    | <input type="checkbox"/>                   | <input type="checkbox"/> |
|    | <i>Orders<br/>Issued</i>  | <i>Orders, with<br/>some<br/>comments</i> | <i>After<br/>discussion,<br/>by orders.</i> | <i>By group<br/>(except in<br/>crisis)</i> |                          |
| d. | How are the organisational goals established?                     | <input type="checkbox"/>                  | <input type="checkbox"/>                    | <input type="checkbox"/>                   | <input type="checkbox"/> |
|    | <i>Very little</i>  | <i>Relatively<br/>little</i>              | <i>Moderate<br/>amount</i>                  | <i>Great deal</i>                          |                          |
| e. | How much cooperative teamwork exists?                             | <input type="checkbox"/>                  | <input type="checkbox"/>                    | <input type="checkbox"/>                   | <input type="checkbox"/> |
|    | <i>Not very well</i>  | <i>Rather well</i>                        | <i>Quite well</i>                           | <i>Very well</i>                           |                          |
| f. | How well do superiors know problems faced by subordinates?        | <input type="checkbox"/>                  | <input type="checkbox"/>                    | <input type="checkbox"/>                   | <input type="checkbox"/> |



|  | <i>With suspicion</i> | <i>Possibly with suspicion</i> | <i>With caution</i> | <i>With a receptive mind</i> |
|--|-----------------------|--------------------------------|---------------------|------------------------------|
| g. How is downward communication accepted? |                       |                                |                     |                              |

|  | <i>Usually inaccurate</i> | <i>Often inaccurate</i> | <i>Often accurate</i> | <i>Almost always accurate</i> |
|--|---------------------------|-------------------------|-----------------------|-------------------------------|
| h. How accurate is upward communication? |                           |                         |                       |                               |

|                                       | <i>Mostly at top</i> | <i>Policy at top, some delegation</i> | <i>Broad policy at top, more delegation</i> | <i>Throughout, but well integrated</i> |
|---------------------------------------|----------------------|---------------------------------------|---|--|
| i. At what levels are decisions made? |                      |                                       |   |  |

|  | <i>Almost never</i> | <i>Sometimes consulted</i> | <i>Generally consulted</i> | <i>Fully involved</i> |
|--|---------------------|----------------------------|----------------------------|-----------------------|
| j. Are subordinates involved in decisions related to their work? |                     |                            |                            |                       |

|  | <i>Not very much</i> | <i>Relatively little</i> | <i>Some contribution</i> | <i>Substantial contribution</i> |
|--|----------------------|--------------------------|--------------------------|---------------------------------|
| k. What does the decision making process contribute to motivation? |                      |                          |                          |                                 |

|   | <i>Mostly at top</i> | <i>Top and middle</i> | <i>Fairly general</i> | <i>At all levels</i> |
|---|----------------------|-----------------------|-----------------------|----------------------|
| l. Where is responsibility felt for achieving organisational goals? |                      |                       |                       |                      |

**Please turn to the next section. Thank You.**

### **Part 3**

The questions in this section of the interview are concerned with your perceptions of your employees' sources, levels, and consequences of stress.

You will be presented with a series of both open-ended and closed questions, please indicate which response most distinctly matches your perception.

1. Does your organisation have a stress policy?

1. Yes
2. No
3. Don't know

2. Does your organisation engage in stress management techniques?

1. Yes
2. No
3. Don't know

If yes, what techniques are utilised?

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3. In the last year, have any employees raised stress concerns with you?

1. Yes
2. No

4. In the last year, has your workforce been affected by any of the following?  
(Check as many as apply)

1. Cutbacks
  2. Downsizing
  3. Privatization
  4. Contracting out
  5. Mergers/amalgamations
  6. Restructuring
  7. Other organisational change (please specify)
- 

5. If the job description or role of any of your computing workers has changed in the last year, how has it changed? (check all that apply)

1. More duties added
  2. New duties, not previously part of their job have been added
  3. Faster rate of work
  4. Higher demand/expectations from employer/departments, etc.
  5. Less training has been provided
  6. Inadequate training for new duties
  7. More training
  8. Less supervision
  9. More supervision
  10. Given more supervisory type duties
  11. More paperwork
  12. More meetings
  13. Other (please specify)
- 

If yes to any of the above, do you think that these changes have in some way altered the motivation and stress of your computing employees?

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6. The following statements are all potential sources of stress for your employees. Please rate them in terms of the degree of pressure you perceive they place on your computing employees.

*Very definitely  
a source*

*Very definitely  
not a source*

|     |  | 5 | 4 | 3 | 2 | 1 |
|-----|--|---|---|---|---|---|
| 1.  | Job security   |   |   |   |   |   |
| 2.  | Shift work   |   |   |   |   |   |
| 3.  | Rate of pay  |   |   |   |   |   |
| 4.  | Over/accelerated work pace                                     |   |   |   |   |   |
| 5.  | Lack of control over their job                                 |   |   |   |   |   |
| 6.  | Over promotion – working beyond their ability                  |   |   |   |   |   |
| 7.  | A lack of encouragement from supervisors                       |   |   |   |   |   |
| 8.  | The opportunity to complete the work they start                |   |   |   |   |   |
| 9.  | Inadequate feedback/guidance from supervisors                  |   |   |   |   |   |
| 10. | Fear of job loss from mergers, acquisitions, etc.              |   |   |   |   |   |
| 11. | Lack of communication with co-workers at the same level        |   |   |   |   |   |
| 12. | Company benefit program  |   |   |   |   |   |
| 13. | Too little variety in their work                               |   |   |   |   |   |
| 14. | Having to make important decisions                             |   |   |   |   |   |
| 15. | Under promotion – working below their ability                  |   |   |   |   |   |
| 16. | Being undervalued  |   |   |   |   |   |
| 17. | The chance to do an entire piece of work from beginning to end |   |   |   |   |   |
| 18. | Not being consulted when their work goals are set              |   |   |   |   |   |
| 19. | Inadequate pay   |   |   |   |   |   |

*Very definitely  
a source*

*Very definitely  
not a source*

|     |   | 5 | 4 | 3 | 2 | 1 |
|-----|---|---|---|---|---|---|
| 20. | A lack of social support from colleagues                |   |   |   |   |   |
| 21. | Unfair pay when compared to colleagues                  |   |   |   |   |   |
| 22. | Too much work   |   |   |   |   |   |
| 23. | A lack of power and influence                           |   |   |   |   |   |
| 24. | Being overlooked for promotion                          |   |   |   |   |   |
| 25. | A lack of recognition for the work they do              |   |   |   |   |   |
| 26. | The chance to completely finish the work they do        |   |   |   |   |   |
| 27. | Receiving too much feedback regarding their performance |   |   |   |   |   |

7. On the following scale, please rate the level of stress you perceive each of the following items causes your computing employees in their work environment, with one indicating a low level of stress and five indicating a high level of stress.

|     |   | <i>High Stress</i> |   |   | <i>Low Stress</i> |   |
|-----|---|--------------------|---|---|-------------------|---|
|     |   | 5                  | 4 | 3 | 2                 | 1 |
| 1.  | Lack of job security  |                    |   |   |                   |   |
| 2.  | Poor relationships with colleagues                                  |                    |   |   |                   |   |
| 3.  | Poor relationships with supervisors                                 |                    |   |   |                   |   |
| 4.  | The financial benefits they receive                                 |                    |   |   |                   |   |
| 5.  | Skills required to do the job                                       |                    |   |   |                   |   |
| 6.  | Lack of independence to make decisions                              |                    |   |   |                   |   |
| 7.  | Lack of recognition received from management/supervisors            |                    |   |   |                   |   |
| 8.  | The lack of promotional opportunities available                     |                    |   |   |                   |   |
| 9.  | The repetitive nature of their work                                 |                    |   |   |                   |   |
| 10. | Being uninformed about how they are performing                      |                    |   |   |                   |   |
| 11. | Not getting the rewards they want when rewarded by the organisation |                    |   |   |                   |   |

This image shows a single sheet of white paper with horizontal blue or grey ruling lines. The lines are evenly spaced and run across the width of the page. There are approximately 20 lines visible. The paper has a slight shadow on the right side, suggesting it's resting on a surface.

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#### **Part 4**

The final section of the interview concerns your opinion of the relationship between motivation and stress.

1. What relationship do you believe exists between motivation and stress for your computing professionals? (from both the employees and employer's perspective)

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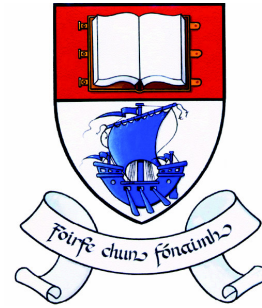
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**Thank you for time and co-operation in the completion of this interview.**



## **APPENDIX D**

### **Letters to Respondent**



1st March 2007

Dear .....,

My name is Maitiú Ó Cuirrín and I am a researcher at Waterford Institute of Technology. I am currently undertaking research into the relationship between motivation and stress in the computing industry and its resulting implications for both the employing organisation and employees.

Previous research conducted on the implications of motivation and stress in the computing industry report substantial effects on employees, as well as cost and performance implications for the employing organisation. However, to date, there remains little or no research examining the linkage between motivation and stress in any industrial sector, and most importantly from your perspective the computing industry.

The outcome of this research will be beneficial to all organisations employing computing professionals, which in turn will impact on its employees. Numerous research studies examining work place stress report the detrimental effects on employees, from a variety of perspective including behavioural, psychological and physiological problems. By providing organisations with information relating to the consequences of the interrelationship between motivation and stress, the results of this research will hopefully help management design and create careers that help motivate employees in addition to creating a less stressful working environment for all current and future computing employees.

I appreciate that you are very busy and have tried to keep the questionnaire as brief as possible. It should take no longer than fifteen minutes to complete.

Completing the questionnaire is entirely voluntary, but it is important to hear from as many people as possible to give useful and accurate results and make the research worthwhile.

***All responses to this questionnaire will be treated with complete anonymity and in the strictest of confidence.***

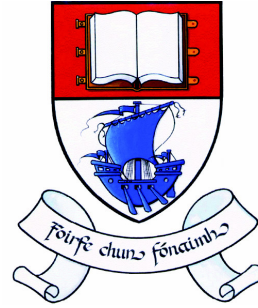
If you would like a copy of the results or require any further information about the research, please do not hesitate to contact me at .....

When you have completed the questionnaire could you please return it to me by post using the addressed envelope provided.

Thank you for your time and co-operation, I greatly appreciate it.

Yours Sincerely,

Maitiú Ó Cuirrín



30th April 2007

***RE: Research into the Relationship Between Employee Motivation and Stress***

Dear .....,

You might remember that two weeks ago I sent you a letter and a questionnaire. My name is Maitiú Ó Cuirrín and I am a master's researcher in the School of Humanities at Waterford Institute of Technology. I am currently undertaking research into the relationship between motivation and stress in the computing industry and its resulting implications for both the employing organisation and employees.

I would just like to remind you to send back your completed questionnaire. If you have already done this, I would like to take this opportunity to thank you. If not, and you would like another copy of the questionnaire please email me at ..... and I will send you one immediately.

The outcome of this research will be of benefit to all organisations employing computing professionals, which in turn will impact its employees. I am therefore asking you if you could kindly complete the following questionnaire. I appreciate that you are very busy and have tried to keep the questionnaire as brief as possible. It should take about fifteen minutes to complete.

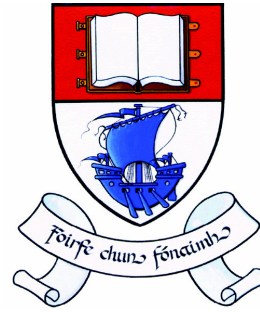
***All responses to this questionnaire will be treated with complete anonymity and in the strictest confidence.***

I would greatly appreciate your help as I need to hear from as many employees as possible to give useful and accurate results and to make the research worthwhile. You can send the questionnaire back to me by post to .....

Thank you for your time and co-operation, I greatly appreciate it.

Yours sincerely,

Maitiú Ó Cuirrín



9th March 2007

***RE: Research into the Relationship Between Employee Motivation and Stress***

Dear .....,

My name is Maitiú Ó Cuirrín and I am a researcher at Waterford Institute of Technology. I am currently undertaking research into the relationship between motivation and stress in the computing industry and its resulting implications for both the employing organisation and their employees.

Previous research conducted on the implications of motivation and stress in the computing industry report substantial effects on employees, as well as cost and performance implications for the employing organisation. However, to date, there remains little or no research examining the linkage between motivation and stress in any industrial sector, and most importantly from your perspective the computing industry.

The outcome of this research will be beneficial to all organisations employing computing professionals. Numerous research studies examining work place stress report the detrimental effects on employees, from a variety of perspectives including behavioural, psychological and physiological problems. This in turn may create problems of increased absenteeism and turnover, lowered organisational commitment, lowered job involvement and job dissatisfaction all leading to reduced motivation and consequently lowered productivity for the employing organisation. By providing organisations with information relating to the consequences of the interrelationship between motivation and stress, the results of this research will hopefully help management design and create careers that help motivate employees in addition to creating a less stressful working environment for all current and future computing employees, consequently enhancing the potential for productivity and profitability among participating organisations.

There are two parts to the research an employee questionnaire and a management interview. Participation is entirely voluntary, but it is important to hear from as many people as possible to give useful and accurate results and make the research worthwhile. Participation in either the interview or questionnaire, however, is not dependent on each other. That is, you may wish to participate in the interview but not wish to have the questionnaires distributed among your employees and vice versa.

***All responses will be treated with complete anonymity and in the strictest confidence; there will be no identifying information required at either an individual or organisational level.***

I appreciate that you and your employees are very busy, so the management interview should take no more than half an hour while the employee questionnaires can be completed in fifteen minutes. If you would like to participate in the interview or alternatively wish for your employees to participate in the research or require any further information about the study, please do not hesitate to contact me at ....., or alternatively via email at .....

Thank you for your time and co-operation, I greatly appreciate it.

Yours sincerely,

Maitiú Ó Cuirrín