PSYCHOLOGICAL RESILIENCE: THE ROLE OF UNCONSCIOUS AND CONSCIOUS COPING STRATEGIES IN THE MEDIATION OF STRESS IN HIGH RISK OCCUPATIONAL CONTEXTS

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ABSTRACT

This study investigates the role of unconscious and conscious coping strategies in the mediation of stress in high risk occupational contexts. The Social Readjustment Rating Scale, the Multidimensional Coping Inventory and the Defense Style Questionnaires were completed by 194 police, ambulance and teaching personnel. A sample of 37 teachers served as a non high risk occupation control group. Descriptive statistics, regression analysis, analysis of variance, analysis of difference and principal component analysis were performed on the data. Results indicated minimal significant between group differences. Within group variances were yielded. A minor relationship between levels of stress and usage of positive and negative mechanisms was observed. The significance of these findings is discussed and recommendations made for further study.

INTRODUCTION

The research investigates the role of unconscious and conscious coping strategies in the mediation of stress in high risk occupational contexts. The aim of the study is to establish whether a relationship exists between conscious and unconscious coping in mediating stress, whether the maturity of psychological defense mediates the experience of stress and or whether a more adaptive coping style mediates the experience of stress. A review of the literature shows that to date stress research has placed little emphasis on unconscious processes in mediating stress. Although both Hartman (1939) (as cited in Mitchell and Black, 1995) and Selye (1956) referred respectively to a psychological self and something that occurs in every person, in terms of stress research focus on this aspect of unconscious adaptation only emerged in the 1980's.

For the purpose of this study the review of the literature encompasses the fields of stress, coping mechanisms, resilience and defense mechanisms. The stress review explores different approaches to stress and highlights theories that have had an impact on stress research e.g. physiological, behavioural and cognitive theories. The review on coping touches on the work of Selye (1956) and Lazarus (1984). It alludes to the mind-body debate, different coping models and coping studies. The section on resilience refers to a well-known long-term study and focuses on the 'protective factors' of resilient children. The defense mechanism review addresses definitions, levels, the various defenses, as well as aspects of measurement (Vaillant, 1986).

STRESS DEFINED

If a particular relationship between a person and the environment is appraised by the person as taxing or exceeding his or her resources and endangering his or her well-being, the person is said to be stressed (Lazarus & Folkman, 1984a). Selye (1974), however, described stress as the non-specific response of the body to any demand made upon it whereas Burchfield (1985) described it as any transactional process in which the organism experiences an alteration of psychological homeostasis.

APPROACHES TO STRESS

There are many theories to explain what stress is, how it works and it's relationship to health. In terms of stress theories there are Biological/Physiological Stress Theories

(Selye, 1956), the Diathesis-Stress Model (Levi, 1974 & Parsons, 1988), Psychological Stress Theories, the Cognitive Transactional Theory (Lazarus and Folkman, 1984) and Social Stress Theories (Bandura, 1977), the Holistic Health Model (Rice, 1992) and Control Theory (Fisher, 1984). The Biological Stress Theories include, amongst others, Selye's (1956) General Adaptation Syndrome and Genetic-Constitutional theories (Fuller and Thompson, 1978). The Diathesis-Stress Model integrates hereditary and environmental factors and suggests that there is an interplay between predisposing (genetic) and precipitating (environmental) factors (Rice, 1992).

The Psychological Stress Theories include the Psychodynamic, Learning, Cognitive and General Systems Models. The Psychodynamic Model refers to two kinds of anxiety namely signal anxiety and traumatic anxiety. The former occurs when objective danger is present i.e. stressor-strain (danger-anxiety) relationship. The latter, a dominant form of anxiety in Freud's (1966) theory refers to instinctual or internally generated anxiety. The symptoms resulting from this are seen as the psychopathologies of everyday life. Conversion also falls within this framework. It is a process that turns a conflicting idea into something harmless. The energy from the conflict is converted into a physical symptom (Rice, 1992). Psychological Stress Theories generally examine how personality, expectations and interpretations turn personal or social events into stressful situations. These theories attempt to understand how stress leads to behaviour change and how stress can be minimized through coping behaviours (Rice, 1992).

To explain stress, the Learning Theory uses either the classical conditioning (Pavlov, 1927) or operant conditioning model (Skinner, 1953) or a combination of the two. Using the Cognitive Transactional Model of stress cognitive researchers attempt to understand stress in terms of the way in which the brain processes information through it's many pathways. These theorists assume that humans are active, reasoning, deciding beings and that they construct schemata or mental blueprints about the world, how it works and how they relate to it. The stored information about people's perceptions and experiences is retrieved and used in different ways. How this influences new encounters is important in terms of stress arousal and the coping strategies employed to deal with stress. Richard Lazarus developed the most

prominent Cognitive Transactional theory. Lazarus assumes that stress and health have reciprocal influences. Stress can have a powerful impact on health and conversely health can change an individual's resistance or coping ability (Lazarus and Launier, 1978).

Several of the social stress theories focus on the integration of the individual into society and the tensions that are part of the society. One such theory is conflict theory and the other is life-change theory. Stress in terms of the former occurs when society cannot afford members the life chances and opportunities for growth. In terms of the latter stress is referenced in terms of the major adaptations individuals must make because of life changes (Dooley and Catalano, 1984). Zimbardo's (1992) sentiments are similar. He suggests that sudden life changes are at the root of stress. Researchers Dohrenwend and Dohrenwend, 1974; Dohrenwend and Shrout, 1985; Holmes and Rahe, 1967 have also viewed stress as resulting from exposure to life changes/events. A major source of stress research has been on the influence of major life changes on subsequent mental and physical health.

One of the scales developed for rating the degree of adjustment required by the various life changes (pleasant and unpleasant) that individuals experience, is the Social Readjustment Rating Scale (SRRS). The scale was developed from responses obtained from adults from all walks of life. The adults were asked to identify from a list the life changes that applied to them. They rated the amount of adjustment necessary for each change by comparing each to marriage, which was arbitrarily given a value of 50 life change units (LCU). The total number of LCU's an individual had undergone during a specific period was calculated using the units as a measure of the amount of stress the individual had experienced (Holmes & Rahe, 1967). Studies also examined the hypothesis that the greater the intensity of the life changes (measured by SRRS) the greater the risk for subsequent illness. Preliminary studies showed support for a relationship between medical problems and the amount of readjustment in life. Other studies also showed that life stress increases an individual's susceptibility to illness (Holmes & Masuda, 1974). One interpretive problem with studies such as these is that they are generally retrospective and measures are often obtained by having subjects recall prior events.

The Holistic Health Model (Sobel, 1979 & Capra, 1982) values treatment of the whole person. These theorists recognize human complexity and diversity. They emphasize the importance of mental events and personal value systems and they recognize the desirability to be responsible for one-self. This approach seeks to deal with stress by focussing on the complete lifestyle i.e. incorporating the physical, psychological and social simultaneously (Rice, 1992). Control Theory also known as cybernetics or systems theory views the individual as a self-contained health-care system that engages in behaviour to reduce discrepancies in feedback loops (Wiener, 1961 & Schwartz, 1982). Stress is seen to have the potential to have multiple effects in systems that range from functions of the body to functions of psychological processes and social functions such as harmony of home and job (Rice, 1992).

Most of these theories explain stress and health by focussing on a limited set of variables. For example Selye (1956) focuses on the physiological but leaves out the social and psychological systems. The learning theorists use narrow conditioning constructs. They pay slight attention to social systems but little attention to physiological systems. Cognitive theorists focus on information processing of data from the external social environment as well as the internal bio-psychosocial environment. However very little emphasis is placed on the physical parameter of stress and health and very little attention is given to social constructs. Social theory on the other hand concentrates mainly on large scale social factors such as poverty, crowding and social change with not much emphasis on physiological and psychological factors (Rice, 1992). Each theory, although it has unique strengths also has weaknesses. Control theory on the other hand attempts to consider complex, dynamic interactions in multivariate systems where systems may be hierarchically enmeshed with other systems. Rice (1992) however argues that it remains to be seen whether this model will generate data to support it or whether it will function more as a meta-theory integrating results of smaller more testable theories.

This extreme diverse body of theoretical knowledge relating to the stress phenomenon has led to disparity within the field. Bartlett (1998) however argues that the fact that there are so many discourses available to explain the stress phenomenon should make it a particularly challenging field of enquiry. He suggests that the notion of 'discourse of stress' offers another perspective from which to view the phenomenon – a

discursive perspective. This approach draws on individuals' experiences of stress that are influenced by or constructed through their everyday understanding of the notion of stress. Radley (1993) suggests that the study of health or illness should include the way in which individuals take up or refuse the dominant discourse in Western culture that defines things as medical matters. The emphasis of the discursive approach is on taking account of the individual's own experience, understanding, interpretation and perception of stressful events in order to explain how such events influence health (Bartlett, 1998). The greatest contribution to stress and coping research came from the physiological, behavioural and cognitive theorists.

STRESS AND COPING

Selye (1956) argued that no one lives without experiencing some degree of stress all the time and it is not something that one can avoid throughout life, however, one can learn to keep it's damaging side effects to a minimum. This, he argued, individuals can do if they understand the mechanisms and have the will power to act according to that dictated by human intellect. He likened the understanding of the mechanisms of the adaptation process to psychoanalysis, suggesting that knowledge about oneself has a curative value (Selye, 1956). He emphasized that stress is not only a negative experience caused by disease, serious physical illness or mental injury, it could also have a positive effect on the body e.g. sport. This positive stress Selye (1956) termed 'eustress' and suggested that this level would be of benefit psychologically. It is a stress that motivates one to think more quickly, work more intensively, to solve problems, to be creative, to perform better and to become more confident (De Vries, 1979) (as cited in Pestonjee, 1992).

The strength of Selye's model is that it is empirically derived and extensively tested. It's weakness is it's extreme biological emphasis, good and bad stressors are treated equally and cognitive and social factors are ignored (Rice, 1992).

Selye (1956) argued that the body adapted to changes via the general adaptation syndrome (GAS). The GAS evolves through three stages: the alarm reaction, the stage of resistance and the stage of exhaustion. It is through this syndrome that various internal organs (especially endocrine and nervous system) help the body to adjust to constant changes in the environment. If errors occur in the adaptive response to

stress i.e. the body is not able to successfully adapt or cope with a potentially disease-producing situation, the body will develop diseases of adaptation e.g. high blood pressure, ulcers, allergies, etc. (Selye, 1956).

At approximately the same time as Selye's work the psychosomatic movement attempted to connect physical illnesses e.g. ulcers, cardiac problems and arthritis to psychosocial stressors i.e. environmental stressors, emotional states and personality types (Oxtoby, 1996). Through this movement researchers gained a better understanding of the mechanisms involved in the adaptation process. Two of the ways in which the mechanisms of adaptation were explained were via the fight/flight mechanism and the immune system. The fight/flight mechanism (Cannon, 1932) was described as an emergency reaction i.e. a biological reaction to prepare the body for the unexpected. At this time the heart rate increases and changes take place in the lungs, liver, spleen, muscles and pupils. Although this is a useful reaction it is described as prehistoric but people activate it far more today than ever before. People were not designed to undergo the bodily experiences that they do from witnessing thousands of murders on television, or from getting stuck in traffic jams (Schomer, n.d.). The more changes one experiences the more one is likely to become ill but not everyone in this position gets ill (Ornstein & Thompson, 1985 & Wallis, 1983).

The immune system as mentioned earlier, also plays a vital role in the effect of psychological states on physical health and vice versa. Many studies have supported the notion that the brain influences the immune system and therefore one's resistance to disease as well as the links between susceptibility to illness and emotional states. A study examining the effects of antecedent chronic life stress on psychological and physiological responsivity, showed that acute psychological stress (mental arithmetic administered in the lab) induced subjective distress (Pike, Smith, Hauger, Nicassio, Patterson, McClintick, Costlow & Irwin, 1997).

Martin (1987) reports a study conducted by Kiecolt-Glaser (n.d.) on medical students, taking an important exam. The study was done to assess immune functioning by looking at the activity of natural killer cells. It showed that the killer cells were less active on the day of the exam than they were a month earlier. Kiecolt-Glaser (n.d.)

found that at times of exam pressure students secrete fewer antibodies in their saliva, which suggests that their immune systems are being impaired (Martin, 1987).

Fisher (1984) took the approach that stress and its relationship to behaviour must be understood in terms of fundamental aspects of cognition. The central theme is that individuals seek to control their environments but the level of control changes in stressful situations. Stressful situations are undesirable and the individual seeks to control this in order to maintain homeostasis and reduce unpleasant experiences. Fishers' (1984) argument is that both behaviour and physiological response form important parts in attempting to minimize the intensity and duration of stress. If individuals fail to control their environments the effects of behaviour and physiological responses will be maximized. This will provide knowledge of failure to cope influencing subsequent reactions. A major theme in this argument is that stress imposes a huge mental demand on individuals. As part of the individual's attempt to gain control and minimize the risk of unpleasant experiences, s/he must be able to recognize stressful situations and organize resources to act effectively.

Unlike Selye's (1956) physiological approach to coping and Fisher's (1984) behavioural approach, the coping approach of Lazarus and Fay (1975) was more cognitive in nature. Lazarus and Folkman (1984) defined coping as the process of managing external and/or internal demands that are appraised as taxing or exceeding the resources of the person. They divided coping into two fundamental types, namely problem-focused coping and emotion-focused coping. Problem focused coping comprises confrontive coping i.e. standing up for one self and planful problem-solving i.e. developing solutions to problems. Emotion focused coping involves distancing oneself from the situation psychologically, self control over expression of one's feelings, accepting responsibility, escape avoidance and positive reappraisal. Seeking social support is also seen as a way of coping and this may be both problem and or emotion focused coping because one could receive either practical and or emotional support (Bartlett, 1998).

Lazarus and Fay (1975) unlike Selye (1956) believe that being aware of mistakes is not enough. They believe that one has to do something about it. They suggest that straightforward, deliberate and systematic rethinking is the correct step towards

constructive change. Rethinking, they also argue, is not enough, they advocate acting differently i.e. changing behaviours as well. The key to change is thus identifying the problem, accepting the possibility that something can be done about it, expressing the desire to change and the willingness to work at making a change. Schomer (1997) refers to this as the social learning model and suggests that in terms of changing self-destructive behaviour it is applicable to 80% of the population. He suggests that the model applicable to the other 20% of the population is the psychodynamic model. In this model self destructive behaviour is explained as a conflict between rational, instinctual and moralistic forces which become unbalanced. One constantly does things (smoke, drink, over/under eat) to satisfy these conflicts to symbolically fulfil deep emotional needs (Schomer, 1997).

Schomer (1997) advocates the rational model and suggests that most people engage in this type of behaviour. This model encompasses the decision making model and the health belief model. The former relates to our reasoning regarding personal, social and psychological costs and benefits. The latter refers to our perception of our current health status that will dictate the behaviour we will be willing to do (Henderson, et.al., n.d. & Schomer, 1997).

Research on US Olympic wrestlers using in-depth qualitative interviews to examine coping strategies showed that 80% used positive thinking, coping thoughts, prayer and perspective taking to cope with adversity and negative aspects of expectations (Gould, Eklund & Jackson, 1993). In a second study done on 17 US national champion figure skaters 40% identified positive focus, positive thinking, anxiety management, physical relaxation and visualisation amongst their coping strategies. In terms of the relationship between coping strategies and sources of stress it was found that different coping strategies were used for different sources of stress. For example a skater experiencing stress related to relationships would use positive focus, social support, rational thinking and self-talk whereas a skater experiencing huge psychological demands prior to a competition would use mental preparation, anxiety management and positive focus (Gould, Finch & Jackson, 1993).

In a study conducted by Finch (1994) (as cited in Hardy, Jones & Gould, 1997) using the COPE instrument (The Multidimensional Coping Inventory) to examine coping

strategies used by 148 collegiate female softball players it was found that the higher individuals' competitive anxiety the more positively it related to maladaptive and emotion-focused coping. Maladaptive refers to disengagement strategies, denial and behaviours such as the use of alcohol. Emotion-focussed coping refers to the regulation of emotional responses that resulted from the problem that caused the stress. The regulation includes behaviours such as meditation, relaxation and cognitive efforts to change the meaning of the situation (Folkman and Lazarus, 1980).

Folkman and Lazarus (1980) point out that problem-focussed coping is the type of coping most effective when individuals have personal control over the situation and maladaptive coping are the strategies they use when they have little control. Aside from the coping responses already described there are many other types of specific coping strategies. Carver, Scheier and Weintraub (1989) offer another classificatory system overlapping with the problem and emotion focused coping which also includes other strategies such as suppressing competing activities and turning to religion. The classificatory system is known as The Multidimensional Coping Inventory. In the trait format the inventory includes (other than the two strategies already mentioned) scale items such as: active coping, planning, seeking instrumental social support, seeking emotional social support, positive reinterpretation and growth, restraint coping, acceptance, focus on and venting of emotions denial, mental disengagement, behavioural disengagement, alcohol/drug use and humour.

Other coping strategies include denial of the problem, seeking information about the problem, blunting, preventive or prospective coping. The latter, meaning that a problem is pre-empted having a prophylactic effect is often referred to as an 'inoculation effect'. Stress inoculation can however also refer to the fact that prior exposure to stress mitigates the impact of subsequent exposures by enabling one to cope better. It also refers to the concept that individuals can be taught specific coping techniques to moderate against the effects of stress e.g. cognitive-behavioural procedures, relaxation techniques, hypnosis etc. (Bartlett, 1998).

Most of the discussion thus far has focussed on conscious coping and how the body copes with (adapts) to stress but little attention is paid to unconscious coping. A large number of researchers have concentrated on a variety of cognitive coping strategies

that can be employed to cope with stress yet there are individuals who without these strategies cope 'famously'. Why do some individuals cope better than others? Why are some individuals more resilient than others are? What is it that makes individuals more resilient?

RESILIENCE

Vaillant (1997) suggests that not all 'Humpty Dumpties' who fall off a wall are shattered beyond repair, forever. Some 'Humpty Dumpties' are mended. Werner in Werner and Smith (1982) refers to individuals who are mended as 'vulnerable but invincible'. This 'mending' or recovery from disadvantage, Vaillant, (1997) refers to as resilience. Resilience he argues conveys both the capacity to be bent without breaking as well as the capacity, once bent, to spring back. Werner and Smith (1982) define it as the tendencies within human organisms to self-right.

In longitudinal studies conducted by Werner and Smith (1982) on resilient children they found that these children had few serious illnesses and tended to recuperate quickly. As infants their mothers perceived them to be very active, physically robust and socially responsive. This resulted in the infants receiving a great deal of attention and the resultant forging of strong bonds between infant and primary caregiver. In their second year of life they showed autonomy, advanced self-help skills and adequate language and sensorimotor development. This secure base, Werner and Smith (1982) attributed to the strong attachment in early life. By middle childhood they had adequate problem-solving and communication skills. Their perceptual-motor development was also age-appropriate. By late adolescence the resilient individuals "had a more internal locus of control, a more positive self-concept, and a more nurturant, responsible, and achievement-oriented attitude towards life than their peers who had developed serious coping problems" (Werner & Smith, 1982, p. 154). By early adulthood the resilient men and women had a sense of coherence in their lives and they were able to make use of informal sources of support. They also expressed the wish to improve themselves (Werner & Smith, 1982). The more resilient individuals had strong social bonds and supports in comparison to those who did not cope well with difficulties. Vaillant (1997) suggests that cognitive strategies such as attributional style and temperament are also potential sources of resilience. Other sources include luck, timing, context, hope and faith.

In terms of care-giving environments contributing to resilience of high risk children Werner and Smith (1982) noted the following key factors: age of the opposite-sex parent e.g. older fathers for resilient girls; the number of children in the family (four or fewer); a spacing of two years between the first born and the next born; the number and type of alternate caretakers available to the mother; the workload of the mother; the amount of attention given to the child in infancy by the primary caretaker(s); structure and rules in the household; cohesiveness in the family; the presence of a multigenerational network of kin and friends during adolescence; and the cumulative number of chronic stressful life events experienced whilst growing up.

Vaillant (1997), in a study looking at men from the worst possible childhood environments, found that eight out of eleven men manifested the quality of resilience. The only two protective factors that these men enjoyed was good physical health and at least two years difference between the individual under study and his next sibling. They did not have protective factors such as high self-esteem, intelligence or social status. They were put at risk by the presence of most of the following factors: low socio-economic status; low self-esteem; severe marital discord; foster care for more than six months; mentally ill mother; delinquent father; person per room ratio more than one; less than two years between the next sibling; alcoholic parent and multi-problem family (Vaillant, 1997). According to Werner and Smith (1982) if at least four major risk factors are present a child's chances of success in adolescence is less than one in four.

Vaillant (1997) suggests that man is born broken, lives by mending and that it is the wisdom of the ego that provides the glue. As far as he is concerned defense mechanisms are an integral part of the protective factors already alluded to. He adds that in explaining the resilience of unpromising lives one ought to invoke the concept of mature defenses. Furthermore, he argues that mature defenses such as sublimation, humor, altruism, suppression and anticipation used by invincible individuals, are often referred to as the individual's ability to spin straw into gold, to laugh at themselves, to display empathy, a stiff upper lip and to worry and plan realistically. Vaillant (1997) debates whether leading investigators Rutter (1985), Garmezy (1983) and Werner (1982) of childhood resilience, although having hinted at it, dismiss the concept of defenses entirely or whether they describe it in language different from his.

Vaillant (1997) proposes that Werner's description of a resilient youth as opposed to a non-resilient youth as humorous, emotionally responsive, nurturant and idealistic is akin to describing him/her as altruistic. An individual's ability to plan constitutes anticipation and the ability to control impulses, suppression. Vaillant (1986, 1997 & 1998) rates altruism, anticipation and suppression as mature defense mechanisms. Rutter, (1985), unlike Vaillant (1997) is less inclined to classify an individual's coping mechanisms according to their adaptive or maladaptive qualities. He argues that the concepts and measures are too elusive and lack evidence (Vaillant, 1997). Vaillant's (1986) solution to bringing order to procedures for rating defenses is to apply more than one methodology to the same clinical sample.

Vaillant (1997) suggests that there are three different ways in which the mind copes with stress and danger. The first he suggests is receiving help from others i.e. social support. The second is learned methods to help one-self i.e. cognitive coping strategies. The first two are voluntary and the third is involuntary. The third is unconscious strategies i.e. ego mechanisms of defense. Vaillant (1997) thus indicates that resilience is not exclusively a conscious deliberate mechanism but has unconscious dimensions. This dimension of resilience has, however, not been adequately researched.

DEFENSE MECHANISMS

Defense mechanisms are defined as mental operations that occur outside of one's awareness. Their function is to protect the individual from experiencing excessive anxiety. Older classical psychoanalytic theorists believed that anxiety occurred if the individual became aware of unacceptable impulses, thoughts and wishes. Contemporary thoughts on the subject have added protection of the self and self esteem as another function (Cremer, 1998). Lowenstein (1967) (as cited in Cremer, 1998, p. 885) argues that defenses serve to protect the integrity of the ego organisation and "their function is implicitly one of adaptation". Cited in the same text Sandler and Joffe (1967) report that they see the use of defense mechanisms directed towards maintenance of well being as opposed to being specifically directed at the emergence of anxiety. Vaillant (1997) also uses the term defenses in the sense of coping i.e. of adaptation. Although initially defense mechanisms were seen in terms of

psychopathology, in the last 60 years they are understood to be part of an individual's normal psychological development. However, the possibility of the mind deceiving itself is not a new concept. As far back as the 3rd century B.C. the Greek Orator Demostenes warned of it. However, it was Freud who introduced the concept in the form of defense mechanisms to psychology more than a hundred years ago (Cremer, 1998) and Vaillant (1997) who argued that if we did not unconsciously distort inner and outer reality we would be condemned to anxiety and depression.

Vaillant (1997) suggests that defense mechanisms are for the mind what the immune system is for the body. He argues that when Hans Selye (1956) wrote that stress can kill, he only emphasised half of the equation. The other half of the equation is that defenses can allow one to survive. He sees the ego as to the mastery of stress as the immune system is to the mastery of tuberculosis. If patients with tuberculosis deploy their immune systems wisely they will never become seriously ill but if their immune systems are ineffective they will become seriously ill. Many complications do not arise from the myobacteria but from the body's efforts to combat it. Similarly, Vaillant (1997) argues that much of what is labelled mental illness reflects an individual's unwise use of defense mechanisms. If defenses are used well individuals are seen as mentally healthy, funny, creative and altruistic. If defenses are used badly individuals are termed ill, unpleasant and immoral. Vaillant (1997) cautions that the term mechanism does not mean anything as concrete as it does in immune mechanism. Mechanism in terms of defense is a descriptive metaphor for the temporary clouding of reality through thoughts, feelings and behaviours. Since they involve the highest integrative regulatory process of the central nervous system, they are not easily distinguishable from ordinary behaviours, thoughts and feelings.

In terms of which phenomenon can be called defenses Freud listed regression, repression, reaction formation, isolation, undoing, projection, introjection, turning against the self and reversal (Freud, 1926) (as cited in Strachy, 1973). Defenses such as sublimation, displacement, denial in fantasy, denial in word and act, identification with the aggressor and altruism were described by Anna Freud (Freud, 1937 &1961). Kernberg (1967) and Klein (1973) described defenses such as splitting, omnipotence with devaluation, primitive idealization, projective identification and psychotic denial.

Vaillant (1976) (as cited in Vaillant, 1986) added the defenses fantasy, passive aggression, hypochondriasis, acting out, suppression, humor and anticipation to the list.

LEVELS OF DEFENSES

Vaillant (1997) groups defenses into four levels based on the relative adaptiveness of the styles of self-deception in adult life e.g. projection is listed as immature (maladaptive) and altruism as mature (adaptive). The four levels are psychotic, immature, neurotic and mature.

Vaillant (1986, 1992 & 1998) describes Level I Psychotic Mechanisms as those mechanisms common in "healthy" individuals before age five, and common in adult dreams and fantasy. These mechanisms alter reality for the user and to the beholder they appear "crazy." Psychotic mechanisms tend to be immune to change by conventional psychotherapeutic interpretation; but they can be altered by change in reality (e.g. chlorpromazine, removal of stressful situation and developmental maturation). In therapy, they can be given up temporarily by offering the user strong interpersonal support as well as direct confrontation with the ignored reality. The defenses at this level are delusional projection, denial and distortion. Delusional projection is defined as frank delusions about external reality, usually of a persecutory type. Denial refers to denial of external reality and distortion to grossly reshaping external reality to suit inner needs (Vaillant, 1986, 1992 & 1998).

Level II are the Immature Mechanisms. They are common in "healthy" individuals ages three to fifteen, in character disorder, and in adults in psychotherapy. For the user these mechanisms often alter distress arising from e.g. threat of interpersonal intimacy or the threat of experiencing its loss. To the beholder they are seen as socially undesirable. Although refractory to change, immature mechanisms can change with improved interpersonal relationships (e.g., personal maturation, a more mature spouse, a more intuitive physician) or with repeated and firm interpretation during psychotherapy or through confrontation with or by peers (Vaillant, 1986, 1992 & 1998).

The defenses included in this level are projection, schizoid fantasy, hypochondriasis, passive aggressive behaviour and acting out. Projection is seen as attributing one's own unacknowledged feelings to others and schizoid fantasy as a tendency to use fantasy and to indulge in autistic retreat for the purpose of conflict resolution and gratification. Hypochondriasis is described as the transformation of reproach towards others which could arise from bereavement, loneliness, or unacceptable aggressive impulses into first self-reproach followed by complaints of pain, somatic illness, and neurasthenia. Passive-aggressive behaviour is defined as aggression towards others that is expressed indirectly and ineffectively through either being passive or directing the aggression against the self. Acting out is the direct expression of an unconscious wish or impulse in order to avoid being conscious of the affect that accompanies it. It includes delinquent or impulsive acts, and "tempers" to avoid being aware of one's feelings. The chronic use of drugs, failure, perversion, or self-inflicted injury to relieve tension (i.e., subjective anxiety or depression) can also be included (Vaillant, 1986, 1992 & 1998).

The level III Neurotic Defenses are common in "healthy" individuals ages three to ninety, in neurotic disorder, and in mastering acute adult stress. For the user these mechanisms alter private feelings or instinctual expression. The beholder sees them as individual quirks or "neurotic hang-ups." They can often be dramatically changed by conventional, brief psychotherapeutic interpretation. Intellectualization, repression, displacement, reaction formation and dissociation fall into this 'category' (Vaillant, 1986, 1992 & 1998). Intellectualization refers to thoughts or thinking about instinctual wishes in formal, affectively bland terms, without acting on them. The idea is in consciousness, but the feeling is missing. Repression is described as inexplicable naivete, memory lapse, or failure to acknowledge input from a selected sense organ. The feeling is in consciousness, but the idea is missing. The "forgetting" of repression is unique in that it is often accompanied by highly symbolic behaviour which suggests that the repressed is not really forgotten. Displacement is redirection of feelings toward a relatively less cared for (less cathected) object than the person or situation arousing the feelings and reaction formation is behaviour in a manner diametrically opposed to an unacceptable instinctual impulse. Dissociation is a temporary but drastic modification of an individual's character or of his/her sense of personal identity to avoid emotional distress (Vaillant, 1986, 1992 & 1998).

Level IV is Mature Mechanisms. Vaillant (1986, 1992 & 1998) suggests that they are common in "healthy" individuals ages twelve to ninety. For the user the mechanisms integrate reality, interpersonal relationships and private feelings and to the observer they appear as convenient virtues. Under increased stress they may change to less mature mechanisms. This level includes altruism, humor, suppression, anticipation and sublimation. The definition of altruism is vicarious but constructive and instinctually gratifying service to others e.g. philanthropy, and well-repaid service to others. Humor is defined as the overt expression of ideas and feelings without the individual experiencing discomfort or unpleasant effect on others. Suppression refers to the conscious or semiconscious decision to postpone or delay paying attention to a conscious impulse or conflict. Anticipation is described as realistically anticipating and planning for future inner discomfort. Sublimation is seen as the indirect or attenuated expression of instincts without either adverse consequences or the loss of pleasure (Vaillant, 1986, 1992 & 1998).

Although defenses are seen as mere metaphors, the defenses individuals use can have profound effects on themselves and others. Deployment of mature defenses tends to pacify other individuals whereas deployment of immature defenses tends to have the opposite effect. However, having made these distinctions, Vaillant (1997) suggests that often defenses are similar e.g. projection (immature), reaction formation (neurotic/intermediate) and altruism (mature). He claims that developmentally the one evolves into the other i.e. projection into reaction formation and the latter into altruism.

MEASUREMENT

By substituting some overt behaviours for intrapsychic processes in his studies Vaillant (1976) (as cited in Vaillant, 1986) claimed that the substitution allowed the ego function to be examined in operational terms as opposed to theoretical terms. Vaillant felt that it was necessary to make intrapsychic processes operational so that defenses could be studied experimentally. In trying to develop an experimental method Vaillant (1976) (as cited in Vaillant, 1986) and Haan, Stroud and Holstein (1973) combined psychiatric interviews with other measures such as questionnaires, autobiographical reports and psychological tests. Vaillant (1976) (as cited in Vaillant,

1986) noted however that the objectivity and reliability of ratings was limited because in most cases clinical judgement was required.

One approach to attempt to measure defense mechanisms is through self-appraisals of conscious derivatives. The measure is said to not directly measure defense mechanisms but to relate to them. In terms of self-appraisals, defense mechanism describes not only an unconscious intrapsychic process it also describes conscious or unconscious behaviour that is designed to reconcile internal drives with external demands (Bond, Gardner & Christian, 1983).

Defense mechanisms in psychoanalytic terms are an unconscious process. One could therefore question how a self-report/appraisal can detect a phenomenon of which a participant is unaware. Bond (1986) (as cited in Vaillant, 1986) argues that there are times when defenses fail temporarily, and at those times subjects may become aware of their unacceptable impulses and their usual styles of defending against them. He also adds that others often point out defense mechanisms to the individual e.g. Mary may say that people often tell her that she takes her anger out on someone other than the person she is angry with. This he suggests might indicate displacement even if the individual is unaware of the defensive behaviour at the time it is occurring.

An example of a self-report defense mechanism measure is the Defense Style Questionnaire (Bond, 1984) (as cited in Vaillant, 1986, 1992). This measure uses structured responses to assess defense mechanism use. The format of the responses is straightforward, objective and can be easily scored without observer bias (Davidson & MacGregor, 1998). Participants are asked to indicate their degree of agreement or disagreement with each statement on a 9-point scale. 1 indicates strong disagreement and 9 indicates strong agreements. The scales are constructed so that a high score on any one defense measure indicates that the subject is using the defense (Bond, 1986) (as cited in Vaillant, 1986).

Bond's 1984 (Vaillant, 1986 & 1992) version of the questionnaire consists of 88 statements designed to reflect behaviour suggestive of the following 24 defenses: acting out, pseudoaltruism, as-if behaviour, clinging, humour, passive aggressive behaviour, regression, somatization, suppression withdrawal, dissociation, denial,

displacement, omnipotence-devaluation, inhibition, intellectualization, identification, primitive idealization, projection, reaction formation, repression, splitting, sublimation, and turning against the self. Two psychologists and one psychiatrist initially tested the statements independently, for face validity. They matched up each statement with its relevant defense or coping mechanism. Only the statements on which they all agreed formed the initial 97 statement questionnaire. These statements were tested in a pilot project on 30 patients. Internal consistency among statements designed to measure the same defense was assessed through correlations of the items-to-total. Only statements correlating with their parent group at a significance level of greater than .001 were retained. The number of statements in each category ranged from 1 to 6. 81 of the 97 statements were retained and seven more added (Vaillant, 1986 & 1992).

Davidson and MacGregor (1998), however, argue that single self-report measures are not sufficient for seizing all the critical dimensions for assessing the complex framework of defense mechanisms. They suggest that it is necessary to consult other sources of information i.e. biographical data, clinical assessment and behavioural observation. Given all the debates surrounding defense mechanisms, their definitions and measurement, it would be prudent in further studies to take heed of the suggestions offered by Davidson and MacGregor (1998).

This review has covered the broader aspects of stress, coping, resilience and defense mechanisms. It was evident from the review of the stress and coping literature that there was little emphasis on unconscious processes (i.e. defense mechanisms) in previous research and publications. However, in terms of adaptation and resilience, Vaillant (1986,1992, 1997 & 1998) has shown that defense mechanisms play a major role. It is in the light of these findings that the research to establish a relationship between stress, coping and the use of defense mechanisms, will proceed.

The research focuses on the level of stress experienced by individuals, the coping mechanisms they employ as well as the defense mechanisms used in terms of adaptation. It is hypothesized that resilience and healthy coping is associated with the level of defense mechanisms used i.e. the more mature level of defense used the better the individual will cope and vice versa. 'Better coping' is associated with adaptation

and adaptation with health and this includes mental health (Vaillant, 1998). Mature Defense Mechanisms are associated with the experience of low stress and adaptive coping, immature mechanisms with high stress and maladaptive coping. It is hypothesised that successful adaptation/resilience is associated with the individual's use of mature defense mechanisms and adaptive coping to adapt to daily stresses.

RESEARCH QUESTIONS

Does the maturity of defenses mediate the experience of stress in high-risk occupational contexts?

Does coping style mediate the experience of stress in high-risk occupational contexts?

Is coping style associated with defense style?

METHOD - PARTICIPANTS

Participants are individuals working in organisations undergoing change and where the nature of the work is inherently stressful e.g. public service employees working in the ambulance, police and teaching services. Participants are males and females, representative of three ethnic groups namely black, coloured and white, the ages range from 18 years to 60 years. Participant numbers are as follows: 102 ambulance service staff members, 55 members of the police force and 37 teachers. Ambulance and police force members were selected because they represented persons working in "high stress environments". Teachers formed a control group because they are representative of individuals working in a less stressful environment in terms of being directly exposed to shift work, emergencies, crime, violence, serious injury and death.

DATA COLLECTION

Participants (600 in total) were approached via their institutions. Voluntary participation was emphasised as well as withdrawal of their participation at any time. Confidentiality was addressed. No personal information was requested, however, those respondents desiring feedback were asked to leave a name and telephone number on the completed questionnaire for the researcher to provide individual private feedback. On completion of the feedback the personal details would be removed. Participants were given a contact number for information regarding the research, feedback or their rights as research participants. Responses were collected at the beginning or end of shifts and prior to or after meetings. Questionnaires were

either completed immediately or in the respondents' own time depending on work demands.

RESEARCH INSTRUMENTS

Research measures consisted of three questionnaires, their respective scales (scoring sheets) and a glossary of defenses. The first questionnaire is the Holmes and Rahe Social Readjustment Rating Scale (SRRS) (Zimbardo, 1992) (Appendix A). The SRRS rates the degree of adjustment required by the pleasant and unpleasant life changes experienced by individuals. The calculated life change units are used to assess the amount of stress the individual is experiencing (Holmes & Rahe, 1967). The scale was developed from responses obtained from adults from all walks of life. The adults were asked to identify from a list the life changes that applied to them. They rated the amount of adjustment necessary for each change by comparing each to marriage, which was arbitrarily given a value of 50 life change units (LCU). The total number of LCU's an individual had undergone during a specific period was calculated using the units as a measure of the amount of stress the individual had experienced (Holmes & Rahe, 1967).

The scoring of the SRRS is as follows: SRRS score above 300 (High health risk interpreted as not coping at all). Scores between 150 and 300 i.e. (50-50 chance of serious health change, interpreted as not coping very well). Scores below 150 i.e.1in 3 chance of serious health change, interpreted as just coping (Zimbardo, 1992). See (Appendix B) for scale scores (Zimbardo, 1992). The SRRS scores will be used to establish the relationships between coping and the use of defense mechanisms.

The second questionnaire is the COPE (The Multidimensional Coping Inventory) questionnaire (Carver, Scheier and Weintraub, 1989) (Appendix C). The COPE is a multidimensional coping inventory that is used for assessing situational coping, dispositional coping or both. It is made up of the following scales: active coping (1); planning (2); seeking instrumental social support (3); seeking emotional social support (4); suppression of competing activities (5); turning to religion (6); positive reinterpretation and growth (7); restraint coping (8); acceptance (9); focus on and venting of emotions (10); denial (11); mental disengagement (12) and behavioural disengagement (13). For the purposes of this study the dispositional version is used.

This version requires respondents to indicate the extent to which they use each coping response when experiencing stressful situations. The test-retest reliabilities taken from two samples of subjects over six and eight week periods ranged from 0.42 – 0.89 for the different scales indicating that the coping tendencies measured by the COPE are reasonably stable (Carver, Scheier and Weintraub, 1989). Carver et.al. (1989) also found the internal consistency (Cronbach's alpha) of the COPE scales acceptably high, exceeding 0.6. Having compared the COPE to the Ways of Coping Checklist (Folkman & Lazarus, 1980) and the Ways of Coping Questionnaire (Folkman & Lazarus, 1988) Carver et.al. (1989) recommend the COPE should a theoretically based instrument be required to assess a wide range of coping responses.

In terms of the COPE scale (Appendix D) maladaptive coping is indicated by scales 10, 11 and 13 and scales 1, 2, 3, 7 & 9 measure coping responses which are hypothesised to be adaptive in situations where active coping is associated with good outcome, whereas scales 4, 5 & 8 are less obvious yet also predicted to be adaptive. In terms of this study the latter is excluded.

The third questionnaire is an adaptation of a self-report defense mechanism measure, the Defense Style Questionnaire (Bond, 1984) (as cited in Vaillant, 1986, 1992) referred to previously in the measurement section (Appendix E). The adapted measure uses a combination of Bond's (1984) structured responses and additional structured responses that fall within Vaillant's (1986, 1992) definitions of mature and immature defenses (see glossary of defenses – Appendix F). Bond's (1984) 88 statements were adapted independently by the researcher a clinical psychology master's student, a clinical psychologist and psychiatrist. Only the statements on which all parties agreed formed the statements for the questionnaire. Vaillant's (1986, 1992 & 1998) glossary of defenses lists 18 defenses (Appendix E) across the 4 different levels as opposed to Bond's (1984) 24. Vaillant's glossary does not include as-if behaviour, clinging, regression, somatization, withdrawal, omnipotence-devaluation, inhibition, identification, primitive idealization, splitting and turning against the self. It does on the other hand, amongst others include delusional projection, distortion, schizoid fantasy, hypochondriasis and anticipation which do not form part of Bond's (1984) list. Statements reflecting defenses not coinciding with Vaillant' glossary were removed from the questionnaire. Statements indicating

mature and immature defenses were included. This questionnaire consists of 44 statements indicating mature defenses, immature defenses and false statements.

As with the original questionnaire structured responses were used to assess defense mechanism use. Using this measure participants were asked to indicate their degree of agreement or disagreement with each statement. The scales were constructed so that a high score on any one defense measure indicates that the subject is using the defense (Bond, 1984) (as cited in Vaillant, 1986).

PROCEDURE

Participants were informed that the purpose of the study was to assess their levels of stress and the ways in which they manage their stress. They were requested to complete all three questionnaires and each statement on each questionnaire even though they may appear similar. Unless participants wanted feedback, personal details were not required. All responses were collected by the researcher and would remain confidential.

DATA PROCESSING

Responses to the 3 questionnaires were scored and captured onto excel. Descriptive statistics e.g. frequency histograms using the Statistica package were applied to all stress variables and all the cope and defense mechanism responses for the total respondents as well as for the groups ambulance, police and teachers. Means and standard deviations of the respondents' scores in each category of defenses (mature and immature) and coping (adaptive and maladaptive) for each group were calculated. Regression analysis (bivariate scatter plots and regression summary) were performed on respondents' total scores in adaptive coping, maladaptive coping, immature defenses and mature defenses versus levels of stress for each group as well as for the total of the three groups. One-way ANOVA's with fixed effects were performed on the variables stress, adaptive coping, maladaptive coping, immature defenses and mature defenses. Principal Component Analysis was applied to the results.

DATA INTERPRETATION

The researcher was able to evaluate the initial hypotheses i.e. are mature defense mechanisms associated with the experience of low stress and adaptive coping? Furthermore, are immature mechanisms associated with high stress and maladaptive coping? Finally, is resilience associated with the individual's use of mature defense mechanisms and adaptive coping to adapt to daily stresses and strains?

RESULTS

DESCRIPTIVE STATISTICS

Levels of stress

A total score (level of stress) was calculated for each subject as the sum of all single scores in each variable of the stress questionnaire. The frequency of subjects attaining a low (<150), medium (150-300) and high (>300) score was estimated for the entire sample and for each group of subjects separately. The results depicted in figure 1 show that in the entire sample and per group of subjects, a low-to-medium level of stress is more predominant than high levels of stress. However, it shows that the frequency of high level stress is higher among ambulance personnel in comparison to the police and teachers groups, where the incidence of high stress is much smaller.

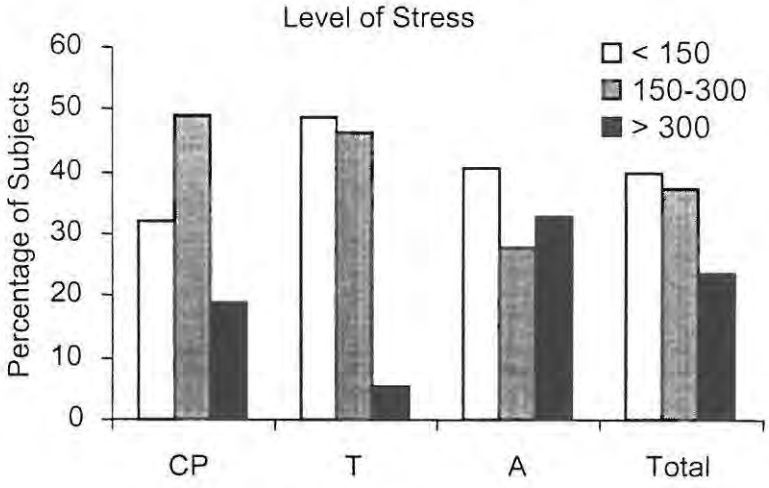

Fig.1 Relative frequency distribution of the levels of stress of all the participants and each group under study.

Defence and Coping mechanisms

In order to estimate the prevalence of healthy (POSITIVE) vs unhealthy (NEGATIVE) mechanisms utilised by the participants, the difference between mature/adaptive and immature/maladaptive total scoring was calculated for each participant. Subjects with a positive difference were considered to be predominantly using healthy mechanisms (mature/adaptive); those with a negative difference were considered to be using predominantly unhealthy mechanisms (immature/maladaptive). The result shows that in each group of participants and in the whole sample there is a high proportion of participants utilising healthy mechanisms (figure 2,3).

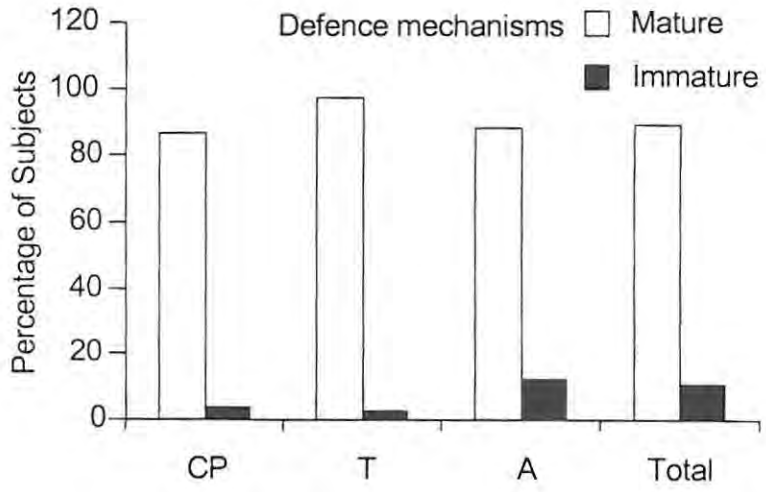

Figure 2. This histogram depicts the relative frequency of participants utilising predominantly healthy defence mechanisms.

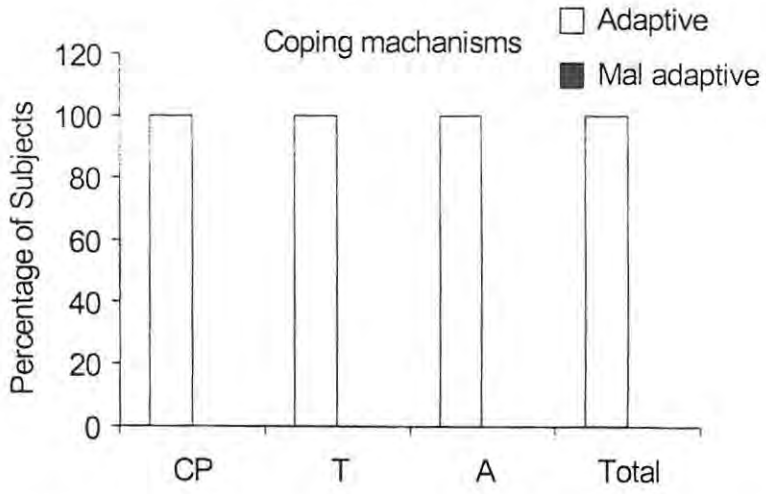

Figure 3. This histogram depicts the relative frequency of participants utilising predominantly healthy coping mechanisms.

In order to estimate apparent differences in the use of the various categories of defence mechanisms among the groups in the study, an average score and standard deviation for each group was calculated in each defense mechanism category. The results show that there is a high similarity in the mean average score of all groups with a high overlap of standard deviation range in all categories (figure 4). This is indicative of no significant differences among the groups in the pattern of utilisation of mature or immature defense mechanisms. However, the histogram for PROJECTION shows that there might be a significant difference in the use of this category of mechanism in the teachers group compared with the rest of the sample.

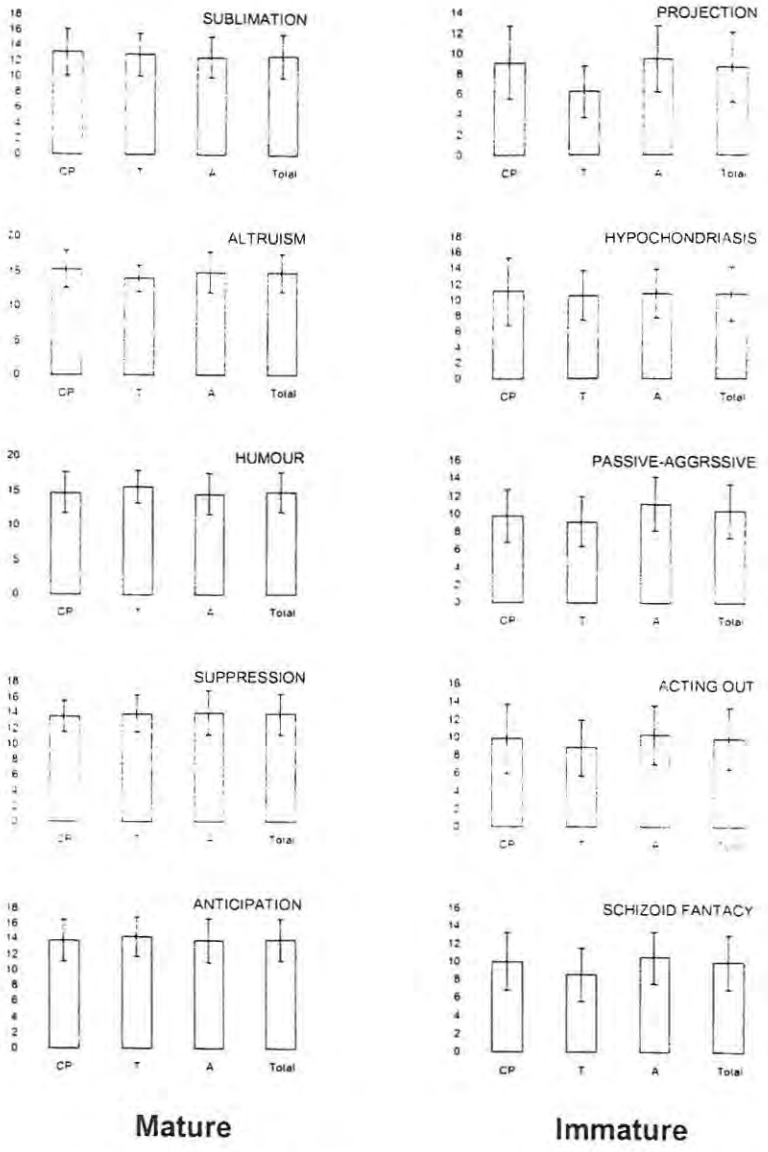

Figure 4. Average score and standard deviation of each participant's group for each category of **defence mechanisms** (CP: police officer; A: ambulance driver; T: teacher)

Similarly, with the intention of estimating apparent differences in the use of the various categories of coping mechanisms among the groups in the study, an average score and standard deviation for each group was calculated in each category of coping mechanism. The results show that there is a high similarity in the mean average score of all groups with a high overlap of standard deviation range in all categories (figure 5). This again is indicative of no significant differences among the groups in the utilisation of adaptive or maladaptive coping mechanisms. However, the histograms for DENIAL and BEHAVIOURAL DISENGAGEMENT show that there might be a significant difference in the use of this category of coping mechanism in the teacher group compared with the rest of the sample. Furthermore, there is a general tendency towards using 'focus on and venting of emotions' across the entire spectrum of participants.

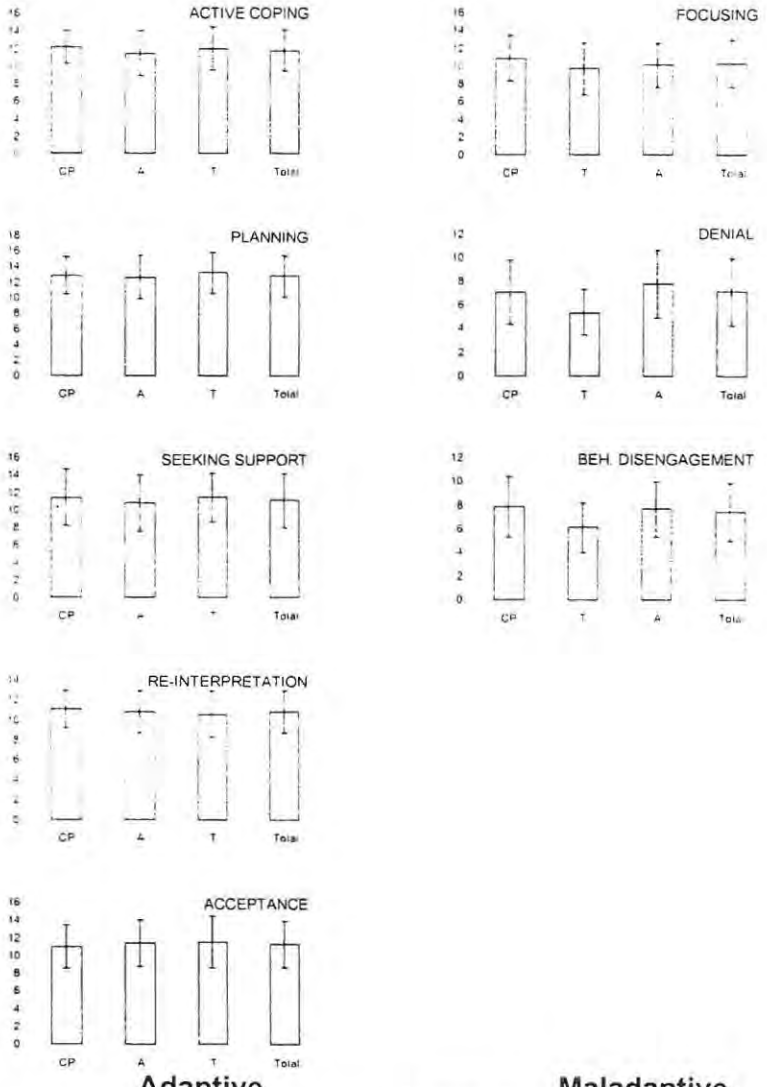

Figure 5. Average score and standard deviation of each group for each category of **coping mechanism** (CP: police officer; A: ambulance driver; T: teacher)

Regression Analysis:

Regression and correlation analyses were performed to investigate the relationship between the type of mechanism utilised by the subjects and their level of stress. The theory predicts that under high levels of stress the occurrence of unhealthy mechanisms (immature/maladaptive), should be more predominant. On the other hand, under low levels of stress one should observe a predominance of healthy mechanisms (mature/adaptive). With this hypothesis in mind, regression/correlation analyses were performed between the subject's level of stress and their total scores in terms of defence and coping mechanisms. The results of the analyses are shown in tables 1, 2, 3 and 4, below.

Table 1. Regression summary for the analysis of **mature defence mechanisms** v/s level of stress in the three study groups

GROUP	N	MODEL	R^2	P
CP	52	Score = 74.12054-0.01706(stress)	0.05542796	0.092926
T	35	Score = 73.57675-0.01704(stress)	0.07012995	0.124196
A	88	Score = 68.11963+0.02239(stress)	0.02239758	0.164014
Total	175	Score = 70.14640+0.001(stress)	0.00030169	0.819534

Table 2. Regression summary for the analysis of **immature defence mechanisms** v/s level of stress in the three study groups

GROUP	N	MODEL	R^2	P
CP	52	Score = 39.92266+0.04176(stress)	0.13529658	0.007303 (*)
T	37	Score = 40.51424+0.01718(stress)	0.02606579	0.339764
A	94	Score = 48.43127+0.01435(stress)	0.04506129	0.039973
Total	183	Score = 44.28586+0.02329(stress)	0.07726119	0.000139

Table 3. Regression summary for the analysis of **adaptive coping mechanisms** v/s level of stress in the three study groups

GROUP	N	MODEL	R^2	P
CP	45	Score = 58.833 - 0.0005(stress)	0.00006304	0.958718
T	28	Score = 63.934 - 0.0398(stress)	0.09087043	0.119020
A	83	Score = 56.399 + 0.00175(stress)	0.00096877	0.7799991
Total	156	Score = 57.764 - 0.001(stress)	0.844348	0.844348

Table 4. Regression summary for the analysis of **maladaptive coping mechanisms** v/s level of stress in the three study groups

GROUP	N	MODEL	R^2	P
CP	51	Score = 24.02583+0.0087(stress)	0.03499262	0.188706
T	33	Score = 19.47979+0.01084(stress)	0.04434661	0.239463
A	88	Score = 23.517+0.00771(stress)	0.07108152	0.012042 (*)
Total	172	Score = 22.613+0.00966(stress)	0.07375645	0.000314 (*)

The results of these analyses show that, with few exceptions (see probability values in summary tables above), there is no significant relationship between these variables. In those cases where regression is significant (*), the correlation index or determination coefficient is particularly low (7.1% to 13.5%), indicating only a minor relationship.

These results contradict the theory prediction that under high levels of stress the occurrence of unhealthy mechanisms (immature/maladaptive) are more predominant and that under low levels of stress healthy mechanisms (mature/adaptive) predominate.

Analysis Of Variance

A one way ANOVA test was applied to investigate the differences in stress levels and type of defence and coping mechanisms amongst the groups under study. In those cases where the model detected significant differences among the groups, a post hoc Tukey honest significant difference (HSD) test was applied to determine the different group(s).

Table 5. ANOVA summary of all Effects for the stress level among the groups of subjects

Source of variance	Df Effect	MS Effect	df Error	MS Error	F	P level
GROUP	2	100363.4	189	24835.60	4.041112	.019119(*)

Table 6. Tukey (HSD) test among the three different groups of subjects for the stress level.

	CP	A
CP		
A	.514458	
T	.217815	.012880 (*)

The ANOVA results for the levels of stress showed significant differences (P=0.019), among the groups (Table 5). The result of the post hoc test (HSD) showed that the level of stress in the teachers group is significantly different from that of the ambulance group but that it does not differ significantly from the police group (Table 6). The teachers group showed a significantly lower level of stress in respect of the ambulance group.

Table 7. Summary of all Effects:

Source of variance	Df Effect	MS Effect	df Error	MS Error	F	P Level
Mature defence:						
GROUP	2	14.3353	176	52.5203	0.272949	0.761453
Immature defence:						
GROUP	2	1318.370	176	108.1443	12.1908	0.000011 (*)
Adaptive coping:						
GROUP	2	45.1671	176	46.6620	.0.9680	0.381869
Maladaptive coping:						
GROUP	2	258.3343	176	24.1518	10.69627	0.000041(*)

Table 8. Tukey (HSD) test among the three different groups of subjects for the immature mechanism.

	CP	A
CP		
A	.453973	
T	.001047	.000024

Table 9. Tukey (HSD) test among the three different groups of subjects for the maladaptive mechanism.

	CP	A
CP		
A	.987887	
T	.000144	.000060

The ANOVA results for the four types of mechanisms considered in this study showed the groups of subjects differ significantly in the incidence of immature defence mechanisms (P=0.000011), and maladaptive coping mechanisms (P=0.000041). (Table 7).

The result of the post hoc test (HSD) for the immature defence mechanisms showed that the teachers group in this variable is significantly different from the ambulance and police groups, whereas the police group and ambulance group are not different from each other (Table 8). The teachers group showed a significantly lower mean score on the immature defence mechanisms in comparison to the other two groups.

The result of the post hoc test (HSD) for the maladaptive coping mechanisms showed a significant difference between the teachers group and that of the ambulance and police groups, whereas the police group and ambulance drivers are not significantly different from each other (Table 9). The teachers group showed a significantly lower maladaptive coping mechanism mean score as opposed to the other two groups.

Analysis of the difference between Healthy (Positive) and Unhealthy (Negative) Mechanisms

With the aim of investigating the relationship between stress and the positive and negative responses (mature vs. immature, adaptive vs. maladaptive), a standardised index (delta) was calculated for each participant in the study according to the following formula:

$$\text{Delta} = (S^{+} / M) - (S^{-} / M)$$

Where:

S^{+} is the scoring of the participant for positive mechanism (mature or adaptive)

S^{-} is the scoring of the participant for negative mechanism (immature or maladaptive)

M is the maximum score in the questionnaire for that particular set of questions, (i.e. the score that a participant would obtain if he/she chooses all the alternatives with maximum score in a category of mechanisms).

Delta is a relative score, which represents the type of mechanism that a participant uses predominantly

Example: Total scores for subject 4 in the four different categories of defence and coping mechanisms:

Mechanism	Participant score	maximum score
Defence mature :	68	100
Defence immature :	47	100
Coping adaptive:	60	80
Coping maladaptive:	24	48

Delta $_{[defence]}$ = (68 /100) – (47 / 100) = 0.21
Delta $_{[coping]}$ = (60 / 80) – (24 / 48) = 0.25

These new relative scores were plotted against the level of stress of each participant and the resulting graphs are shown in figures 15 and 16.

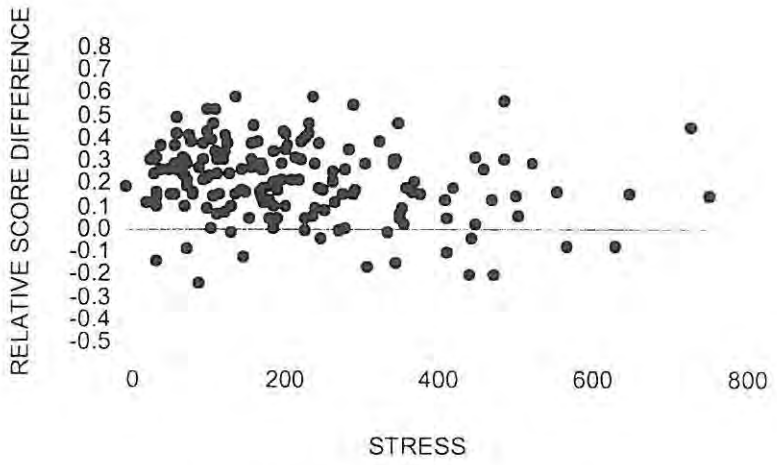

Figure 6. Bivariate scatterplot of the difference between relative scores in defence mechanisms vs level of stress.

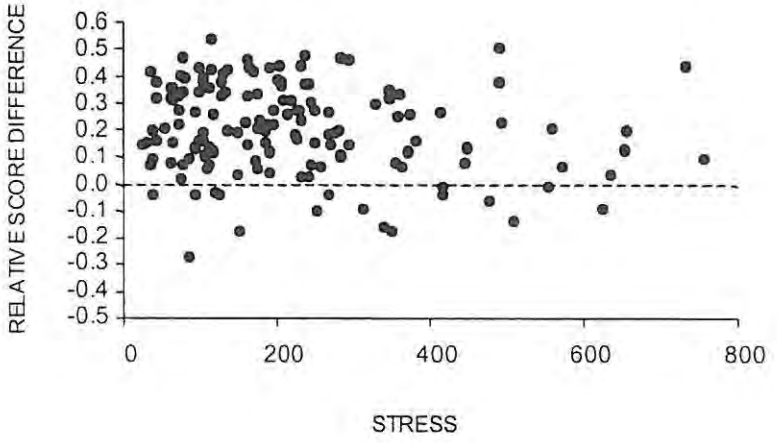

Figure 7. Bivariate scatterplot of the difference between relative scores in coping mechanisms vs the level of stress.

The linear and homogeneous distribution of the points in both diagrams shows that the predominance of negative mechanisms (participants under the zero line) or positive mechanisms (participants above the zero line) is independent of the level of stress. In both diagrams (coping and defence mechanisms), the high concentration of scores above the zero line is evident, indicating that at any level of stress participants are making use of "positive" mechanisms.

Nevertheless, the distribution of the relative scores according to low (<150), medium (150-300) and high (>300) level of stress, shows a tendency towards a major occurrence of "negative" mechanisms in participants highly stressed as compared to those participants with low or medium levels of stress (figure 8).

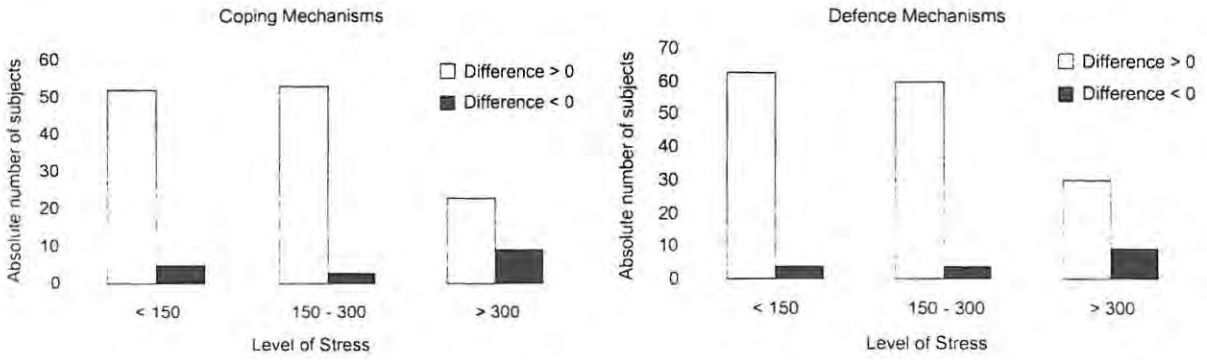

Figure 8. Frequency distribution of subjects presenting positive and negative mechanism in three categories of stress.

Principal Component Analysis

Principal component analysis was applied to identify the separate dimension of the structure and to determine the extent to which each variable is explained by each dimension. The approach in the present study was as follows:

The four responses measured in this study (totals were used) were entered in the analysis as the original set of variables: DEF_IMM, DEF_MAT, COP_MAL, COP_ADP. The first result obtained was a set of four factors, each one "made" as a linear combination of the four original variables (each one of the 4 original variable is represented in the 4 factors). These factors were ordered according to the amount of total original variance that they explain i.e. the "eigenvalue" (Table 10).

Table 10. Eigenvalues calculated for the first 4 principal components.

	Eigenvalue	% total Variance	Cumulative Eigenvalue	% Cumulative Variance
1	1.864833	46.62082	1.864833	46.6208
2	1.214180	30.35451	3.079013	76.9753
3	.641203	16.03007	3.720216	93.0054
4	.279784	6.99460	4.000000	100.0000

The table shows that the first factor explains 46.6% of the variance, the second factor explains 30.3%, etc. The amount of variance explained by the first two factors (cumulative) is 76.9%, which is a high value suggesting a consistent underlying pattern of variation among the original variables. To investigate the pattern the factor structure was perused. The result is in the next table (table 11).

Table 11. Factor Loadings (Un-rotated) calculated for the four variables entered in the current analysis.

	Factor 1	Factor 2	Factor 3	Factor 4
COP_ADP	.628769	.609894	-.416806	-.242798
COP_MDP	-.676336	.610508	-.281234	.301260
DEF_MAT	.607550	.563295	.536589	.160168
DEF_IMM	-.801832	.390113	.316947	-.323143
Expl.Var	1.864833	1.214180	.641203	.279784
Prp.Totl	.466208	.303545	.160301	.069946

These results show that there is no segregation of the original variables across the factor structure in terms of the magnitude of the contribution of the original variables. All factor loadings have a similar magnitude in all factors indicating that there are no sub-sets of variables associated with different factors. One can conclude that variation in the 4 variables is generalised throughout the sample and there are no conspicuous groups of subjects. It is, however, interesting that the loadings for mature and adaptive mechanisms are positive whereas those for immature and maladaptive mechanisms are negative. This indicates that the two sets of variables (the two different types of mechanisms) have a high contribution to factor 1 but in an opposite direction. This may be reflecting that the occurrence of one or other type of mechanism is not entirely independent, a result that the previous descriptive analysis failed to elucidate.

DISCUSSION

The literature addressed a number of definitions of stress as well as the various approaches to stress by a number of authors. We saw that if a person appraised a particular relationship between him/herself and the environment as taxing or exceeding his or her resources and endangering his or her well-being, the person is said to be stressed (Lazarus & Folkman, 1984a). Furthermore, that stress is the non-specific response of the body to any demand made upon it (Selye, 1974) and that it is any transactional process in which the organism experiences an alteration of psychological homeostasis (Burchfield, 1985).

From the different approaches we gleaned that the greatest contribution came from the physiological, behavioural and cognitive theorists, with minimal emphasis on the unconscious domain. Holmes and Rahe (1967) contributed to the stress literature by developing the Social Readjustment Rating Scale (SRRS) as a means of assessing the impact of life changes on individuals' stress levels. In terms of the current study high risk for stress groups in the public service i.e. ambulance and police force personnel were targeted as well as teachers who formed the control group. One would expect a degree of stress in the public service given that 'controlling one's environment' in this service is generally more problematic. The central theme to Fisher's (1984) approach is that individuals seek to control their environments but the level of control changes in stressful situations. When stressful situations are undesirable the individual seeks to control this in order to maintain homeostasis and reduce unpleasant experiences. However, if individuals fail to control their environments the effects of behaviour and physiological responses are maximized, providing knowledge of failure to cope and influencing subsequent reactions.

The results of the SRRS showed that high level stress is higher among ambulance personnel in comparison to the police and in particular the teachers groups, where the incidence of high stress is much smaller (see page 24). The prominent difference between the groups in terms of stressors can be understood apropos the nature of their work and the cross section of participants. In terms of the former, contributing to stressors of an ambulance worker are long hours, shift work, safety aspects and work with a partner. These aspects are similar for police force workers but dissimilar for

teachers. The participants from the police force, however, included a large number of administrative staff who work under similar conditions to teachers whereas participants from the ambulance service were mainly operations staff with one or two participants from the administrative section.

Responses to life change units/stressors (Holmes and Rahe, 1967) were to be expected given the nature of work of the different groups. Responses to death in the family were equal for all groups but death of a friend or colleague was more prominent in the ambulance and police groups as was argument with a friend or colleague. Divorce was less amongst teachers. This finding could be due to 'normal' working hours and shifts. Injury was highest amongst police and much less amongst teachers. Teachers indicated less failure in terms of courses than police personnel. Both groups were less than ambulance service staff. In terms of increased workload the teachers scored the highest whereas the police and ambulance participants scored higher on arguments with the boss. Health changes were more prominent amongst ambulance workers and change in sleep patterns affected both ambulance and police participants (See appendix H). The response in terms of health changes by members of the ambulance service is in keeping with Selye's (1956) argument that the body adapts to changes via the general adaptation syndrome (GAS) i.e. it evolves through three stages: the alarm reaction, the stage of resistance and the stage of exhaustion. If errors occur in the adaptive response to stress, the body becomes unable to adapt and a potentially disease-producing situation arises resulting in the body developing diseases of adaptation e.g. high blood pressure, ulcers, allergies etc. (Selye, 1956). Both the ambulance and police services reported a high rate of absenteeism.

The ANOVA results for levels of stress showed significant differences between the groups and the post hoc test (HSD) showed the level of stress in the teachers group to be significantly different from that of the ambulance group but less different from the police group. The teachers group showed a significantly lower level of stress compared to the ambulance group.

How individuals perceive and cope with stress was explored and understood in terms of approaches the different authors have taken. Selye's (1956) emphasis was on the General Adaptation Syndrome. The psychosomatic movement was supported by

researchers Kiecolt-Glaser (reported by Martin, 1987) and Pike, Smith, Hauger, Nicassio, Patterson, McClintick, Costlow & Irwin (1997). Fisher (1984) espoused control theory, while the understanding of Lazarus and Folkman (1984) was more cognitive in nature incorporating problem and emotion focussed coping. Carver, Scheier and Weintraub's (1989) approach was similar to that of Lazarus and Folkman (1984) but their focus they termed situational and dispositional coping. The instrument they referred to as the COPE instrument (The Multidimensional Coping Inventory) (Appendix C). In the current study, this instrument was used to measure conscious coping while a combination of Bond (1984) and Vaillant's (1986, 1992 & 1998) instruments was used to measure unconscious coping i.e the use of defense mechanisms. One could argue that the General Adaptation Syndrome and the psychosomatic responses are unconscious, which to a large degree they are but the unconscious referred to in terms of the study is in particular the individuals' use of defense mechanisms in the same way that the immune system is activated. The emphasis on unconscious coping emerged from a paucity of information and focus in this regard.

The current study sought to establish whether a relationship existed between conscious and unconscious coping and whether the level of defense/coping strategy used had an impact on the experience of stress and vice versa. It was hypothesised that in the presence of mature mechanisms one's experience of stress would be of a lower level whereas in the presence of immature mechanisms one's experience of stress would be relatively high. The writer, however, is of the opinion that the use of mature mechanisms in the presence of high stress is indicative of successful adaptation i.e. resilience. In general, Vaillant (1986, 1992 & 1998) argues that mature mechanisms are common in 'healthy' individuals, ages twelve to ninety. For the user the mechanisms integrate reality, interpersonal relationships, and private feelings and to the observer they appear as convenient virtues. Under increased stress they may change to less mature mechanisms. If, however, under increased stress they do not change to immature mechanisms can this be assumed to be resilience?

The results of defense mechanism and coping use, irrespective of stress levels showed that in terms conscious and unconscious coping, participants' use of mature mechanisms far outweighed that of immature mechanisms. Bearing in mind

Vaillant's (1986, 1992 & 1998) description of mature mechanisms in the paragraph above, the more frequent use of mature mechanisms and adaptive coping makes reasonable sense. Nevertheless, apropos the latter there appears to be no evidence of maladaptive coping, only adaptive (Figure 3). This information is however misleading. On viewing (Figure 5) it is evident that participants do resort to maladaptive coping but these are fewer in number than adaptive coping. When these categories are directly compared given the unequal groupings, it stands to reason that a false picture will emerge. Figure 5 nevertheless highlights that teachers resort to denial and behavioural disengagement less than ambulance and police participants but that on all other conscious coping mechanisms the responses of all three groups are evenly matched. The difference between the teacher and ambulance and police groups can be understood in terms of the nature of their work. The latter groups, given their working conditions i.e. threat to safety, exposure to trauma, crime and violence, are more likely to resort to denial and behavioural disengagement. The only notable difference between groups in defense mechanism responses occurred in the immature category where teachers were less likely to use projection as a defense than the ambulance and police groups (Figure 4).

The use of the immature defense mechanism projection by ambulance and police personnel but not by teachers is explained by Vaillant's (1986, 1992 & 1998) comment that mature mechanisms can under increased stress change to less mature mechanisms. This explanation can be likened to the body's response to stress. When exposed to severe stress for too long the immune system becomes weakened and the body becomes susceptible to illness. Dienstbier (1989) argues to the contrary, suggesting that repeated exposure to arousing stressors may lead to a physiological toughness i.e. an increasing capacity to respond to stress and increased resistance to potential physical damage that stress can produce. Nevertheless, the too frequent use of less mature mechanisms over long periods of time can lead to mental ill-health. Vaillant (1997) argues that much of what is labelled mental illness reflects an individual's unwise use of defense mechanisms. If defenses are used well individuals are seen as mentally healthy, funny, creative and altruistic, however, if defenses are used badly individuals are termed ill, unpleasant and immoral.

The ANOVA results for the four types of mechanisms considered in this study showed that groups of subjects differed significantly in the use of immature defence mechanisms and maladaptive coping mechanisms (Table 7). The post hoc test (HSD) for the immature defence mechanisms showed that the teachers group, differed significantly on this variable from the ambulance and police groups, whereas no difference between the police and ambulance groups was evident (Table 8). The teachers group showed a significantly lower mean score on the immature defence mechanisms in comparison to the other two groups. The post hoc test (HSD) for the maladaptive coping mechanisms showed a very similar picture to that of the immature defense mechanisms (Table 9). This poses the questions whether teachers exposed to the same high risk for stress environments would use more negative/unhealthy mechanisms.

In terms of a relationship between stress and both coping and defense mechanisms results showed that, with few exceptions there is no significant relationship between these variables. In those cases where regression was significant (*), the correlation index or determination coefficient was particularly low, indicating only a minor relationship (Tables 2 & 4). The result of no significant relationship contradicts the theory that under high levels of stress individuals resort to immature/maladaptive mechanisms and that under low levels of stress use is made of mature/adaptive mechanisms.

Analysis of the difference between positive/healthy mechanism and negative/unhealthy mechanisms confirmed that the use of these mechanisms was independent of the participants' level of stress. Furthermore it is evident that at any level of stress participants make use of positive mechanisms. This finding is in keeping with Vaillant's (1986, 1992, 1998) developmental approach i.e. the different levels of defense mechanisms. One would expect mature mechanism usage from functioning adults bearing in mind Vaillant's (1986, 1992, 1998) suggestion that these mechanisms are common in healthy individuals age twelve to ninety. Could one, however, argue that positive mechanism usage from individuals with high levels of stress indicates successful adaptation i.e. resilience?

Although the results revealed no significant relationship between levels of stress and unconscious and conscious processes there were non-significant indications that a relationship exists. The analysis revealed a predominance of negative mechanisms in highly stressed participants in comparison to participants with low and medium levels of stress. The study suggests that rather than switching from positive to negative mechanisms participants experiencing high stress deploy increasingly more negative mechanisms. Furthermore, it suggests that individuals utilize positive and negative conscious and unconscious mechanisms simultaneously but that at higher stress levels there is a tendency for the negative to predominate. This suggests a 'shading effect' where positive mechanisms are overshadowed by negative mechanisms at critical stress levels for the individual. However, the positive mechanisms are present at any level of stress. A question remains as to the 'tipping point' at which negative predominates over positive. From the findings this 'tipping point' was either not reached in these participants or is never reached. This finding raises the theoretical possibility that stress overload is marked by the predominance of negative over positive rather than the absence or depletion of the latter.

The findings suggest that conscious and unconscious mechanisms complement rather than act against each other and that both contribute to resilience. In terms of this study resilience can be understood to be the concept of not reaching the 'tipping point' despite high stress levels. Whether reaching the 'tipping point' can be explained by an individual reaching the stage of exhaustion i.e. the General Adaptation Syndrome (Selye, 1956) would require further study as would an individual not reaching the tipping point despite high levels of stress i.e. resilience. Given that the concept of resilience is not well articulated further study will contribute towards an understanding thereof in terms of conscious and unconscious coping strategies in the mediation of stress.

A limitation of the study was the difference in the qualitative nature of the exposure of ambulance and police personnel to stress. The police personnel included many more administrative staff compared to the ambulance personnel who comprised mainly operations staff. A further limitation may have been the small control group. In addition, discrepancies in the results may be explained by an insufficient number of participants, problems with the design or perhaps the research instruments. It could

also be argued that particular personalities choose to work in high risk for stress environments and perhaps these persons are generally more resilient in terms of change. Given the limitations of the study and the need for more concrete evidence, it is recommended that further study be pursued.

In conclusion, the study indicates that at any level of stress, individuals make use of positive conscious and unconscious mechanisms. However, as stress levels increase, negative conscious and unconscious mechanisms usage increases but does not predominate over positive mechanisms. Thus individuals persist in utilising positive coping but also resort increasingly to utilising negative mechanisms as stress escalates. Not reaching the 'tipping point' suggests resilience and that both conscious and unconscious mechanisms appear to contribute towards psychological resilience.

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APPENDIX A - QUESTIONNAIRE 1

SOCIAL READJUSTMENT RATING SCALE

Please check the events below and indicate with a tick ( ) in the bracket provided, those events you have experienced in the last year.

PLEASE RESPOND ONLY TO THOSE ITEMS THAT APPLY TO YOU

Death of a close family member	( )
Death of a close friend	( )
Divorce (own or parents)	( )
Detention in jail or comparable institution	( )
Major personal injury or illness	( )
Marriage	( )
Being fired from your job	( )
Failing an important course	( )
Change in the health of a family member	( )
Pregnancy(male – girlfriend/wife)	( )
Sex problems	( )
Serious argument with close friend	( )
Change in financial status	( )
Change in work situation	( )
Problems with parents	( )
New girl/ boyfriend/husband/wife	( )
Increased workload	( )
Outstanding personal achievement	( )
First month back at work	( )
Change in living conditions	( )
Serious argument with boss	( )
Lower assessments than expected	( )
Change in sleeping habits	( )
Change in social activities	( )
Change in eating habits	( )
Chronic car/transport trouble	( )
Change in number of family get-togethers (closeness of family)	( )
Too many missed work days	( )
Change of course of study	( )
Dropping of more than one course	( )
Minor traffic violations	( )

APPENDIX B

SCORING SHEET

SOCIAL READJUSTMENT RATING SCALE **(ZIMBARDO, 1992)**

EVENT	LIFE CHANGE UNIT
Death of a Close Family Member	100
Death of a Close Friend	73
Divorce between Parents	65
Jail Term	63
Major Personal Injury or Illness	63
Marriage	58
Being Fired from Job	50
Failing an Important Course	47
Change in Health of Family Member	45
Pregnancy	45
Sex Problems	44
Serious Argument with Close Friend	40
Change in Financial Status	39
Change of Major	39
Trouble with Parents	39
New Girl- or Boyfriend	38
Increased Workload at School	37
Outstanding Personal Achievement	36
First Quarter Semester in College	35
Change in living Conditions	31
Serious Argument with Instructor	30
Lower Grades than Expected	29
Change in Sleeping Habits	29
Change in Social Activities	29
Change in Eating Habits	28
Chronic Car Trouble	26
Change in Number of Family Get-togethers	26
Too Many Missed Classes	25
Change of College	24
Dropping of More than One Class	23
Minor Traffic Violations	20

APPENDIX C - QUESTIONNAIRE 2

We are interested in how people respond when they confront difficult or stressful events in their lives. There are lots of ways to try to deal with stress. This questionnaire asks you to indicate what you generally do and feel when you experience stressful events. Obviously, different events bring out somewhat different responses, but think about what you usually do when you are under a lot of stress. Then respond to each of the following items by choosing one letter for each, using the response choices listed just below.

1 = I usually don't do this at all. 2 = I usually do this a little bit.

3 = I usually do this a medium amount. 4 = I usually do this a lot.

Please try to respond to each item separately in your mind from each other item. Choose your answers thoughtfully, and make your answers as true FOR YOU as you can. Please answer every item. There are no 'right' or 'wrong' answers, so choose the most accurate answer for YOU – not what you think 'most people' would say or do. Indicate what YOU usually do when YOU experience a stressful event.

1. I try to grow as a person as a result of the experience. 1 2 3 4
2. I turn to work or other substitute activities to take my mind off things. 1 2 3 4
3. I get upset and let my emotions out. 1 2 3 4
4. I try to get advice from someone about what to do. 1 2 3 4
5. I concentrate my efforts on doing something about it. 1 2 3 4
6. I say to myself 'this isn't real'. 1 2 3 4
7. I put my trust in God. 1 2 3 4
8. I laugh about the situation. 1 2 3 4
9. I admit to myself that I can't deal with it and give up trying. 1 2 3 4
10. I restrain myself from doing anything too quickly. 1 2 3 4

11. I discuss my feelings with someone. 1 2 3 4
12. I use alcohol or drugs to make myself feel better. 1 2 3 4
13. I get used to the idea that it happened. 1 2 3 4
14. I talk to someone to find out more about the situation. 1 2 3 4
15. I keep myself from getting distracted by other thoughts or activities. 1 2 3 4
16. I daydream about things other than this. 1 2 3 4
17. I get upset, and am really aware of it. 1 2 3 4
18. I seek God's help. 1 2 3 4
19. I make a plan of action. 1 2 3 4
20. I make jokes about it. 1 2 3 4

21. I accept that this has happened and that it can't be changed. 1 2 3 4
22. I hold off doing anything about it until the situation permits. 1 2 3 4
23. I try to get emotional support from friends and relatives. 1 2 3 4
24. I just give up trying to reach my goal. 1 2 3 4
25. I take additional action to try to get rid of the problem. 1 2 3 4
26. I try to loose my self for a while by drinking alcohol or taking drugs. 1 2 3 4
27. I refuse to believe that it has happened. 1 2 3 4

28. I let my feelings out. 1 2 3 4
29. I try to see it in a different light, to make it seem more positive. 1 2 3 4

30. I talk to someone who could do something about the problem. 1 2 3 4
31. I sleep more than usual. 1 2 3 4
32. I try to come up with a strategy about what to do. 1 2 3 4
33. I focus on dealing with this problem and if necessary let other things slide a little. 1 2 3 4
34. I get sympathy and understanding from someone. 1 2 3 4
35. I drink alcohol or take drugs, to think about it less. 1 2 3 4
36. I kid around about it. 1 2 3 4
37. I give up the attempt to get what I want. 1 2 3 4
38. I look for something good in what is happening. 1 2 3 4
39. I think about how I might best handle the problem. 1 2 3 4

40. I pretend that it hasn't really happened. 1 2 3 4
41. I make sure not to make matters worse by acting too soon. 1 2 3 4
42. I try hard to prevent other things from interfering with my efforts at dealing with this. 1 2 3 4
43. I go to the cinema or watch television, to think about it less. 1 2 3 4
44. I accept the reality of the fact that it happened. 1 2 3 4
45. I ask people who have had similar experiences what they did. 1 2 3 4
46. I feel a lot of emotional distress and I find myself expressing those feelings a lot. 1 2 3 4
47. I take direct action to get around the problem. 1 2 3 4
48. I try to find comfort in my religion. 1 2 3 4
49. I force myself to wait for the right time to do something. 1 2 3 4

50. I make fun of the situation. 1 2 3 4
51. I reduce the amount of effort I'm putting into solving the problem. 1 2 3 4
52. I talk to someone about how I feel. 1 2 3 4
53. I use alcohol or drugs to get through it. 1 2 3 4
54. I learn to live with it. 1 2 3 4
55. I put aside other activities in order to concentrate on this. 1 2 3 4
56. I think hard about what steps to take. 1 2 3 4
57. I act as though it hasn't even happened. 1 2 3 4
58. I do what has to be done, one step at a time. 1 2 3 4
59. I learn something from the experience 1 2 3 4
60. I pray more than usual. 1 2 3 4

APPENDIX D

Table 1: COPE Scales of showing Items in trait format

Item No.	Scale Items
	1. Active Coping
5	I concentrate my efforts on doing something about it.
25	I take additional action to try to get rid of the problem.
47	I take direct action to get around the problem.
58	I do what has to be done, one step at a time.
	2. Planning
19	I make a plan of action.
32	I try to come up with a strategy about what to do.
39	I think about how I might best handle the problem.
56	I think hard about what steps to take.
	3. Seeking Instrumental Social Support
4	I try to get advice from someone about what to do.
14	I talk to someone to find out more about the situation.
30	I talk to someone who could do something concrete about the problem.
45	I ask people who have had similar experiences what they did.
	4. Seeking Emotional Social Support
11	I discuss my feelings with someone.
23	I try to get emotional support from friends or relatives.
34	I get sympathy and understanding from someone.
52	I talk to someone about how I feel.
	5. Suppression of Competing Activities
15	I keep myself from getting distracted by other thoughts or activities.
33	I focus on dealing with this problem and, if necessary, let other things slide a little.
42	I try hard to prevent other things from interfering with my efforts at dealing with this.
55	I put aside other activities in order to concentrate on this.
	6. Turning to Religion
7	I put my trust in God.
18	I seek God's help.
48	I try to find comfort in my religion.
60	I pray more than usual.
	7. Positive Reinterpretation and Growth
1	I try to grow as a person as a result of the experience.
29	I try to see it in a different light, to make it seem more positive.
38	I look for something good in what is happening.
59	I learn something from the experience.

(Table 1 continued on overleaf)

(Table 1 continued)

Item No.	Scale Items
	8. Restraint Coping
10	I restrain myself from doing anything too quickly.
22	I hold off doing anything about it until the situation permits.
41	I make sure not to make matters worse by acting too soon.
49	I force myself to wait for the right moment to do something.
	9. Acceptance
13	I get used to the idea that it happened.
21	I accept that this has happened and that it can't be changed.
44	I accept the reality of the fact that it happened.
54	I learn to live with it.
	10. Focus on and Venting of Emotions
33	I get upset and let my emotions out.
17	I get upset, I am really aware of it.
28	I let my feelings out.
46	I feel a lot of emotional distress and I find myself expressing those feelings a lot.
	11. Denial
6	I say to myself "this isn't real".
27	I refuse to believe that it has happened.
40	I pretend that it hasn't really happened.
57	I act as though it hasn't even happened.
	12. Mental Disengagement
2	I turn to work or other substitute activities to take my mind off things.
16	I daydream about things other than this.
31	I sleep more than usual.
43	I go to the cinema or watch television, to think about it less.
	13. Behavioural Disengagement
9	I admit to myself that I can't deal with it, and give up trying.
24	I just give up trying to reach my goal.
37	I give the attempt to get what I want.
51	I reduce the amount of effort I'm putting into solving the problem.
	14. Alcohol/Drug Use
12	I use alcohol or drugs to make myself feel better.
26	I try to lose myself for a while by drinking alcohol or taking drugs.
35	I drink alcohol or take drugs, in order to think about it less.
53	I use alcohol or drugs to help me get through it.
	15. Humour
8	I laugh about the situation.
20	I make jokes about it.
36	I kid around about it.
50	I make fun of the situation.

APPENDIX E

QUESTIONNAIRE 3

This questionnaire consists of 44 statements, each of which is followed by a rating scale:

SD	D	N	A	SA
Strongly disagree	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**

Rate the degree to which you agree or disagree with each statement by placing an X in box provided.

	Example: Cape Town is a city in South Africa.	SD	D	N	A	SA
1	I get satisfaction from helping others and if this was taken away from me I would get depressed.	SD	D	N	A	SA
2	I'm able to keep a problem out of my mind until I have time to deal with it.	SD	D	N	A	SA
3	I'm always treated unfairly.	SD	D	N	A	SA
4	I work out my anxiety through doing something constructive and creative like painting or woodwork.	SD	D	N	A	SA
5	Quite often I put off until tomorrow what I ought to do today.	SD	D	N	A	SA
6	I'm able to laugh at myself pretty easily.	SD	D	N	A	SA
7	People often mistreat me.	SD	D	N	A	SA
8	If I were robbed I would prefer the culprit to be rehabilitated rather than punished.	SD	D	N	A	SA
9	I often think of things too bad to talk about.	SD	D	N	A	SA
10	I feel better when, because of my own experience with trauma, I am able to give information, advice and comfort to others.	SD	D	N	A	SA
11	I take drugs or alcohol to relieve my tension.	SD	D	N	A	SA
12	Sometimes when I am not feeling well I am cross.	SD	D	N	A	SA
13	I often act impulsively when something is bothering me.	SD	D	N	A	SA
14	I get physically ill when things aren't going well for me.	SD	D	N	A	SA
15	I do not always tell the truth.	SD	D	N	A	SA
16	I put a great deal of time and effort into my job. I regularly start early and finish very late.	SD	D	N	A	SA
17	Sometimes at elections I vote for men about whom I know very little.	SD	D	N	A	SA
18	I'm often late for appointments.	SD	D	N	A	SA
19	I work more things out in my daydreams than in my real life.	SD	D	N	A	SA
20	I get a migrain from disagreements with people.	SD	D	N	A	SA
21	I get very sarcastic when I am angry.	SD	D	N	A	SA
22	I get openly aggressive when I feel hurt.	SD	D	N	A	SA

23 I do not read every editorial in the newspaper everyday.	SD	D	N	A	SA
24 If my boss bugged me, I might make a mistake in my work or work more slowly so as to get back at him.	SD	D	N	A	SA
25 Everybody is against me.	SD	D	N	A	SA
26 I can keep the lid on my feelings if it would interfere with what I'm doing if I were to let them out.	SD	D	N	A	SA
27 I'm usually able to see the funny side of an otherwise painful predicament.	SD	D	N	A	SA
28 I get a headache when I have to something I don't like.	SD	D	N	A	SA
29 I'm sure I get a raw deal from life.	SD	D	N	A	SA
30 When I expect a busy stressful period, I especially plan activities to help me deal with it.	SD	D	N	A	SA
31 When I know I have to face a difficult situation, like an exam or a job interview, I try to imagine what it would be like to plan ways to cope with it.	SD	D	N	A	SA
32 I do not exercise every day.	SD	D	N	A	SA
33 I regularly work a 15 hour day. I don't have time to think about issues in my life.	SD	D	N	A	SA
34 I often find more meaning in films, plays or books than is in real life.	SD	D	N	A	SA
35 If I can predict that I'm going to be sad ahead of time I can cope better.	SD	D	N	A	SA
36 Even when I am very upset I stick to the task at hand.	SD	D	N	A	SA
37 I smoke when I'm nervous.	SD	D	N	A	SA
38 If I anticipate a crisis, I would seek advice from a person who had the same problem.	SD	D	N	A	SA
39 Even in unfortunate situations there can often be humorous moments.	SD	D	N	A	SA
40 It makes me feel good to be able to help others who are experiencing pain and discomfort.	SD	D	N	A	SA
41 I always look at photographs of an old school friend when I feel lonely.	SD	D	N	A	SA
42 When I have a bad day at work an aggressive game e.g., squash is what I need.	SD	D	N	A	SA
43 When I disagree with someone I try to sort out the disagreement when I am not angry.	SD	D	N	A	SA
44 I am able to laugh at some of the mistakes I make.	SD	D	N	A	SA

APPENDIX F

A GLOSSARY OF DEFENCES (VAILLANT, 1986, 1992 & 1998)

Level I – Psychotic Mechanisms

These mechanisms are common in "healthy" individuals before age five, and common in adult dreams and fantasy. For the user, these mechanisms alter reality. To the beholder, they appear "crazy". They tend to be immune to change by conventional psychotherapeutic interpretation; but they are altered by change in reality (e.g., chlorpromazine, removal of stressful situation. developmental maturation). In therapy, they can be given up temporarily by offering the user strong interpersonal support in conjunction with direct confrontation with the ignored reality.

1. **DELUSIONAL PROJECTION** – Frank delusions about external reality, usually of a persecutory type.

   It includes both the perception of one's own feelings in another person and then acting on the perception (e.g., florid paranoid delusions), and the perception of other people or their feelings literally inside oneself (e.g., the agitated depressed patient's claim that "the devil is devouring my heart". This mechanism can be distinguished from projection by the fact that in the former, reality testing is virtually abandoned. It is distinguished from distortion by the absence of wish-fulfilment and from introjection in that the responsibility for acknowledged internal feelings is still projected. In toxic psychosis, delusional projection adaptively organises otherwise chaotic perceptions.

2. **DENIAL** – Denial of external reality.

   Unlike repression, denial, as here defined, affects perception of external reality (e.g., "girls do so got penises") more than perception of internal reality (e.g., I am not angry). It includes the use of fantasy as a major substitute for other people – especially absent other people (e.g., "I will make a new him in my own mind").

3. **DISTORTION** – Grossly reshaping external reality to suit their inner needs.

   It includes unrealistic megalomaniacal beliefs, hallucinations, wish-fulfilling delusions, end employment of sustained feelings of delusional superiority or entitlement. It can encompass persistent denial of personal responsibility for one's own behaviour. It also includes acting upon, as well as thinking about, unrealistic obsessions or compulsions. In distortion, there may be a pleasant merging or fusion with another person (e.g., Jesus lives inside me and answers all my prayers"); but in contrast to delusional projection where distress is alleviated by assigning responsibility for offensive feelings elsewhere, in distortion unpleasant feelings are replaced with their opposites. As manifested in religious belief, distortion can be highly adaptive.

Level II – Immature Mechanisms

These mechanisms are common in "healthy" individuals ages three to fifteen, in most character disorder, and adults in psychotherapy. For the user these mechanisms most often alter distress engendered either by the threat of interpersonal intimacy or the threat of experiencing its loss. To the beholder they appear socially undesirable. Although refractory to change, immature mechanisms change with improved interpersonal relationships (e.g., personal maturation, a more mature spouse, a more intuitive physician, or a fairer parole officer) or with repeated and forceful interpretation during prolonged psychotherapy or with confrontation by peers.

4. **PROJECTION** – Attributing one's own unacknowledged feelings to others.

   It includes sever prejudice, rejections of intimacy through unwarranted suspicion, marked hypervigilance to external danger, and injustice-collecting. The behaviour of someone using this defence may be eccentric and abrasive but "within the letter of the law".

5. **SCHIZOID FANTASY** – Tendency to use fantasy and indulge in autistic retreat for the purpose of conflict resolution and gratification.

   It is associated with global avoidance of personal intimacy and the use of eccentricity to repel others. In contrast to psychotic denial, the individual does not fully believe in or insist upon acting out his fantasies. Nevertheless, unlike mere wishes, schizoid fantasies serve to gratify unmet needs for personal relationships, and to obliterate the overt expression of aggressive of sexual impulses towards others. Unlike disassociation, fantasy remakes the outer not the inner world.

6. **HYPERCHONDRIASIS** – The transformation of reproach towards others arising from bereavement, loneliness, or unacceptable aggressive impulses into first self-reproach and then complaints of pain, somatic illness, and neurasthenia.

   It includes those aspects of introjection which permit traits of an ambivalently regarded person to be perceived within oneself and causing plausible disease. Unlike identification, hypochodriacal introjection produces dysphoria and a sense of affliction; hypochondriacal introjects are 'ego alien'. The mechanism may permit the individual to belabour others with his own pain or discomfort in lieu of making direct demands upon them or in lieu of complaining that others have ignored his wishes (often unexpressed) to be dependent. It does not include illnesses like asthma, ulcer or hypertension, which may neither adaptive nor defensive. Unlike hysterical conversion symptoms, hypochondriasis is accompanied by the very opposite of la belle indifference.

7. **PASSIVE AGGRESSIVE BEHAVIOUR** – Aggression towards others expressed indirectly and ineffectively through passivity or directed against the self.

   It includes: failures, procrastinations, or illnesses that (initially at least) affect others more than oneself. It includes silly or provocative behaviour in order to

receive attention and clowning in order to avoid assuming a competitive role. People who form sadomasochistic relationships often manifest both passive and hypochondriacal defences.

8. **ACTING OUT** – Direct expression of an unconscious wish or impulse on order to avoid being conscious of the affect that accompanies it.

   It includes of motor behaviour, delinquent or impulsive acts, and "tempers" to avoid being aware of one's feelings. It also includes the chronic use of drugs, failure, perversion, or self-inflicting injury to relieve tension (i.e., subjective anxiety or depression). Acting out involves chronically giving in to impulse in order to avoid the tension that would result were there any postponement of instinctual expression.

Level III – "Neurotic" Defences

These mechanisms are common in "healthy" individuals ages three to ninety, in neurotic disorder, and in mastering acute adult stress. For the user these mechanisms alter private feelings of instinctual expression. To the beholder they appear as individual quirks or "neurotic hang-ups". They often can be dramatically changed by conventional, brief psychotherapeutic interpretation.

9. **DISSASSOCIATION** – Thinking about wishes in formal, affectively bland terms, and not acting on them. The idea is in consciousness, but the feeling is missing.

   The term encompasses the mechanisms of isolation, rationalisation, ritual, undoing, restitution, magical thinking, and busy work. While these mechanisms differ from each other, they usually occur as a cluster. Intellectualisation includes paying undue attention to the inanimate in order to avoid intimacy with people, or paying attention to irrelevant detail to avoid perceiving the whole. Obsessions and compulsions not acted upon are included here, although they can also be thought of as a form of intrapsychic displacement.

10. **REPRESSION** – Seemingly inexplicable naivete, memory lapse, or failure to acknowledge input from a selected sense organ. The feeling is in consciousness, but the idea is missing.

    The "forgetting" of repression is unique in that it is often accompanied by highly symbolic behaviour which suggests that the repressed is not really forgotten. The mechanism differs from suppression by effecting unconscious inhibition of impulse to the point of losing, not just postponing, cherished goal. Unlike denial it blocks conscious perception of instincts and feelings rather than recognition of and response to external events. If a man were weeping but forgot for whom he wept, this would be repression; if he denied the existence of his tears or insisted that the mourned one was still alive, this would represent denial.

11. **DISPLACEMENT** – The redirection of feelings toward a relatively less cared for (less cathected) object than the person or situation arousing the feelings.

It includes facile "transference" and the substitution of things or strangers for emotionally important people. Practical jokes, wit with hidden hostile intent, and caricature involve displacement. Most phobias, many hysterical conversion reactions, and some prejudice involve displacement.

12. **REACTION FORMATION** – Behaviour in a fashion diametrically opposed to an unacceptable instinctual impulse.

    This mechanism includes overtly caring for someone else when one wishes to be cared for oneself, "hating' someone or something one really likes, or "loving" a hated rival or unpleasant duty.

13. **INTELLECTUALISATION** – Temporary but drastic modification of one's character or of one's sense of personal identity to avoid emotional distress. Synonymous with Neurotic Denial.

    This can include fugues, many hysterical conversion reactions, a sudden unwarranted sense superiority or devil-may-care attitude, and a short-term refusal to perceive responsibility for one's acts or feelings. It also includes overactivity and counterphobic behaviour in order to blot out anxiety or distressing emotion; safe expression of instinctual wishes through acting on stage; and the acute use of religious "joy" or of pharmacological intoxication to numb unhappiness. Intellectualisation is more comprehensible to others than distortion, more considerate of others, and less prolonged than acting out.

Level IV – Mature Mechanisms

These mechanisms are common in "healthy" individuals ages twelve to ninety. For the user these mechanisms integrate reality, interpersonal relationships, and private feelings. To the beholder they appear as convenient virtues. Under increased stress they may change to less mature mechanisms.

14. **ALTRUISM** – Vicarious but constructive and instinctually gratifying service to others.

    It includes benign and constructive reaction formation, philanthropy, and well-repaid service to others. Altruism differs from projection and acting out in that it provides real, not imaginary, benefit to others and from reaction formation that leaves the person using the defence at least partly gratified.

15. **HUMOUR** – Overt expression of ideas and feelings without individual discomfort or immobilisation and without unpleasant effect on others.

    Some games and playful regression come under this heading. Unlike wit, which is a form of displacement, humour lets you call a spade a spade; and humour can never be applied without some element of an "observing ego". Like hope, humour permits one to bear and yet to focus upon what is too terrible to be borne;

in contrast, with always involves distraction; unlike schizoid fantasy, humour never excludes other people.

16. **SUPRESSION** – The conscious or semiconscious decision to postpone paying attention to a conscious impulse or conflict.

    The mechanism includes looking for silver linings, minimising acknowledged discomfort, employing a stiff upper lip, and deliberately postponing but not avoiding. With supression, one says, "I will think about it tomorrow", and the next day one remembers to think about it.

17. **ANTICIPATION** – Realistic anticipation of or planning for future inner discomfort.

    This mechanism includes goal-directed but overly careful planning or worrying, premature but realistic affective anticipation of death or surgery, separation, and the conscious utilisation of "insight" gained from psychotherapy.

18. **SUBLIMATION** – Indirect or attenuated expression of instincts without either adverse consequences or marked loss of pleasure.

    It includes both expressing aggression through pleasurable games, sports, and hobbies, and romantic attenuation of instinctual expression during a real courtship. Unlike humour, with sublimation "regression in the service of the ego" has real consequences. Unlike the case with "neurotic" defences, with sublimation instincts are channelled rather than dammed or diverted. Successful artistic expression remains the classic example. In displacement one's feelings are acknowledged as one's own, but are redirected toward a relatively insignificant object, often without satisfaction. In sublimation, feelings are acknowledged, modified, and directed toward a relatively significant person or goal so that modest instinctual satisfaction results.

APPENDIX G

Q3. Defences

Immature

Projection:	3	7	25	29	
Hypochondriasis:		12	14	28	20
Passive Aggressive:		30	18	21	24
Acting out:	11	35	22	37	
Schizoid Fantasy:		9	19	34	41
Lies:	15	17	23	32	

Mature

Sublimination:	4	16	33	42
Altruism:	1	8	10	40
Humour	6	27	39	44
Suppression:	2	26	36	43
Anticipation:	5	31	13	38

Q2. Coping

Maladaptive

10.	17	33	28	46	Focus on and venting of emotions
11.	6	27	40	57	Denial
13.	9	24	37	51	Behavioural disengagement

Adaptive

1.	5	25	47	58	Active coping
2.	19	32	39	56	Planning
3.	4	14	30	45	Seeking instrumental social support
7.	1	29	35	59	Positive reinterpretation and growth.
9.	13	21	44	54	Acceptance

APPENDIX H

Exploring the frequency distribution of the two possible answers to the variables in the stress questionnaire (fig.2), it is clear that: a negative answer predominates among all the subjects for all stress variables and that there is no apparent differences in the type of answer among the groups of subjects under study. The results also show that positive answers have higher frequency in those variables related to change (CHG_FINA, CHG_WORK, CHG_SLEE, CHG_SOCI, CHG_EAT, INC_WORK) i.e. change in finances, work, sleep, social activities, eating and work.

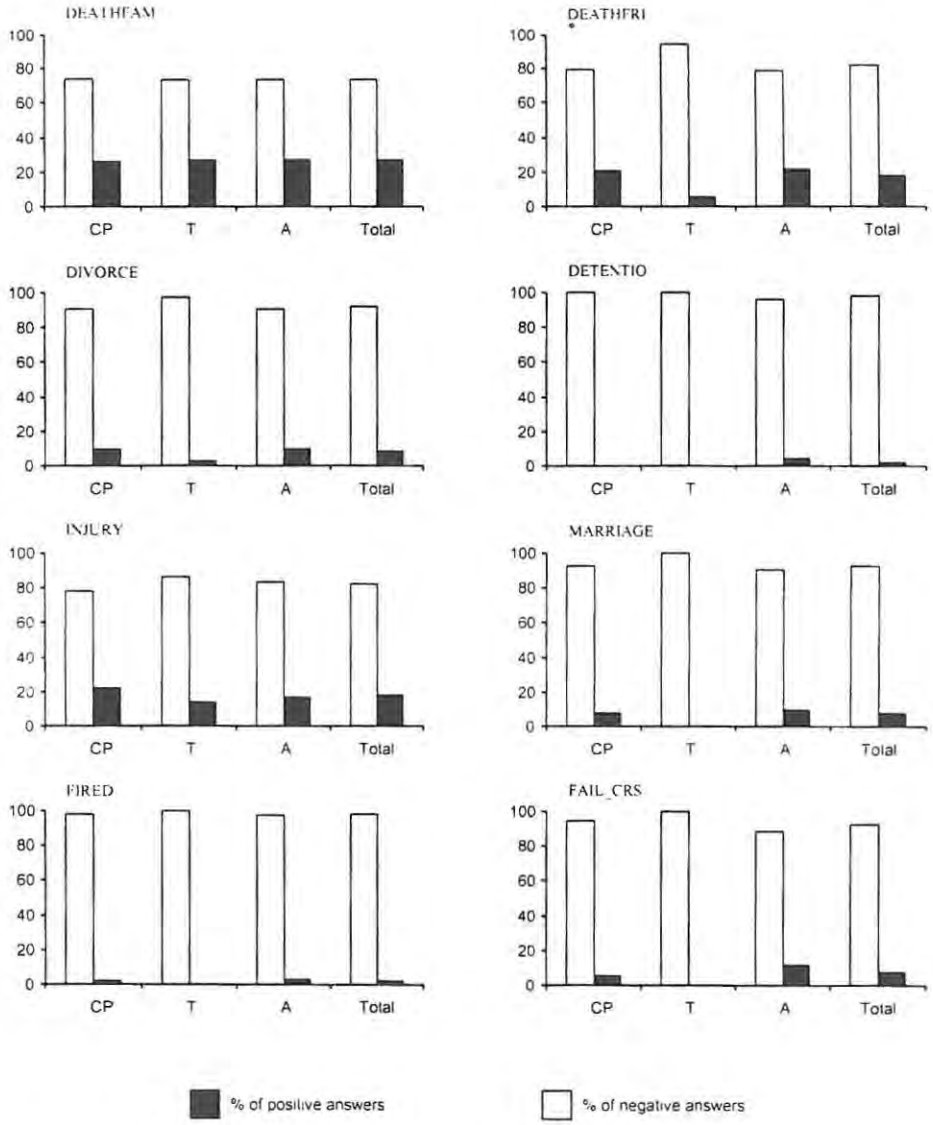

Figure 2. Relative frequency distribution of the two possible answers in the stress variables for the three groups of subjects under study (CP: police, T: teacher, A: ambulance), and for the total of subjects combined.

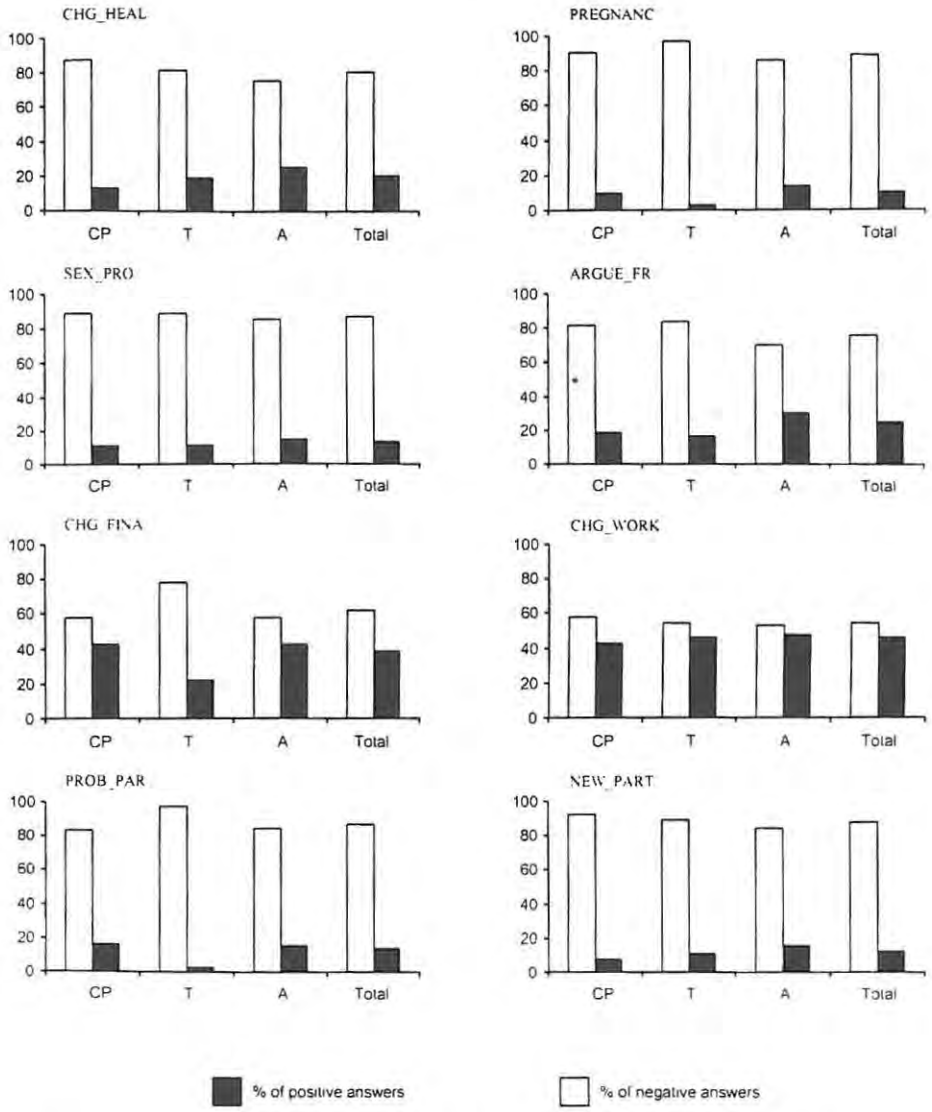

Figure 2. (cont), Relative frequency distribution of the two possible answers in the stress variables for the three groups of subjects under study (CP: police, T: teacher, A: ambulance), and for the total of subjects combined.

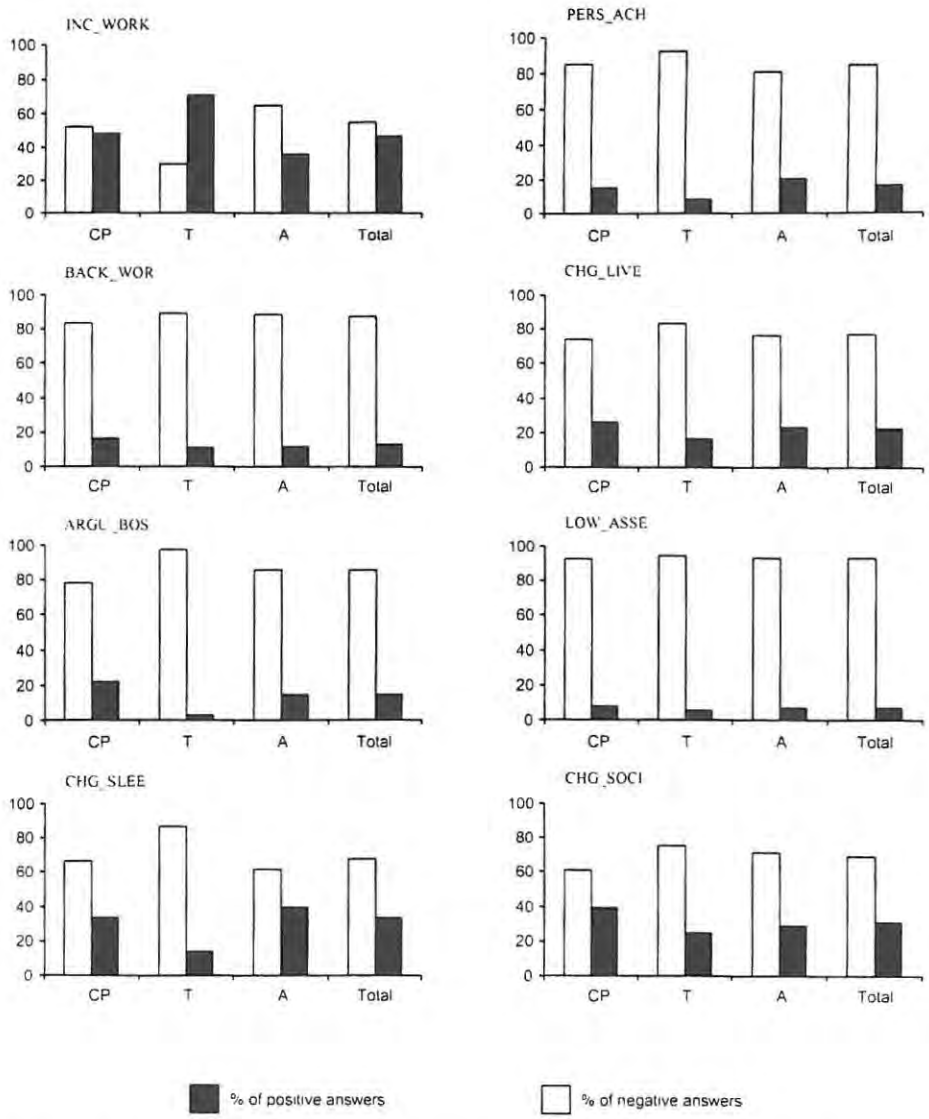

Figure 2. (cont), Relative frequency distribution of the two possible answers in the stress variables for the three groups of subjects under study (CP: police, T: teacher, A: ambulance), and for the total of subjects combined.

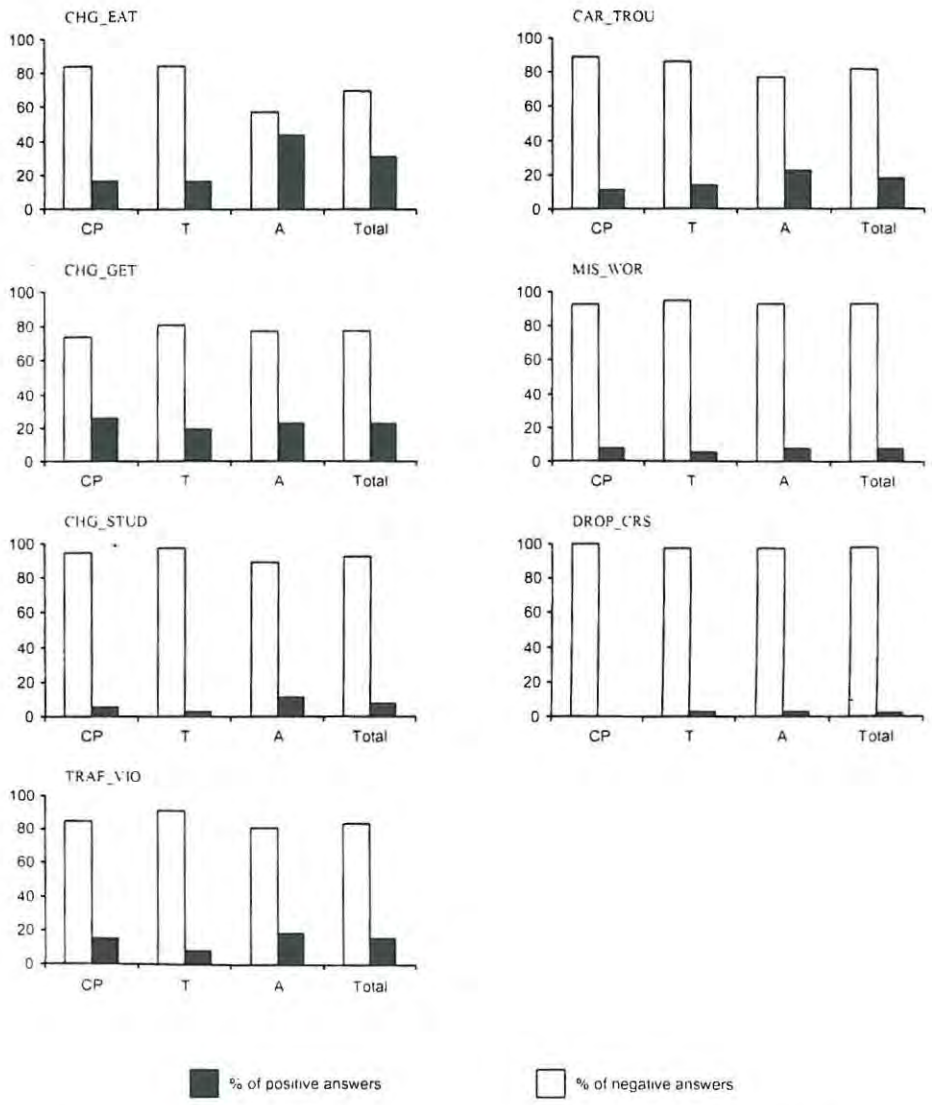

Figure 2. (cont), Relative frequency distribution of the two possible answers in the stress variables for the three groups of subjects under study (CP: police, T: teacher, A: ambulance), and for the total of subjects combined.