

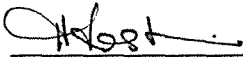
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**EFFECTIVENESS AND USE OF COPING STRATEGIES  
IN THREAT AND CHALLENGE SITUATIONS**

A thesis presented in partial fulfilment of  
the requirements for the degree of  
Master of Arts in Psychology  
at Massey University

Helen Marguerite Foster  
1988

Dedicated to the  
memory of my father,  
Gordon Lawrence Daniell  
1913-1975

## ABSTRACT

The present study aimed to investigate the perceived effectiveness and reported use of three coping strategies in threat and challenge situations. Eighty psychology students were given false feedback following a test, in either threat or challenge conditions. Subjects were given one of three cognitive coping strategies (fatalism, perseverance, or rational action) or no strategy, prior to a second test. The results revealed fatalism to be perceived as significantly less effective than perseverance and rational action. Repeated measures of pulse rate indicated the effectiveness of the threat and challenge manipulation, but the results for appraisal revealed those in the threat condition found the situation more challenging than threatening. Subjective measures of eight emotions showed changes over time and suggested that positive affect was more evident than negative affect. It was concluded that there are differences between coping strategies and that threat and challenge can be classified either as subjective or objective variables.

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## CHAPTER I: INTRODUCTION.

### OVERVIEW

Coping is a term well known to the lay person, but its common usage belies the facets of coping behaviour that researchers have identified. Coping is a complex concept. There are many variables involved and although there is empirical evidence for some of these, others are merely speculative. The specific links among these variables have yet to be identified adequately.

This chapter reviews the literature, focusing on the main aspects, and examines some of the discrepancies in the area. The present study attempts to investigate some of the variables that are speculative or which have inadequate empirical evidence.

## **STRESS, COPING, AND ADAPTATION**

Researchers generally view coping behaviour as a mediator between stressful events and adaptational outcomes (Folkman, Lazarus, Gruen, & DeLongis, 1986). How these concepts are linked has not yet been identified empirically (Wilson, 1985). One of the reasons suggested for this is that the area is too wide to be investigated in a single study (Pearlin, Menaghan, Lieberman, & Mullan, 1981). An understanding of the possible connections between the concepts is necessary for an overall perspective of coping behaviour.

Stress can be defined simply as excessive demands which exceed the resources of an individual (Coyne & Lazarus, 1980). An attempt to deal with these demands requires coping efforts which will mediate the adaptational outcome (Pearlin et al., 1981). Adaptation can be described as success or failure to function in terms of wellbeing, social action and somatic health (Lazarus & Folkman, 1984). A rudimentary perspective suggests that stress can create emotional and physiological disturbances which may result in poor psychological and physical health. Those who cope effectively will remain healthy. Holroyd and Lazarus (1982) maintain that it is effective coping which determines health outcomes, not a result of the presence or absence of stress. But research has not confirmed this notion. Little is known about whether or not some coping processes are more effective than others, and any consequent effects these have on adaptation.

## **THEORIES OF COPING**

There are two major theoretical perspectives: the trait-oriented approach and the process-oriented approach. The trait-oriented approach is considered the traditional view. Psychoanalytic ego psychology models are applied to the concept of coping (Lazarus & Folkman, 1984). This assumes that person variables or traits such as repression-sensitization (e.g. Shipley, Butt & Horwitz, 1979) are the most influential determinants of coping responses.

For example, Menninger (1977) views coping as a stress-relieving device where the function of the ego is that of a homeostatic regulator. His model consists of a hierarchy referred to as five orders of regulatory devices which are ranked in order of the level of internal disorganisation indicated.

First order devices may be used by the ego when ordinary events become stressful, and fifth order devices are seen as attempts to overcome complete failure of the ego before disorganisation occurs.

Shapiro (1977) maintains that the consistent methods of behaving, thinking and feeling that are characteristic of neurotic conditions are basically major forms of coping which have become part of psychological functioning.

The trait-oriented approach has received much criticism. A major one is that this perspective does not provide adequate information about the actual coping processes (Lazarus & Launier, 1978; Folkman & Lazarus, 1980; Folkman, 1982). Folkman et al. (1986) suggest there is little evidence that coping processes are influenced by personality traits. Although traits may be related to coping they do not describe the coping processes adequately (Stone & Neale, 1984).

In more recent years the perspective on coping research has altered as methodological developments have been introduced. The major emphasis is now on coping as a process-oriented approach. The critical difference between this and the trait-oriented perspective is that in the latter variations in the stressful situation are of little importance. The context is crucial when the emphasis is on process because coping is assessed as a response to both the psychological and environmental demands of specific stressful encounters (Folkman, Lazarus, Dunkel-Schetter, DeLongis, & Gruen, 1986). If there is no stressful encounter then there is no need for coping behaviour to occur.

The process-oriented approach has been developed primarily by Lazarus and his colleagues (e.g. Lazarus, 1966; Lazarus & Launier, 1978; Lazarus & Folkman, 1984). The theoretical framework is transactional as coping is determined by the ongoing reciprocal relationship between the person and the environment (Folkman & Lazarus, 1980). The transactional model emphasises cognitive appraisal and coping as process. Appraisal is essentially an evaluative judgement by a person of what he or she is experiencing when confronted with a possible stressful encounter. The type of coping response used is based on an appraisal of the best method to achieve the outcome that is desired (Roskies & Lazarus, 1980).

Parkes (1986) suggests that current research methods are not yet adequate to deal with the theoretical and empirical complexity of transactional process models. Nevertheless, Lazarus' (1966) theory and the reformulation of this (Lazarus & Folkman, 1984) has become the most pervasive in coping research. Briefly, the theory suggests that when a person is faced with a possible stressful event, he or she evaluates whether or not the encounter is relevant to his or her well-being through a process of primary appraisal. If the event is appraised as stressful there may be emotional and physiological changes, and coping becomes necessary. The individual evaluates the various coping options through secondary appraisal. There is a feedback loop which provides the person with information on emotional, physiological, and environmental responses to the coping strategies in use.

## **DEFINITIONS OF COPING**

Most researchers agree that coping can be generally defined as a response to stress (Fleming, Baum, & Singer, 1984). However, the concept is more complex than this definition suggests. This complexity makes it difficult for researchers to agree on a specific definition (Billings & Moos, 1981; Fleming, Baum, & Singer, 1984; Menaghan, 1983), and consequently there are many variations.

For example, Fleishman (1984) refers to coping as "both overt and covert behaviors that are taken to reduce or eliminate psychological distress or stressful conditions" (p. 229). Stone and Neale (1984) provide a more specific definition. They view coping as "those behaviors and thoughts which are consciously used by an individual to handle or control the effects of anticipating or experiencing a stressful situation" (p.893).

Lazarus & Folkman (1984) criticise such definitions. They consider that coping is typically equated with adaptational success which results in confounding of coping and its outcome. They define outcome as the effect a coping strategy has and maintain that definitions of coping must include efforts to handle stressful encounters, regardless of outcome. So they define coping as "constantly changing cognitive and behavioral efforts to manage specific external and/or internal demands that are appraised as taxing or exceeding the resources of the person" (p.141). This definition provides a

broader view. Coping behaviour does not have to be successful, although the idea of effectiveness may be implicit. More knowledge about the processes of coping may be gained by focusing on the efforts to manage stressful encounters, but knowledge about outcome is equally important. Lazarus and Folkman's definition also reflects another essential difference between the process and trait oriented approaches. Coping is not a unidimensional trait but is considered by several researchers to be a multifaceted, dynamic, unfolding process (e.g. Folkman, Schaefer, & Lazarus, 1979; Holroyd & Lazarus, 1982; Pearlin & Schooler, 1978).

## **EMOTIONS AND COPING**

An important theoretical component of coping theory is the role that emotions play. Coping researchers view emotions as a result of how individuals appraise their ongoing transactions with the environment (Folkman & Lazarus, 1985; Lazarus, 1982). Lazarus (1982) acknowledges that the more recent definitions include the idea that coping activities are crucial mediating processes in the stress emotions (e.g. anxiety, fear, anger). There is an interplay between coping and affect (Lazarus, 1982). Coping influences the emotional responses, and emotions will alter depending on the success of an individual to manage the stressful event. According to Lazarus (1977) emotions are not constant, but change over time, partly as a result of coping efforts.

Lazarus & Launier (1978) consider that efforts to control the emotions are extremely important aspects of coping for three reasons. First, stress emotions are distressing and need to be reduced. Second, strong emotions interfere with adaptation. Third, individuals will be aroused emotionally if they consider they are in some sort of trouble. These issues are open to debate. The stress emotions may not necessarily be disturbing. Other, more positive emotions may also be involved and if so, these may be useful indicators in adaptation. Most researchers investigate anxiety only, so little is known about the function of other emotions in coping behaviour.

Kremer and Spiridigliozzi (1982) measured anger as well as anxiety and found that the results for the two emotions were similar. They suggested that the emphasis on anxiety as an index of stress may be too narrow. This emphasis



also restricts the emotions to the negative aspects. It appears that only Folkman & Lazarus (1985) have attempted to examine the effects of several emotions. They investigated coping and emotion at three stages of a mid-term examination and found that at any given phase of this stressful encounter subjects were likely to experience apparently contradictory states of emotion during every stage. For example, they would experience positive (e.g. confidence, pleasure) and negative (e.g. anxiety, fear) emotions.

Averill (1980) states that although the experience of emotion represents a dynamic whole it is still possible to classify the experience as positive or negative. Some authors, (e.g. Lazarus, Averill & Opton, 1974; Lazarus & Folkman, 1984) have acknowledged the potential to experience both positive and negative emotions when faced with a need for coping, such as a mixture of eagerness and fear.

### **Measurement of emotions**

One of the reasons for the emphasis on anxiety as an index of arousal may be that measures of this emotion are more readily available. Many studies (e.g. Kremer & Spiridigliozzi, 1982; Spacapan & Cohen, 1983) use the Multiple Affect Adjective Checklist (MAACL; Zuckerman, Lubin, & Robins, 1965). Kelly (see Buros, 1972) reviewed the MAACL and criticised it as a relatively crude psychometric instrument with the scores being clearly vulnerable to response sets. Averill (1980) considers that subjects will check any adjective that has a negative connotation because the (experimental threat) situation is negative and unusual, not because they are necessarily feeling the emotions. Therefore the validity of the instrument is questionable.

Measures of subjective feelings that do not appear to have been used in coping research are the visual analogue scales. Bond and Lader (1974) state that the use of these scales in rating subjective feelings is not recent. The technique was first described in 1921 and Aitken (1969) revived the interest by discussing the advantages. The scales are considered to be a valid measure of mood (Luria, 1975), reliable and sensitive. But as they are a state measure rather than a trait measure, reliability is difficult to establish in the test-retest method (Bond & Lader, 1974), and in repeated measures (Clarke & Spear, 1964). Bond and Lader consider that visual analogue scales

have advantages over conventional scales in rating subjective feelings in normal subjects, and Huskisson (1983) states that the advantages of the scales are sensitive, simple, reproducible, and universal. Aitken (1969) views them as suitable for the measurement of change and states the limitations are no more than the language used.

## **PHYSIOLOGICAL RESPONSES**

Thoits (1986) maintains that emotions are composed of physiological sensations (such as increased heart rate and blood pressure) and that a change in one will produce change in the other. But Gal and Lazarus (1975) maintain that psychological and physiological indices do not necessarily correspond to any given emotional state. Steptoe and Vögele (1986) investigated coping strategies, and psychological and physiological reactions to a distressing film. They found that subjects who used a strategy which lowered their physiological responses did not have a similar decrease in subjective emotional reactions.

It appears that there is little agreement on the relationship between emotional and physiological responses in coping behaviour. How coping affects physiological reactions is not an aspect which is emphasised by Lazarus and Folkman's (1984) theory. This may be one of the reasons that this appears to be a neglected area. Another reason may be that most of the investigations of the transactional perspective have been carried out in the field where there are methodological problems in obtaining physiological measures. So this variable does not appear to have been investigated.

Physiological responses can be viewed as an outcome variable. Assuming there are changes when a person appraises an event as stressful then, according to Cameron and Meichenbaum (1982), the rate of return to a normal pattern of functioning suggests that stress no longer exists and therefore this can be interpreted as a measure of coping effectiveness.

### **Physiological measurement**

Measurement of any physiological response nearly always requires instrumentation (Brown, 1972). A commonly used recorder is the polygraph.

This can record electrical activity in a somatic response, such as heart rate from the surface of the skin (Stern, Ray, & Davis, 1980).

Many of the earlier studies in coping research used physiological measures. For example, Houston and Holmes (1974) used pulse rate and galvanic skin response as physiological measures of stress, when a coping strategy (avoidant thinking) was manipulated for subjects faced with stress under conditions of temporal uncertainty. They found that the physiological indices showed that subjects who used the coping strategy had more rather than less stress than subjects who did not use the coping strategy.

## **FUNCTIONS OF COPING**

Folkman and Lazarus (1984) state that an important component of their conceptualisation is that effective coping serves functions other than problem solving. Two main functions are noted by several researchers. The first is problem-focused coping and is directed at managing or altering the problem. The second function is emotion-focused coping which is directed at regulating the emotional response to the problem (Coyne & Lazarus, 1980; Folkman, 1982; Pearlin & Schooler, 1978).

According to Folkman (1982) problem-focused and emotion-focused coping can facilitate each other. For example, using problem-focused coping may reduce an emotional response. The two forms of coping can also hinder each other such as when emotion-focused coping delays or obstructs problem-focused coping.

There is a link between the functions of coping and the specific strategies used. Folkman and Lazarus (1984) state that a coping function refers to the purpose a strategy serves. Different coping strategies can serve different functions for different people (Stone & Neale, 1984).

## **COPING STRATEGIES**

Strategy is the most prevalent term for attempts to manage stressful situations. According to Ray, Lindop, & Gibson (1982) the term strategy is used rather than response because coping behaviour has a purpose. But other

terms appear to be used interchangeably. For example: McCrae and Costa (1986) refer to mechanisms; Folkman and Lazarus (1980) use the term items; Menaghan (1983) refers to efforts as specific actions taken in specific situations; and Lazarus (1982) assigns activities as the crucial mediating processes. Whatever term is used it is essential to clarify that they all refer to specific coping processes actually used in a given stressful situation (Folkman, Schaefer, & Lazarus, 1979).

When coping is viewed from the process-oriented perspective the coping strategies are no longer seen only as unconscious defense mechanisms but are considered conscious responses to external influences which can be identified objectively (McCrae, 1984).

### **Classification of coping strategies**

There are many strategies available and Roskies and Lazarus (1980) consider that a method for classifying strategies is essential for the systematic study of coping. Yet there is no widely accepted and used taxonomy of coping (Moos & Billings, 1982; Stone & Neale, 1984). This lack of an adequate classification has impeded the study of coping processes according to Lazarus and Launier (1978).

Nevertheless, there have been attempts at the development of taxonomies. McCrae and Costa (1986) describe how theorists differ considerably in the number of coping strategies they propose, from global dichotomies to attempts at finer distinctions. Holahan and Moos (1987) suggest that most approaches distinguish between active strategies which are directed toward confronting the problem, and strategies which endeavour to reduce tension by attempting to avoid the problem. Their own (Holahan & Moos, 1985) classification divides strategies into two categories. The approach strategies are active cognitive and behavioural attempts to manage the stressful situation. Avoidance strategies are cognitive and behavioural attempts to avoid the stressful event.

Folkman and Lazarus (1980) propose a typology of strategies which corresponds to their conceptualisation of coping functions. Problem-focused

coping strategies are attempts to manage or alter the situation. Emotion-focused strategies are attempts to manage or reduce emotional distress.

## **APPRAISAL**

Appraisal is a key concept and essential to a transactional theory of psychological stress and coping (Lazarus, 1982; Lazarus & Folkman, 1984), as coping and appraisal mutually influence each other during an encounter (Folkman & Lazarus, 1980; Folkman, 1982). Lazarus and Launier (1978) define it as "a continuously changing set of judgements about the significance of the flow of events for the person's well-being" (p.302).

Lazarus (1966) identified two kinds of cognitive appraisal: primary and secondary. In primary appraisal the individual evaluates whether there is anything at all at stake which may affect his or her well-being (Folkman, Lazarus, Gruen, & DeLongis, 1986). Lazarus and Folkman (1984) distinguish three types of primary appraisal:

- [1] Irrelevant, which means there is no current implication at all for well-being.
- [2] Benign-positive, where a person regards an event as a positive state.
- [3] Stress appraisals, which can be of three kinds: harm/loss, threat, or challenge. Stress appraisals will occur only if a person judges that something is at stake (Folkman & Lazarus, 1985). For example, an individual may appraise an event as affecting his or her self-esteem in some way.

No coping is required in the first two types of appraisal. It is necessary in stress appraisals. In harm/loss some damage has already occurred as in death of a loved one or an incapacitating injury. Threat involves losses or harms that have not yet occurred but are anticipated as in problems finding a job, or personal illness. Challenge has a more positive tone and generally requires exceptional efforts from the individual as in job promotion, a new career, or marriage.

In secondary appraisal the individual evaluates what can be done to overcome or improve the stressful event. The various coping options are taken into account and consideration is given to what these will accomplish and whether or not they can be applied effectively.

Lazarus and Folkman (1984) emphasise that primary appraisal does not necessarily precede secondary appraisal, nor is it more important. Secondary appraisal shapes the coping activities as well as affecting the primary appraisal process (Lazarus & Launier, 1978). The two types of appraisal interact with each other in a complex manner to determine the degree of stress and the emotional reaction. The transactional perspective emphasises the fact that as an individual's cognitive appraisal changes so will the accompanying emotions.

The understanding of the processes of appraisal is still quite limited according to Lazarus and Folkman (1984), but there is ample research evidence for the existence of appraisal as a construct (e.g. Bennett & Holmes, 1975; Holmes & Houston, 1974; Lazarus & Alfert, 1964; Neufeld, 1975).

More recent research has examined the specific relationships of cognitive appraisal and the coping processes. Folkman, Lazarus, Dunkel-Schetter, DeLongis and Gruen (1986) examined the functional relations among cognitive appraisal, coping processes, and the outcome of stressful encounters. They found that variability in coping is at least partially a function of both primary and secondary appraisal. They concluded that there are bidirectional relations among the variables. They also found that different coping strategies were used depending on the process of secondary appraisal. When the situation was appraised as changeable strategies were used that kept subjects focused on the situation. When the situation was appraised as having to be accepted coping strategies were used to help the subjects avoid focusing on the situation.

Folkman and Lazarus (1980) examined coping in an empirical study of stressful episodes reported by middle-aged subjects over a one year period. They found that more problem-focused coping was reported for situations

subjects perceived they could change. More emotion-focused coping was reported in situations that had to be accepted.

## **CONTROL**

An important aspect of appraisal is the degree of personal control a person can apply (Ray, Lindop, & Gibson, 1982). Fleming, Baum, & Singer (1984) also acknowledge the important role control may play in coping behaviour. Lazarus and Folkman (1984) agree, but maintain there is no single concept of control, but that it has at least three aspects: as an antecedent situation or person variable; as a mediator; and as an outcome.

Folkman (1984) provides a theoretical analysis of the concept of control. She emphasises that control can have multiple functions in any stressful event. She distinguishes between two different forms of control. Firstly, situational appraisals are part of secondary appraisal and refer to the possibilities for controlling a specific stressful encounter. Secondly, generalised beliefs about control which pertain to the degree individuals assume they can control outcomes of importance. This is connected to primary appraisal and will be examined in the present study.

Folkman (1984) states that the relationships among control, threat, challenge and coping have not yet been investigated systematically. She suggests that differences in the perception of control will determine either a threat or challenge appraisal. Threat appraisals are more likely when the expectations for control are not as strong as the desire for control. Challenge appraisals predominate when a specific encounter is appraised as relevant to well-being and therefore has potential for control. Lazarus and Folkman (1984) also suggest that challenge appraisals are more likely to occur when there is a sense of control.

## **EFFECTIVENESS AND USE OF COPING STRATEGIES**

Menaghan (1983) maintains that the notion of effectiveness is implicit in the concept of coping, that is, it infers that stress has been managed successfully. This view is too restrictive for the process-oriented perspective. Lazarus and Folkman (1984) maintain that effective coping depends on the

appraisal and coping processes that mediate between the demands of the situation and the resources of the person, and the outcome of the encounter. Yet very little is known about the relative effectiveness of the different coping strategies (Aldwin & Revenson, 1987; Houston, 1977; Pearlin & Schooler, 1978).

Lazarus and Folkman (1984) do not view coping strategies as good or bad. A strategy that is effective in one situation can be ineffective in another, and vice versa. But it is important to determine which strategies are more effective for which situation. Thoits (1986) suggests that finding if one coping strategy is more effective than another in a particular situation will allow more rapid accumulation of knowledge. But there are also practical implications. For example, knowledge of which strategies are effective and which are not may have implications for therapeutic interventions such as coping skills training.

Menaghan (1983) provides a discussion of the complexities of assessing the effectiveness of coping strategies and maintains there is a wide variation on how effectiveness is measured, such as perceived effectiveness or observed effectiveness. Menaghan (1982) asks what criteria are appropriate for deciding whether a given strategy is effective. She suggests conclusions may differ depending on the choice of outcome and the time frame concerned.

McCrae and Costa (1986) investigated the perceived effectiveness of coping strategies and personality and well-being. Subjects responded to two questions of whether a strategy they had used was helpful in solving the problem, or in reducing distress. They found that subjects who used more effective coping strategies generally reported higher subsequent happiness and well-being. McCrae and Costa used a yes/no response to determine perceived effectiveness. This seems rather limiting. It would be preferable to use several measures. For example, a combination of physiological indices, affect measures, and a scale which determined some degree of effectiveness would provide a better indication of the effectiveness of coping strategies. The present study will use multiple measures in an attempt to provide a more complex analysis.



McCrae and Costa (1986) also examined frequency of use of coping strategies and suggested that there is some evidence that use and perceived effectiveness are separable. Some coping strategies are used but are rarely thought useful. Menaghan (1983) maintains that a recurring problem is the failure to assess usage and perceived effectiveness separately. So there is no way of knowing whether perceived ineffective strategies were tried and found lacking, were avoided, or were used despite their perceived ineffectiveness.

McCrae (1984) attempted to examine a large number of specific coping strategies, rather than a few general categories such as problem-focused versus emotion-focused strategies. Subjects responded to 118 items in a Coping Questionnaire. A factor analysis produced 28 factors (e.g. fatalism, rational action, perseverance, distraction, avoidance). McCrae found that the most frequently used strategies were: taking one step at a time; expression of feelings; and restraint. The mechanisms used the least frequently were: self-blame; intellectual denial; hostile reaction; sedation; and passivity.

At least two further studies have used the same set of coping strategies identified by McCrae (1984). McCrae and Costa (1986) found that rational action, faith, seeking help and self-adaptation were perceived as the most effective strategies for problem solving and distress reduction. The strategies perceived as the least effective were: hostile reactions; self-blame; wishful thinking; and indecisiveness. Rippetoe and Rogers (1987) selected six coping strategies to investigate the effects of information about a health threat (breast cancer) on these strategies. They found that the coping information was a critical factor in determining the specific strategies used. When the ability to cope was maximised, use of rational problem solving was increased. When the ability to cope was minimised, fatalism, religious faith, and hopelessness increased.

Fleming et al. (1984) suggest that individuals appear to alter coping strategies according to the specific situations encountered. This implies that there may be a difference in the effectiveness of different strategies for different situations. The present study intends to examine the perceived effectiveness and reported use of three specific strategies in two situations.

## THE SITUATION

McCrae (1984) states that within the process-oriented perspective of coping one of the most important questions identified is whether coping responses are determined primarily by the situation, the person, or some interaction of these. Some researchers have attempted to begin to answer this question by turning their attention to the characteristics of the situation and attempting to identify the kinds of coping related to particular events.

Pearlin and Schooler (1978) used an open-response interview format to identify ways of coping with financial, marital, parental, and work problems. They found that some kinds of coping strategies were not equally effective in these different areas. The manipulation of goals and values was most effective in relatively impersonal areas (e.g. work experiences). Problems arising from close interpersonal relationships were best handled by strategies in which the individual remained committed to and engaged with relevant others. Pearlin and Schooler's findings are fairly general, but they are important as they appear to be the first attempt to specifically investigate the effects of the situation.

Billings and Moos (1981) attempted to determine if different categories of coping responses were used more frequently in response to different events. They found that problem-focused coping was used most in dealing with illness and least in dealing with death. Emotion-focused coping was used with non-interpersonal events.

Menaghan (1982) investigated a single area (marriage) and focused on four specific coping efforts. She found that negotiation and optimistic comparisons were effective in reducing problems over time, and selective ignoring and resignation increased ongoing distress.

Folkman, Lazarus, Dunkel-Schetter, DeLongis, and Gruen (1986) criticise these studies, maintaining that although the coping processes are usually assessed contextually their impact tends to be evaluated without regard to their context. Consequently there still remains a lack of information about actual coping processes and the variables that influence them. This criticism appears justified in that these and other researchers make general statements

and suggestions but fail to investigate the specific strategies and variables that may influence their use.

Folkman (1982) states that an advantage of assessing coping from a situation-oriented approach is that it allows the complex coping processes to be described. According to Parkes (1986) situational factors are related to the immediate nature of the stressful transaction.

In accordance with their transactional perspective, Lazarus and Launier (1978) contend that it is the individual's appraisal of the situation as a loss, threat, or challenge which determines the coping response. Losses, threats, and challenges are not strictly situational, but are reciprocal concepts in the relationship between the individual and the environment. However, McCrae (1984) maintains that the three types of stressors can be classified objectively and therefore are clearly situational variables.

### **THREAT STUDIES IN THE LABORATORY**

Many earlier studies have investigated threat as short-term laboratory induced stress (e.g. Averill, & Rosenn, 1972; Bennett & Holmes, 1975; Holmes & Houston, 1974; Lazarus & Alfert, 1964). Most of these studies investigated coping under the trait-oriented perspective, defining traits as the coping strategies. Not one laboratory study could be found in the available literature which investigated the effectiveness of coping strategies from the process-oriented perspective. In 1978, Lazarus and Launier stated that the laboratory experiment was not the ideal research strategy for stress, coping and adaptation. Lazarus and Folkman (1984) still hold to this idea but concede there is undoubtedly more than one research design appropriate to their theory, including the use of experimental laboratory research. The consequent emphasis on field studies has possibly limited knowledge in the coping area. There is a need to return to the laboratory to begin to identify the specific links of the process of coping through the control of variables and examination of interactions.

Since 1980 there have been few laboratory studies and these also investigated coping from the trait-oriented approach. Steptoe and Vögele (1986) merely replicated the experimental threat of some of the earlier

studies (e.g. Lazarus, Opton, Nomikos, & Rankin, 1965). Kremer and Spiridigliozzi (1982) examined the effect of laboratory-induced stress on subjects with high or low amounts of life stress. They also investigated the effectiveness of a coping strategy (affective isolation) on emotional arousal. Threat to self-esteem was operationalised using a procedure developed by Bennett and Holmes (1975). Short-term stress was defined as failure feedback of a testing situation. They found that failure feedback increased subjective anger and anxiety and the coping strategy significantly reduced the emotions.

Kremer and Spiridigliozzi (1982) manipulated the coping strategy for use during the failure feedback following the testing situation. They maintained that their study investigated two types of short-term stress: the stress of being tested and the stress of the failure feedback. This may have confounded the two types of stress. But they discussed the results in terms of the reduction of stress for the failure feedback only, which meant the situational aspects were very brief. The present study intends to manipulate the coping strategies after false feedback for use before and during a second testing situation. This will allow a longer period of short-term stress in which to assess the situational influences.

## **THREAT AND CHALLENGE**

Lazarus (1982) suggests that the distinction between threat and challenge is one of the most interesting and obscure questions in coping research. He views them as two very different but closely related stressors. Coyne and Lazarus (1980) see the main difference as a positive (challenge) versus a negative (threat) tone, depending on whether the individual focuses on the potential gain or harm resulting from the stressful event.

Lazarus and Folkman (1984) suggest that threat and challenge are not necessarily mutually exclusive. Although they must be considered as separate, but often connected, constructs, they can occur simultaneously. Also the relationship between threat and challenge appraisals can alter as a stressful event unfolds. A situation that is at first appraised as more threatening can come to be seen as challenging when cognitive coping efforts are used.

Holroyd and Lazarus (1982) maintain it is usually assumed that challenge has more potential for adaptation. Lazarus and Folkman (1984) agree that challenge, rather than threat, has important implications for adaptation, but state that their comments about the differences between the two types of appraisal is speculation as empirical evidence is sparse. They suggest that these hypotheses seem worth investigating more closely in controlled studies.

Clearly there are many unsettled issues concerning the distinction between threat and challenge. It is important to discriminate these variables to ascertain whether or not there is a difference in response to threat or challenge. If there is a difference then any implications for adaptation can be investigated by examining the use and effectiveness of different coping strategies in either a threat or challenge situation.

It is also important to distinguish threat and challenge as objective situational variables as suggested by McCrae (1984), and as a subjective appraisal as suggested by Lazarus and Folkman (1984). The current research intends to operationalise threat and challenge as objective variables in the form of the situation to determine whether subjects will respond differently to the manipulation. The present study also intends to investigate threat and challenge as subjective variables in the form of primary appraisal.

From the available literature only four articles have been found which specifically investigate losses, threats, and challenges. McCrae (1982) examined age differences in the use of coping strategies. He found that as people age the number of losses remain the same, challenges decrease, and threats increase.

McCrae (1984) attempted to assess the influence of losses, threats, and challenges on the choice of coping strategies. The results provided strong evidence that the type of stressor had a consistent and significant effect on the choice of specific strategies. He found that subjects facing a threat were most likely to use fatalism, faith and wishful thinking. Those who faced challenge used rational action, positive thinking and perseverance.

Folkman and Lazarus (1985) investigated emotion and coping during three stages of a college examination. They found that the coping processes

associated with threat emotions (e.g. anxiety, fear) were different from those associated with challenge emotions (e.g. confidence, hope). Ninety-four percent of the subjects reported feeling both threat and challenge emotions, and threat and challenge emotions were associated with different forms of coping.

McCrae and Costa (1986) categorised stressors into losses, threats, and challenges to examine the influence of personality on coping responses and the perceived effectiveness of coping strategies. The results suggested that the three stressors have little influence on the relative effectiveness of strategies. Strategies were equally effective across situations. But they suggest their study is only a preliminary guide to perceived effectiveness and that it would be expedient to recognise that different strategies may be more or less effective for specific groups and problems. They were not satisfied they had answered the question of whether or not losses, threats, and challenges require different strategies. Therefore this question needs further investigation.

McCrae and Costa (1986) asked subjects to indicate from a checklist which coping strategies they had used. These were then ranked in order of effectiveness. Retrospective data such as this are common in field studies. Although information is gained about the number and type of coping strategies that are used, the more specific effects of different strategies are not investigated. The current research intends to operationalise three different strategies and to obtain measures immediately rather than retrospectively. Together with the manipulation of threat and challenge situations more specific links in the coping process may be identified.

## **CRITIQUE OF CURRENT RESEARCH AND THEORY**

Several researchers have suggested the need for more specific analyses of the coping processes (e.g. Fleming et al, 1984; Menaghan, 1983; Stone & Neale, 1984). Yet most of the research in the process-oriented perspective continues to focus on general aspects of coping behaviour. One reason for this may be that the emphasis on field studies has restricted methodology to generalities. For example, it is easier to have subjects complete a checklist retrospectively than it is to ask them to identify the specific cognitive

coping strategies they used. In the laboratory the use of coping strategies may be controlled, thus lessening this problem. In naturalistic settings no two situations are the same. By manipulation of the situation in the laboratory the threat or challenge encountered will be the same for every subject so any differences between the two situations will become obvious. Thus, control of the variables may provide the more specific information which is difficult to obtain in real-life studies.

Current research is dominated by the theory of Lazarus. This is a very complex theory and as such it necessitates a more complex design than a field study can provide. There is insufficient information about most aspects of the theory. As Silver and Wortman (1980) contend, the model does not predict a person's behaviour in any given stressful encounter as the influences of the particular variables are not confirmed. For example, the process of primary appraisal is still speculative. It is not clear what antecedent factors determine threat or challenge.

The process of secondary appraisal does not have adequate empirical confirmation. Although research has found a connection between the type of coping response used (problem-focused versus emotion-focused coping) and secondary appraisal, little is known about how or why a person selects particular strategies. The concept of control is also speculative and too general. There is little empirical evidence to confirm its role or to investigate the ways it may influence the other variables.

The theory suggests there are emotional and physiological responses in coping behaviour, yet little is known about their role. It is not known which emotions prevail as there has been a limited focus on anxiety as the only index of affect. It may be that there are other more prevalent and important emotional reactions. Similarly, there has been little emphasis on physiological responses so it is not known which ones are important indicators and how these may help the individual monitor coping behaviour.

Lazarus and Folkman (1984) emphasise that process and outcome must be kept separate. Yet these issues are linked irrevocably. There will always be at least an immediate outcome when coping processes occur, so short-term adaptation is important in any investigation of coping behaviour. Lazarus and

Folkman (1984) maintain that adaptational outcomes consist of effective, affective, and physiological components, yet these are the very processes that research has not investigated adequately. There has not been sufficient emphasis on outcome in relation to process. They can be investigated together but be assessed separately in the same study. It is important to determine how coping processes affect adaptational outcome. Outcome can be assessed through investigating the effectiveness and frequency of use of coping strategies. Yet specific links in the coping process also need to be examined to identify the connection between process and outcome.

## **THE PRESENT STUDY**

The general aim of the present study is to investigate the effects of a threat or challenge situation on appraisal, control, specific strategies, emotions, and physiological responses.

### **Operational Definitions**

Threat and challenge will be manipulated as objective situational variables. Threat is operationally defined as the anticipation of harm to the self-esteem; Challenge is operationalised as the potential to master a task and gain self-esteem.

Three cognitive coping strategies will be manipulated: fatalism, perseverance and rational action. These are classified according to Folkman and Lazarus' (1980) typology. Fatalism is an emotion-focused strategy, perseverance and rational action are problem-focused strategies. All three are cognitive strategies, and are operationally defined in the following manner: Fatalism is acceptance of the inevitable; Perseverance is thoughts of continued persistence; Rational Action is an attempt to analyse the problem. These strategies were selected from the 28 investigated by McCrae (1984). They were chosen on the basis of McCrae's findings for their frequency of use with threat and challenge stressors, and for their suitability for use with a cognitive task.



## Objectives and Hypotheses

There are three main aims to the present study:

[1] The primary purpose of the present study is to determine the reported frequency of use and the perceived effectiveness of three coping strategies in Threat and Challenge situations.

[2] To examine the variables of primary appraisal, secondary appraisal, and control and to determine the relationship of these to coping strategies in Threat and Challenge situations.

[3] To investigate the outcome variables of pulse rate, affect, and test performance and to determine the relationship of these to specific coping strategies in Threat and Challenge situations.

### Affect.

The present study will investigate eight different emotions. As very little is known about which emotions are important in coping behaviour, and specifically in threat and challenge situations, the investigation of these emotions will be considered exploratory. No specific predictions will be made.

### Primary Appraisal.

It is intended to operationalise Threat and Challenge as objective variables (McCrae, 1984) and to measure the subjective appraisal of the situation as threatening or challenging (Lazarus & Folkman, 1984). It is expected there will be a relationship between these variables. Therefore it is predicted that:

- 1.1 Subjects in the Threat condition will appraise the situation as more threatening than challenging. Conversely, those in the Challenge condition will appraise the situation as more challenging than threatening.

### Secondary Appraisal.

Previous research on secondary appraisal (Folkman & Lazarus, 1980; Folkman, Lazarus, Dunkel-Schetter, DeLongis, & Gruen, 1986), has found that when the situation was appraised as changeable more problem-focused forms of coping were used, and when the situation was appraised as unchangeable emotion-focused forms of coping were used. It is expected that similar results will be found when the coping options are manipulated. It is predicted that:

**1.2** The situation will be appraised as more changeable for the problem-focused strategies (Perseverance and Rational Action) than for the emotion-focused strategy (Fatalism).

**1.3** The situation will be appraised as having to be accepted more for the emotion-focused strategy than for the problem-focused strategies.

### Control.

Folkman (1984) maintains that a greater perception of control may determine a challenge rather than a threat appraisal. Therefore it is expected that:

**1.4** Subjects in the Challenge condition will perceive a higher degree of control than those in the Threat condition.

### Pulse Rate.

Pulse rate can be viewed as an index of arousal to a stressful encounter (Holroyd & Lazarus, 1982). It is predicted that:

**2.1** Pulse rate will be higher in the Threat condition than in the Challenge condition following the false feedback manipulation.

If a return to a normal pattern of physiological functioning is interpreted as a measure of coping effectiveness (Cameron & Meichenbaum, 1982) then it is predicted that:

- 2.2** Pulse rate will have a greater decrease in the three experimental groups than the control group following use of the coping strategies.

Reported Use of Coping Strategies.

McCrae (1984) found a significant difference between threat and challenge stressors in the frequency of use of different coping strategies. Fatalism was used more when subjects were faced with threat. Perseverance and Rational Action were used more by subjects faced with challenge. It is expected that similar findings will occur in the present study. Therefore:

- 3.1** Perseverance and Rational Action will be reported as used more frequently in the Challenge condition than in the Threat condition.
- 3.2** Fatalism will be reported as used more frequently in the Threat condition than in the Challenge condition.

Perceived Effectiveness of Coping Strategies.

Reported use and perceived effectiveness are assessed separately to determine whether or not they are independent as suggested by McCrae and Costa (1986). It is predicted that:

- 3.3** Perseverance and Rational Action will be perceived as more effective in the Challenge condition than in the Threat condition.
- 3.4** Fatalism will be perceived as more effective in the Threat condition than in the Challenge condition.

## CHAPTER II: METHOD

### OVERVIEW AND DESIGN

The experiment utilised a 2 x 4 (situations x strategies) factorial design. The two situations were Threat and Challenge. The four strategies were Fatalism, Perseverance, Rational Action, and No Strategy.

Subjects were asked to estimate how well they expected to do on a speeded test. Deception was used to manipulate the Threat and Challenge conditions; subjects were given false feedback on their test scores. They made another estimate and were given one of the coping strategies prior to sitting a second test. Pulse rate and affect were measured three times during the experiment: (1) at the conclusion of the initial rest period; (2) immediately following the false feedback; and (3) after they had completed the second test. In a post-experimental questionnaire subjects were asked for their perceptions of the effectiveness and use of the coping strategies, and primary appraisal, secondary appraisal, and control were measured.

A computerised random number generator was used to randomly assign the subjects in equal numbers to the eight conditions.

## **SUBJECTS**

The subjects were 80 volunteer first and second year psychology students. There were 44 males and 36 females. The age range was from 18 to 50. The mean age was 20.9, the median and modal ages were 19.

Students were approached in class and asked to volunteer to participate in the study. They were told the research was to examine the relationship between emotion, performance on a cognitive task, and physiological reactions. It was pointed out that their emotions would be measured by filling out some forms, and that although the cognitive task was simple it would require their maximum performance. The polygraph was explained briefly. The potential subjects were advised that participation may contribute to their understanding of psychological experimentation.

A suitable time was then arranged with those who volunteered. They were given a form showing their time and date, and a map of how to find the experimental room.

## **MATERIALS**

### **Technical Equipment**

A Data Graph Systems polygraph, (Lafayette Instrument Company, model no. 76101-10) was used to record physiological reactions. Pulse rate was measured through a pulse pickup crystal strapped to the index finger of the non-dominant hand. Respiratory rate was measured through an air-pressure pneumograph. Respiratory rate was not used as a dependent variable but as a monitor to ensure breathing was even when the pulse rate was read.

A tape recorder was used to issue instructions to the subject throughout the experiment. A male voice, unknown to any potential subjects, was used for these instructions.

## **Cognitive Task**

The ACER Speed and Accuracy test (Australian Council For Educational Research, 1962), Forms A and B, was used to provide subjects with a simple yet demanding cognitive task. The test contains number checking and name checking and only the former was used. There are 160 pairs of numbers, ranging from three to twelve digits. The subject is required to indicate whether the items in each pair of numbers are the same or different. The time allowed for the test is six minutes.

Forms A and B are parallel. Reliability data is available only for the combined number and name checking tests. Reliability, using the test-retest method with an interval of approximately 10 minutes, was .893 for AB and .916 for BA.

The ACER Speed and Accuracy test was chosen for several reasons. Firstly, its simplicity was considered important to provide a relatively innocuous task when deception was involved. Use of an intelligence test, for example, may have caused too much concern for some subjects. Secondly, the fact that it is a speeded test provided a more plausible deception as the subjects would not realise they could never finish it. Thirdly, the parallel forms provided ideal circumstances to set up the subjects for coping behaviour during the second test. Lastly, two six minute intervals for sitting the test provided sufficient time for the length the experiment aimed to take.

## **Affect Measurement**

Visual analogue scales (Aitken, 1969) were administered to measure the subjects present feelings (see Appendix A). The scales consist of 100 millimetre lines with stops at either end and a description of the feeling beyond these stops (Huskisson, 1983). Eight adjectives were chosen from those used in the Folkman and Lazarus (1985) study (confident, anxious, pleased, annoyed, eager, worried, happy, and disappointed). These adjectives provided an even mix of positive and negative emotions. The same adjectives were used at either end of the scales to limit the use of language as much as possible. The instructions were based on those used by Bond and Lader

(1974). The visual analogue scales were chosen as a quick sensitive measure of change.

### **Percentile Score Form**

A form was designed for subjects to estimate their percentile scores for the two tests, and for the experimenter to report their scores to them (see Appendix B). No standard form was available.

### **Post-experimental Questionnaire**

The post-experimental questionnaire (see Appendix C) was developed to measure the subjects perceived use and effectiveness of the coping strategies, primary appraisal, secondary appraisal, and control.

The first question asked subjects to rate the use and effectiveness of the assigned coping strategies on a seven point scale. This question was omitted from the questionnaire given to the control subjects. Questions two and three were designed to assess secondary appraisal. Subjects were asked to what extent they thought they had to accept and change the situation. These were chosen from the four used by Folkman and Lazarus (1980).

Questions four and five were a check for primary appraisal. Subjects were asked to what extent they perceived the situation as threatening and challenging. Question six was to assess the validity of Lazarus and Folkman's (1984) claim that perceived control of the situation is central to their theory. The subjects were asked to what extent they thought they could control the outcome of the second test.

### **ETHICAL CONSIDERATIONS**

As the study involved deception steps were taken to ensure the ethical considerations were covered:

- [1] Informed consent was obtained in two ways. Firstly, students agreed to participate. Secondly, they signed a consent form (see Appendix D).

- [2] Subjects were at all times under observation by the experimenter. She was either in the room with them or observed them through a one way mirror.
- [3] The visual analogue scales provided a quick check for any extreme emotion.
- [4] The safety of the polygraph was assured by a technician.
- [5] Subjects were debriefed immediately.

The procedure and ethical considerations were discussed and approved by a Departmental Ethics Committee.

## **PILOT STUDY**

The pilot study had three main objectives. Firstly, to check whether the manipulation for the Challenge condition was effective. Manipulation for the Threat condition was based on that developed by Bennett and Holmes (1975). The same manipulation was used for the Challenge condition and the pilot study showed that the most effective percentage for the false feedback was 95%. This was found to be sufficiently challenging as subjects could push themselves a little further to attain a realistic goal.

Secondly, to determine the utility of the visual analogue scales. These were found to be effective as they took approximately 20 seconds to complete and were sensitive to change. One adjective was changed from angry to annoyed, as pilot subjects considered anger to be inappropriate for the situation.

Thirdly, to check for any procedural problems. Some minor procedural changes were made to improve the timing and smooth running of the experiment.



## DEPENDENT VARIABLES

Pulse rate was recorded for three 30 second intervals: at the conclusion of the three minute rest period; immediately after the false feedback was given; and at the conclusion of the second test. The index was the number of heart beats per 30 seconds, doubled to obtain pulse rate per minute.

Subjects completed the visual analogue scales, to measure their present feelings, during the same three 30 second periods. Scores were obtained by measuring the distance in millimetres from the left edge to the subject's mark.

Perceived effectiveness, reported use of the coping strategies, appraisal and control were measured on the post-experimental questionnaire using a seven point scale.

Test performance and the percentile estimates of test performance were additional dependent variables.

## PROCEDURE

All subjects were run individually. After entering the experimental room subjects were seated at a small table. They were given an explanation of the experimental procedure, including the fact that they would be asked to do two short tests and fill out some forms. The subjects were shown the attachments to the polygraph and it was explained that although these would be fastened throughout the experiment, recordings would be taken on three occasions only. The subjects were told all instructions throughout would be via a tape recorder and the experimenter would not speak to them again until the end, unless there was something they did not understand. The participants were then asked to sign a statement of consent.

The air-pressure pneumograph was placed around the subjects' chests and the pulse pickup crystal was attached to the index finger of the non-dominant hand. Respiratory rate and pulse rate were recorded continuously during a three minute rest period. This allowed time for the subjects to become adjusted to the polygraph and the experimental situation.

While the polygraph was still recording, the tape recorder was started which gave instructions to the subjects to complete the first set of visual analogue scales as quickly as possible. After subjects had completed these the polygraph was switched off. Tape recorded instructions were given (see Appendix E-1). These were similar to those used by Bennett and Holmes (1975) and Kremer and Spiridigliozzi (1982). The subjects were told that they were taking part in a special speed and accuracy test. The instructions explained that they would have a chance to look over the test before they made an estimate of how well they expected to do on it. The subjects were then shown Form A of the ACER Speed and Accuracy test for 10 seconds.

The tape-recorded instructions continued (see Appendix E-2) which explained the test briefly, then explained percentiles and asked them to estimate the percentile in which they thought they would score. The experimenter handed them an estimation sheet which they completed. The experimenter took the estimation sheet, handed the subjects the test booklet and answer sheet and went into an adjoining room where the subject could be observed through a one way mirror.

Once the experimenter had left the room the tape recorded directions continued, requesting the subjects to listen carefully while the instructions in the front page of the test booklet were read. The standardised instructions (with minor adaptations) for the ACER Speed and Accuracy test were given (see Appendix E-3). The subjects completed the practice items and had six minutes to complete the test. At the end of this time the taped instructions asked the subjects to stop work and wait for the experimenter to come in and collect the answer sheet (see Appendix E-4). The experimenter entered the room, collected the answer sheet and booklet, returned to the adjoining room, scored the test and prepared the false feedback. This feedback differed for the Threat and Challenge conditions:

- [1] The feedback for subjects in the Threat condition indicated that they had scored 55% of the percentile they had estimated.
- [2] The feedback for subjects in the Challenge condition indicated that they had scored 95% of their estimated percentile.

The experimenter remained in the adjoining room for two minutes, then re-entered the experimental room and handed back the score sheet without looking at the subject. Subjects had approximately five seconds to look at the score before the tape-recorded instructions stated that the experimenter would start the polygraph and asked subjects to complete another form to indicate their present feelings. While subjects completed the second set of visual analogue scales, pulse rate and respiratory rate were recorded for at least 30 seconds.

The tape-recorded instructions then informed the subjects that they would now complete Form B of the same test after making another estimation of how well they expected to do this time (see Appendix E-5). Subjects were shown Form B of the test for 10 seconds and then the taped directions asked them to complete their percentile score. When this was finished the experimenter placed the test booklet and answer sheet on the table beside the subjects and then handed them a sheet containing the instructions to elicit the use of the coping strategies. The three experimental conditions received the following written directions with the appropriate coping strategies inserted:

Please read the following carefully:

Research in the area of test performance emphasises the importance of remaining calm and relaxed in the test-taking situation. One way to do this.....(coping strategy is given).

Think about this for a minute or two while you wait for further instructions.

The coping strategies for the three experimental conditions were:

- [1] Fatalism: One way to do this is to repeatedly tell yourself, as you think about the second test, that you may as well accept the outcome as nothing can be done about it.
- [2] Perseverance: One way to do this is to repeatedly tell yourself, as you think about the second test, that you must keep going and you can try harder.
- [3] Rational Action: One way to do this is to think about your performance on the first test. If you were happy with the way you approached this then do the same again for the second test. If you think you can change something to improve your performance then do so.

The control group were given the following written instruction:

Please read the following:

In this part of the procedure there will be a brief delay. Please wait a minute or two for further instructions.

The experimenter then went to the adjoining room. One minute 10 seconds elapsed before the tape-recorded directions asked the subjects to get ready to begin the second test, this time with no practice items (see Appendix E-6). The subjects had six minutes to complete the test. At the end of that time the tape-recorded instructions asked them to stop work and put the pen down.

The experimenter entered the room and collected the test booklet, answer sheet and written coping instructions. The tape-recorded instructions then indicated that the experimenter would start the polygraph and asked subjects to complete another form to indicate their present feelings. At the same time that the subjects completed the third set of visual analogue scales, pulse rate and respiratory rate were recorded for 30 seconds.

The instructions then asked the subjects to complete the last form as quickly and honestly as possible (see Appendix E-7). The experimenter handed the subjects the post-experimental questionnaire and went to the adjoining room to score the second test. When the subject was observed to have completed the form the experimenter re-entered the experimental room to conduct the debriefing interview.

### **Debriefing**

The debriefing consisted of a structured interview (see Appendix F). This was modelled on that suggested by Christensen (1980) and covered the three main functions of debriefing suggested by Tesch (1977): ethics, methodology and education. Questions two, three and six encompassed the ethical function by checking the subjects' stress level to ensure this was eliminated before the end, and informing them of the deceptions. Questions one, three, four, five and nine covered the methodological purpose by probing the subjects' suspicions, checking the effectiveness of the manipulation and the deception, and asking them not to reveal any details of the experiment. Questions six

and eight served the educational function by providing the experimenter with an opportunity to explain basic experimental methods.

The subjects who had underestimated their score were given the correct percentile based on the norms from the ACER manual. Those who had overestimated their score were told they had performed according to their estimation. Subjects were given their score for the second test. Use of other coping strategies was requested as recognition of the coping process as dynamic. It was therefore unrealistic to expect that subjects would use only the ones they had been assigned. When the debriefing had been completed satisfactorily the subjects were thanked and dismissed.

## **FEEDBACK**

Feedback was given to the subjects during the last week of their psychology classes, approximately six weeks after the experiment was completed. This was to provide some more background information and to inform subjects of the tentative results (see Appendix G).

## CHAPTER III: RESULTS

### DATA ANALYSIS

The hypotheses presented in the present study were tested using a 2 x 4 multivariate analysis of variance (MANOVA) design. MANOVA takes the correlation between the dependent variables into account and considers all the means simultaneously (Kerlinger & Pedhazur, 1973). More information is gained when the interrelation among the dependent variables is considered and so complex relationships can be investigated as the effect of the manipulation on all criteria is observed simultaneously (Winer, 1971).

However, according to Kerlinger and Pedhazur (1973) there is a risk of judgmental errors and interpretation difficulties in a very complex analysis. To lessen this risk in the present study three separate MANOVA'S were analysed.

Pillai's trace was chosen as the multivariate test statistic as this is the most robust criterion (Norusis, 1985). Therefore the significance level is reasonably correct even when the assumptions are violated.

When significant multivariate effects were found univariate F-tests were examined to determine the variables in which the significant differences occurred. Planned and focused comparisons (Rosenthal & Rosnow, 1984) were calculated to test the hypotheses and to locate the significant differences respectively.

For clarity, the results will be presented in the order of the three multivariate analyses, regardless of the order of the hypotheses.

## ANALYSIS 1

This analysis involved the dependent variables which were measured once (frequency, effectiveness, primary appraisal, secondary appraisal, and control).

The multivariate test revealed there was no significant interaction effect for situation by strategy,  $F(21,204) = .567, p > .05$ . There was a significant main effect for strategy,  $F(21,204) = 4.29, p < .001$ ; and no significant main effect for situation,  $F(7,66) = 1.27, p > .05$ . The univariate results will be reported under the separate variables. The tables of the multivariate and univariate tests of significance are presented in Appendix H. To minimise the space requirements only the significant univariate results are included).

### Reported Use of Coping Strategies

Planned comparisons were calculated to test hypotheses 3.1 and 3.2. For hypothesis 3.1 there was no significant difference between the Threat and Challenge conditions for Perseverance,  $F(1,54) = 0, p > .05$ ; or for Rational Action,  $F(1,54) = 0.78, p > .05$ . For hypothesis 3.2 there was no significant difference between the Threat and Challenge conditions for Fatalism,  $F(1,54) = 0.54, p > .05$ . These results fail to support the hypotheses.

The univariate F-tests revealed a significant main effect for strategy,  $F(3,72) = 34.2, p < .001$ . Focused comparisons found this to be between the Threat Fatalism and Challenge Rational Action groups,  $F(1,54) = 7.04, p < .025$ . Threat Fatalism was used the least frequently ( $\bar{x} = 1.8$ ) and Challenge Rational Action was used the most frequently ( $\bar{x} = 3.6$ ) as shown on Table 1 which demonstrates the means for the frequency of use of the coping strategies in the Threat and Challenge situations. Threat Fatalism was reported as the least frequently used, and Challenge Rational Action was reported as used the most frequently. Perseverance had the same reported usage in both Threat and Challenge conditions, and Rational Action was used more frequently in the Challenge condition.

### Perceived Effectiveness of the Coping strategies

Planned comparisons were calculated to test hypotheses 3.3 and 3.4. For hypothesis 3.3 there was no significant difference between the Threat and Challenge conditions for Perseverance,  $F(1,54) = 1.06$ ,  $p > .05$ ; or Rational Action,  $F(1,54) = 0.19$ ,  $p > .05$ . For hypothesis 3.4 there was no significant difference between the Threat and Challenge conditions for Fatalism,  $F(1, 54) = 3.69$ ,  $p > .05$ . These results fail to support the hypotheses.

The univariate tests revealed a significant main effect for strategy,  $F(3,72) = 36.27$ ,  $p < .001$ . Focused comparisons showed this to be between the following groups: Threat Fatalism ( $\bar{x} = 1.7$ ) was perceived to be less effective than Challenge Rational Action ( $\bar{x} = 3.4$ ),  $F(1,54) = 6.31$ ,  $p < .025$ ; Challenge Perseverance ( $\bar{x} = 3.7$ ),  $F(1,54) = 8.73$ ,  $p < .005$ ; and Threat Rational Action ( $\bar{x} = 3.1$ ),  $F(1,54) = 4.26$ ,  $p < .05$ . Table 1 shows the means for the perceived effectiveness of coping strategies in Threat and Challenge situations. Threat Fatalism was the least effective strategy and Challenge Perseverance was the most effective strategy. All three strategies were perceived as more effective in the Challenge condition than in the Threat condition.

TABLE 1: Means for reported frequency of use and perceived effectiveness of coping strategies in Threat and Challenge situations

Strategy	FREQUENCY		EFFECTIVENESS	
	Threat	Challenge	Threat	Challenge
Fatalism	1.8	2.3	1.7	3.0
Perseverance	3.1	3.1	3.0	3.7
Rational Action	3.0	3.6	3.1	3.4



### Primary Appraisal

The univariate test of the main effect for situation showed there was no significant difference between the Threat and Challenge conditions for threat appraisal,  $F(1,72) = 0.03$ ,  $p > .05$ ; or challenge appraisal,  $F(1,72) = 1.75$ ,  $p > .05$ . Therefore hypothesis 1.1 is not supported.

Figure 1 shows the overall means for all conditions for threat and challenge appraisal. These results show that subjects in the Threat condition found the second test more challenging than those in the Challenge condition. Subjects in both conditions found the situation more challenging than threatening.

### Secondary Appraisal

Planned comparisons were calculated to test hypotheses 1.2 and 1.3. For hypothesis 1.2 there was no significant difference between the problem-focused (perseverance and rational action) and emotion-focused (fatalism) strategies for changeability,  $F(1,72) = 0.6$ ,  $p > .05$ . The mean for the problem-focused strategies was slightly higher ( $\bar{x} = 4.05$ ) than the mean for the emotion-focused strategy ( $\bar{x} = 3.4$ ). For hypothesis 1.3 there was no significant difference between the emotion-focused and problem-focused strategies for acceptance,  $F(1,72) = 0.56$ ,  $p > .05$ . The mean for the emotion-focused strategy was slightly lower ( $\bar{x} = 4.65$ ) than the mean for the problem-focused strategies ( $\bar{x} = 5.2$ ). The results fail to support these hypotheses.

The univariate tests revealed there was no significant main effect for strategy in changeability,  $F(3,72) = 1.35$ ,  $p > .05$ ; or for acceptance,  $F(3,72) = 1.5$ ,  $p > .05$ .

### Control

The univariate test of the main effect for situation showed there was no significant difference between the Threat and Challenge conditions for control,  $F(1,72) = 0.8$ ,  $p > .05$ . This result fails to support hypothesis 1.4.

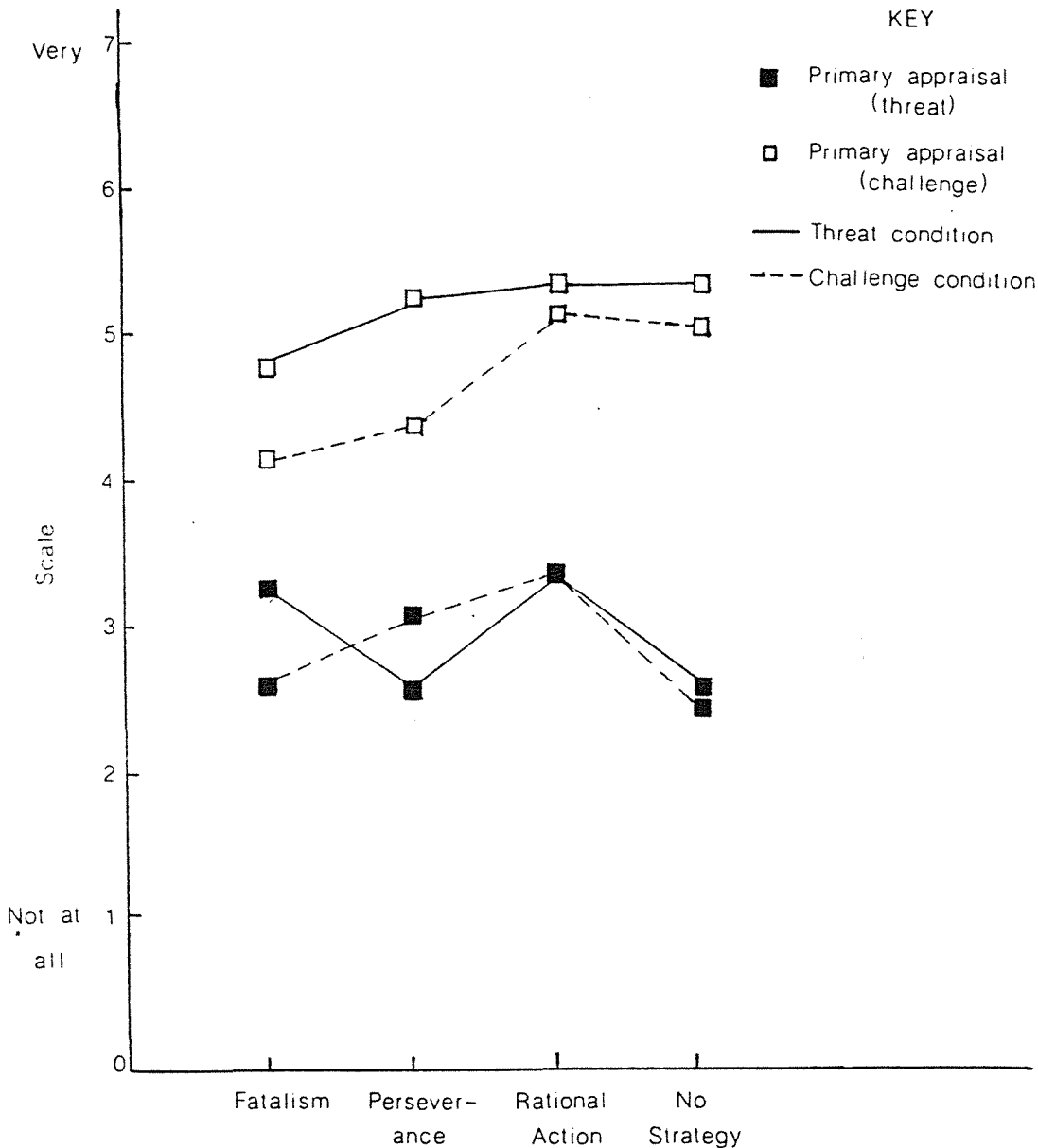


FIGURE 1: Means for all conditions for primary appraisal of threat and challenge

The univariate test of the main effect for strategy revealed a significant difference for control,  $F(3,72) = 4.14$ ,  $p < .01$ . Focused comparisons showed this difference to be between the following groups: Subjects in the Threat Fatalism group perceived less control than those in the Challenge Perseverance group,  $F(1,72) = 5.71$ ,  $p < .025$ ; Challenge No Strategy group,  $F(1,72) = 8.05$ ,  $p < .005$ ; and the Threat No Strategy group,  $F(1,72) = 4.37$ ,  $p < .05$ . Subjects in the Challenge Fatalism group perceived less control than

those in the Challenge Perseverance group,  $F(1,72) = 4.37$ ,  $p < .05$ ; and those in the Challenge No Strategy group,  $F(1,72) = 6.45$ ,  $p < .025$ .

Table 2 shows the means for perceived control in all conditions. Subjects in the Challenge No Strategy group perceived the highest amount of control, and the least amount of control was perceived by those in the Threat Fatalism group.

TABLE 2: Means for perceived control in all conditions.

Strategy	THREAT	CHALLENGE
Fatalism	3.1	3.3
Perseverance	4.3	4.7
Rational Action	4.2	4.3
No Strategy	4.5	5.0

## ANALYSIS 2

The second analysis was a doubly multivariate repeated measures design involving the variables which were measured twice (test performance and estimate of test performance). In addition to the 2 x 4 between groups design, a repeated measures MANOVA includes a within-subjects factor of time when subjects are measured more than once for each dependent variable.

The multivariate tests revealed that there was no significant three way interaction effect for situation by strategy by time,  $F(6,144) = 0.4$ ,  $p > .05$ . There was no significant interaction effect for strategy by time,  $F(6,144) = 1.08$ ,  $p > .05$ . There was a significant interaction effect for situation by time,  $F(2,71) = 42.64$ ,  $p < .001$ ; and a significant main effect for time,  $F(2,71) = 66.63$ ,  $p < .001$ . The univariate results will be reported under the separate

variables (see appendix H for the tables of the multivariate and univariate tests of significance).

### **Test Performance**

The univariate tests showed there was no significant effect for situation by time for test performance,  $F(1,72) = 0.26$ ,  $p > .05$ . There was a significant time effect for the difference between the first and second tests,  $F(1,72) = 45.42$ ,  $p < .001$ . Performance was higher on the second test ( $\bar{x} = 83.0$ ) than on the first test ( $\bar{x} = 76.7$ ).

### **Estimate as a Manipulation Check**

The effectiveness of the false feedback manipulation was determined by examining the univariate results for the percentile estimate of the subjects expected performance on the two tests.

The results revealed a significant interaction for situation by time,  $F(1,72) = 85.86$ ,  $p < .001$ . Figure 2 shows the overall means for the estimation of the two tests for the Threat and Challenge conditions. The second estimate for the Threat condition ( $\bar{x} = 40.6$ ) was significantly below that of the Challenge condition ( $\bar{x} = 54.7$ ).

### **ANALYSIS 3**

The third analysis was a doubly multivariate repeated measures design involving the dependent variables which were measured three times (pulse rate and affect). For this analysis three contrasts were specified. Contrast 1 compared the first and second measures, contrast 2 compared the second and third measures and contrast 3 compared the first and third measures.

The multivariate test showed that there was no significant three way interaction for situation by strategy by time,  $F(54,171) = 1.06$ ,  $p > .05$ . There was no significant interaction for strategy by time,  $F(54,171) = 1.29$ ,  $p > .05$ . There was a significant interaction for situation by time,  $F(18,55) = 2.58$ ,  $p < .005$ ; and for the main effect of time,  $F(18,55) = 9.91$ ,  $p < .001$ . The

univariate test results will be reported under the separate variables (see Appendix H for the tables of the multivariate and univariate tests of significance).

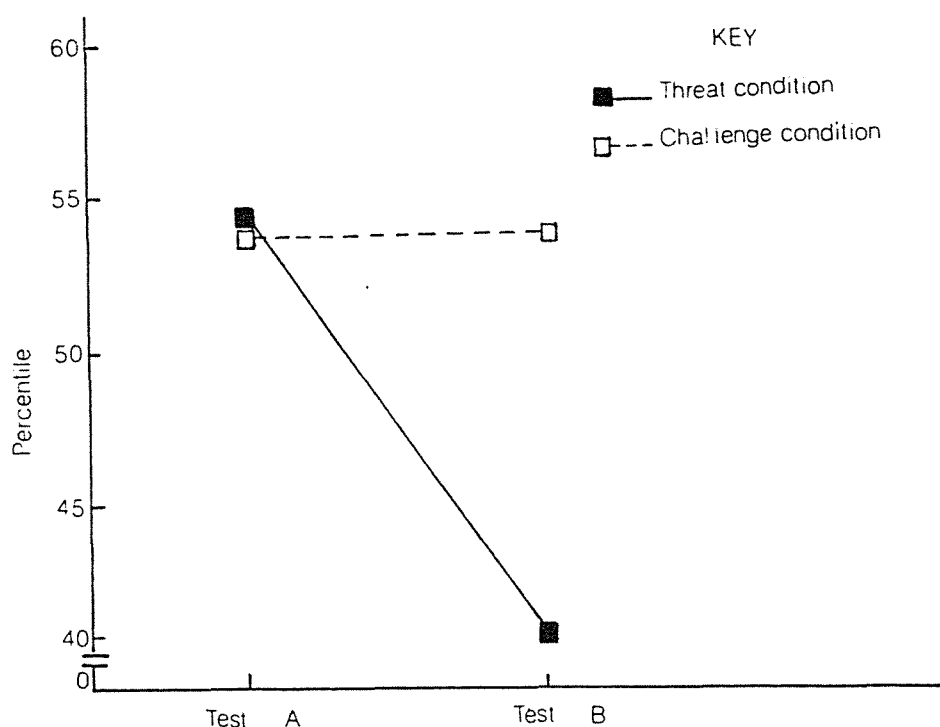


FIGURE 2: Overall means of test estimate for Threat and Challenge conditions

### Pulse Rate

The univariate test revealed a significant effect for situation by time between the first and second measures,  $F(1,72) = 4.84$ ,  $p < .05$ . Therefore hypothesis 2.1 was supported.

A planned comparison was calculated to test for hypothesis 2.2. This was not significant,  $F(1,72) = 0.38$ ,  $p > .05$ . Therefore this hypothesis was not supported.

The univariate results revealed a significant difference for situation by time between the second and third measures for pulse rate,  $F(1,72) = 5.83$ ,  $p < .05$ .

Figure 3 shows the overall means for the three measures of pulse rate for the Threat and Challenge conditions. Pulse rate was similar for both conditions at Time 1, the Challenge condition ( $\bar{x} = 81.2$ ) had a greater decrease than the Threat condition ( $\bar{x} = 83.7$ ) at Time 2, and both conditions decreased to the same level at Time 3 ( $\bar{x}$ 's = 78.4)

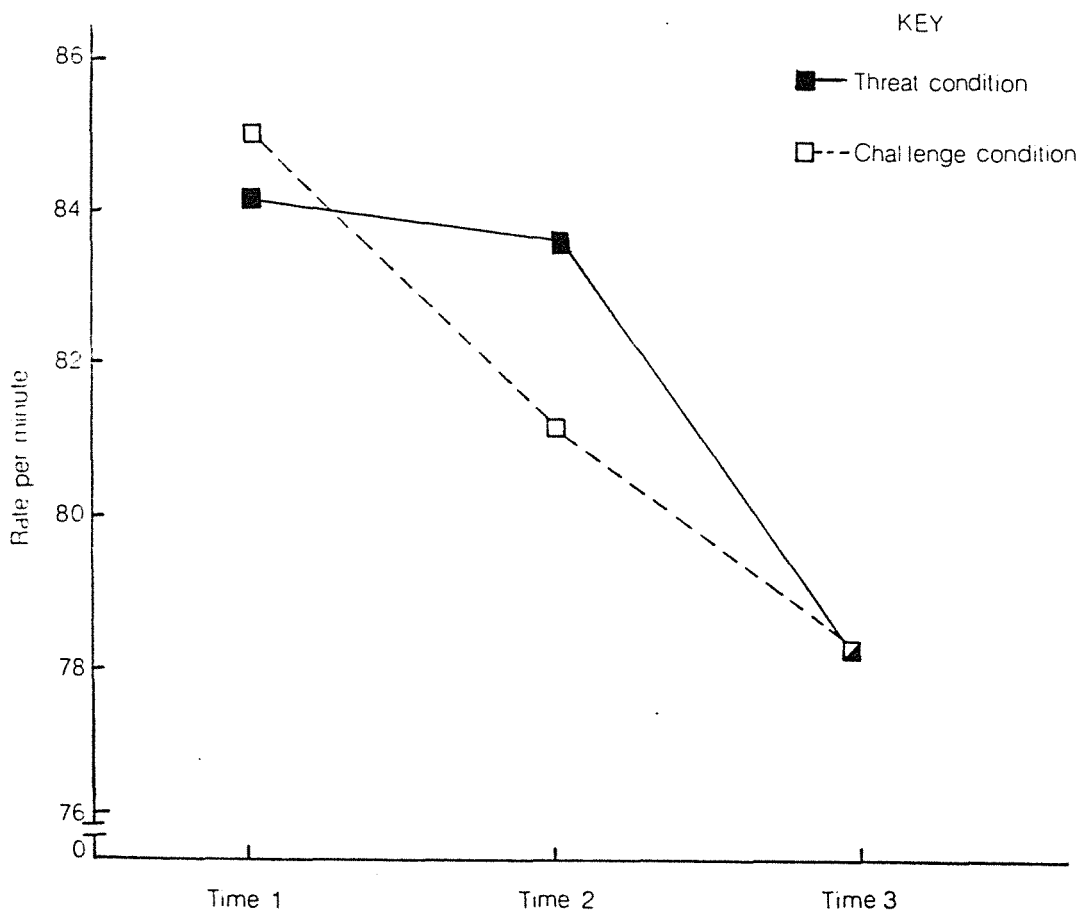


FIGURE 3: Means for the three pulse rate measures for Threat and Challenge conditions

### Negative Affect

The univariate results showed a significant effect for situation by time for disappointment between the first and second measures,  $F(1,72) = 6.80$ ,  $p < .025$ .

There was a significant main effect of time between the first and second measures for annoyance,  $F(1,72) = 18.53$ ,  $p < .001$ ; between the second and third measures for anxiety,  $F(1,72) = 5.23$ ,  $p < .025$ , and disappointment,  $F(1,72) = 27.4$ ,  $p < .001$ ; and between the first and third measures for disappointment,  $F(1,72) = 30.5$ ,  $p < .001$ , and annoyance,  $F(1,72) = 7.62$ ,  $p < .01$ . The multivariate test for homogeneity was not met for annoyance, (Box's  $M = 177.24$ ,  $p = .0000$ . when this assumption is not met the tabled value of  $F$  represents a significance level that is greater than that specified (Keppel, 1973). Therefore this result must be interpreted with caution.

### Positive Affect.

The univariate test results revealed a significant effect for situation by time between the first and second measures for confidence,  $F(1,72) = 5.78$ ,  $p < .025$ ; pleasure,  $F(1,72) = 6.42$ ,  $p < .025$ ; and happiness,  $F(1,72) = 6.86$ ,  $p < .025$ . The test for homogeneity was not met for happiness (Box's  $M = 78.58$ ,  $p = .008$ ). There was also a significant effect for pleasure between the first and third measures,  $F(1,72) = 5.89$ ,  $p < .025$ .

There was a significant main effect of time between the first and second measures for eagerness,  $F(1,72) = 20.54$ ,  $p < .001$ ; between the second and third measures for confidence,  $F(1,72) = 26.9$ ,  $p < .001$ , and pleasure,  $F(1,72) = 27.83$ ,  $p < .001$ ; and between the first and third measures for eagerness,  $F(1,72) = 16.35$ ,  $p < .001$ , and happiness,  $F(1,72) = 5.4$ ,  $p < .025$ .

Figure 4 shows the overall means for the three measures of each of the emotions for the Threat and Challenge conditions which revealed a significant effect for situation by time. Disappointment showed in subjects for both conditions at Time 2, but those in the Threat condition ( $\bar{x} = 57.4$ ) were more disappointed than those in the Challenge condition ( $\bar{x} = 68.4$ ). There was a similar improvement for both conditions at Time 3.

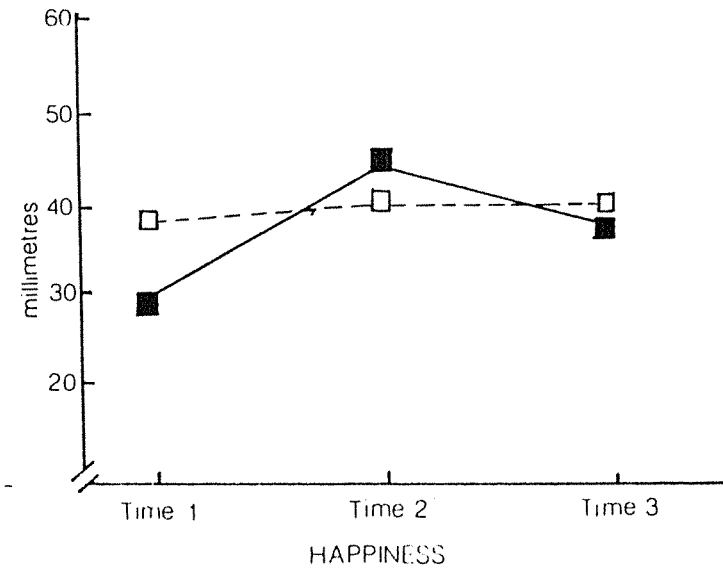
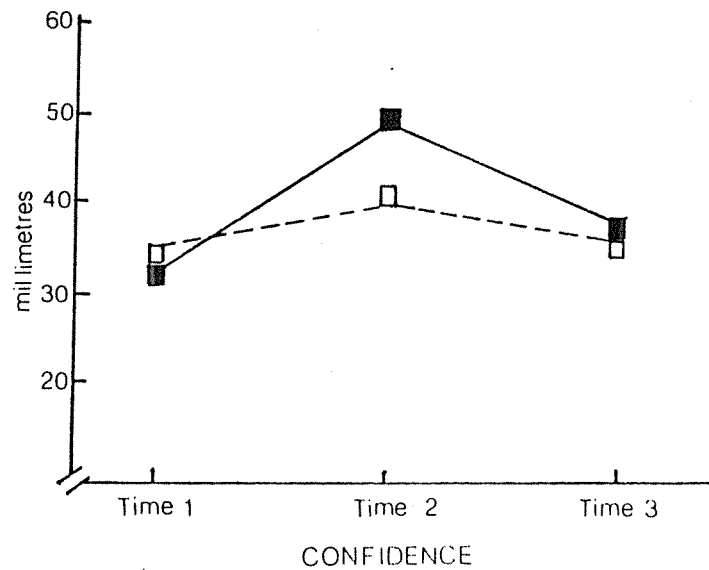
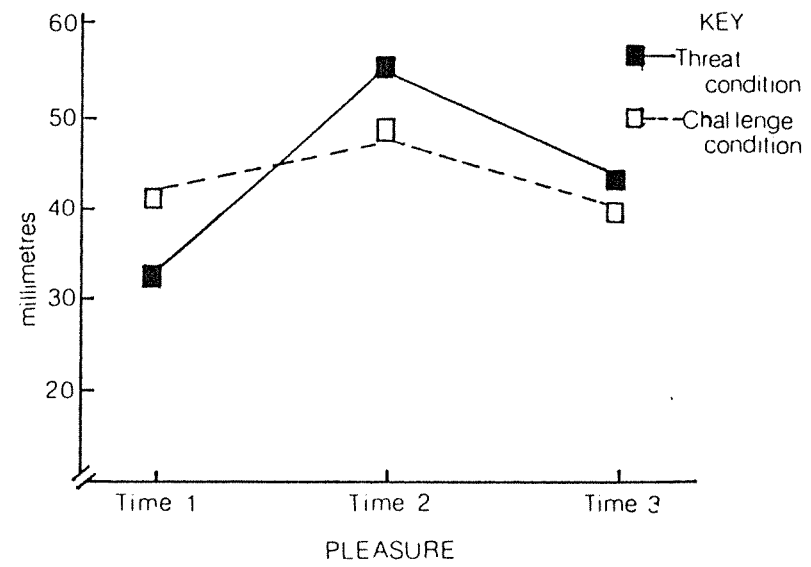
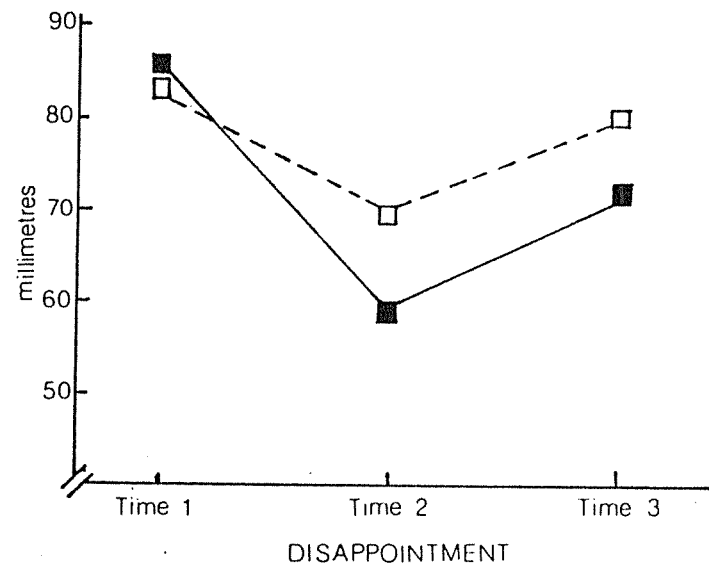


FIGURE 4: Means for the three measures of the emotions which showed a significant effect for situation by time.



Confidence decreased more for the subjects in the Threat condition than for those in the Challenge condition and both conditions returned to a similar level to baseline at Time 3. Pleasure had a greater decrease in the Threat condition ( $\bar{x} = 54.5$ ) than the Challenge condition ( $\bar{x} = 47.3$ ) at Time 2. The Threat condition did not regain baseline level, but the Challenge condition was above baseline at Time 3. The scores for happiness for the Challenge condition altered very little, while the Threat condition showed a decrease between Time 1 ( $\bar{x} = 28.8$ ) and Time 2 ( $\bar{x} = 44.3$ ), and an increase at Time 3 ( $\bar{x} = 38.6$ ).

## CHAPTER IV: DISCUSSION

### EFFECTIVENESS AND FREQUENCY OF USE OF COPING STRATEGIES

None of the hypotheses for the perceived effectiveness and reported use of the coping strategies were supported. However, there were significant differences between the groups. For frequency of use only two groups differed significantly: Threat Fatalism and Challenge Rational Action. Contrary to expectations, Fatalism in the Threat condition was reported to be used the least of the coping strategies. This is not consistent with McCrae's (1984) findings. However, the most frequently used strategy was Rational Action in the Challenge condition which does support McCrae's results.

The same two groups were significantly different for perceived effectiveness. Fatalism in the Threat condition was also the least effective strategy, but those in the Challenge condition found Perseverance, rather than Rational Action to be the most effective strategy. So, in the Challenge condition, Perseverance was not used as frequently but was found to be more effective; Rational Action was used more frequently but perceived as slightly less effective. Fatalism was also perceived as more effective than its reported use. These results imply that perceived effectiveness and usage are independent as suggested by McCrae and Costa (1986).

The separate assessment of these variables in the present study also helps to clarify the relationship between perceived effectiveness and reported use, which Menaghan (1983) suggested has not been ascertained. Fatalism, in the Threat condition appears to have been tried and found lacking in some way, or it may have been avoided by some subjects. In the Challenge condition, Fatalism and Perseverance may not have needed to be used so frequently to be effective. Both these strategies required the subjects to repeat a phrase to themselves and the number of repetitions necessary to perceive the strategies as effective may have been relatively few. Rational Action required the subjects to think about a more specific approach to coping behaviour, so the perceived effectiveness may not have been as apparent as the reported use.

Fatalism was perceived as less effective than the other strategies in both the Threat and Challenge conditions. This supports the findings of McCrae and Costa (1986) who found that fatalism was ranked below rational action and perseverance when used for problem solving and stress reduction. The results are also in keeping with Rippetoe and Rogers (1987) who suggested that fatalism is a maladaptive form of coping response because persons have resigned themselves to the situation and so do not need to use any other form of coping effort. This may be one of the reasons that subjects in the present study found Fatalism to be ineffective. They may have thought that if they accepted their fate then this may have affected their performance on the second test.

Aldwin and Revenson (1987) suggested that the effectiveness of a strategy may depend on its perceived efficacy in a particular situation. In the present study the two problem-focused strategies (Perseverance and Rational Action) were perceived as more effective in the particular situation the subjects faced. Rational Action helped the subjects to focus on the specific task at hand and they could choose to take action to change what they had done previously. Perseverance provided a cognitive opportunity to help the subjects focus on the task. It appears that for this type of cognitive task, problem-focused strategies are more effective than the emotion focused strategy of Fatalism.

## **THREAT AND CHALLENGE**

The prediction for primary appraisal, that subjects in the Threat and Challenge conditions would appraise the situation as more threatening and challenging respectively, was not supported. The subjective appraisal and the objective manipulation did not correspond as expected, as all subjects found the situation more challenging than threatening. This is an interesting result and may be explained methodologically or theoretically.

It could be that the manipulations were not effective. It was difficult to establish a treatment for the Challenge condition as no precedent could be found. The inclusion of a control group would have been an advantage to

determine the effectiveness of the Threat and Challenge manipulation. The possibility of confounding between the two situations cannot be dismissed.

However, the results suggest that the manipulations were effective. There was a significant difference between the Threat and Challenge conditions for the second estimate of their expected test performance, which implies that the false feedback was plausible. There was also a significant difference between the Threat and Challenge conditions for pulse rate and four of the emotions immediately following false feedback. These results indicate that the manipulation did affect the subjects in different ways.

Therefore, a more likely explanation is one which raises some theoretical implications. The notion that threat and challenge appraisals can occur simultaneously as suggested by Lazarus and Folkman (1984) was supported. Subjects did find the situation both threatening and challenging. Challenge was the dominant appraisal. This may have been that subjects were reluctant to admit that they felt threatened, or it may have been a result of the coping strategies used. Lazarus and Folkman (1984) suggested that a threatening situation can come to be viewed as challenging when coping strategies are used. Subjects in the present study may have felt more threatened before they were presented with the coping strategy, and before they began the second test.

The results suggest that threat and challenge can be assessed separately as subjective and objective stressors. How the subject appraises a situation is obviously important and may not necessarily parallel physiological and affective responses. This raises an interesting point. In previous threat studies in the laboratory (e.g. Bennett & Holmes, 1975; Houston & Holmes, 1974) researchers have assumed that subjects have been threatened as physiological and anxiety indices have increased. For example, Bennett and Holmes (1975) found that failure feedback increased subjects' pulse rates significantly. The present study used a similar procedure and obtained a similar result, yet subjects in the Threat condition reported that they felt more challenged than threatened. Previous researchers simply have not asked subjects if they perceived the event as either threatening or challenging. It may be that subjects did not feel as threatened as researchers believed.

## SECONDARY APPRAISAL

The hypotheses concerning secondary appraisal were not supported. The situation was not appraised as more changeable for the problem-focused strategies and more acceptable for the emotion-focused strategy. This is not consistent with previous research (Folkman & Lazarus, 1980). Manipulation of the coping strategies may account for this inconsistency. The strategies were assigned and used before the perception of secondary appraisal was requested. In the previous research secondary appraisal occurred before the choice of coping strategies. The function of secondary appraisal is to evaluate the coping options, so the manipulation of the strategies in effect reversed the process and may have restricted the options in some way.

Although the coping options were reduced to some extent through the manipulation, it was assumed that subjects would still use coping strategies of their own. There were several difficulties involved in attempting to manipulate the coping strategies. Strategies needed to be chosen which were suitable for this particular experimental situation, so the choice was limited. There was no guarantee that subjects would comply with using the assigned strategies, and that related to how best to measure the perceived effectiveness and frequency of use. As the subjects were set a speeded test they may not have had time to think of using cognitive coping strategies during the task, and their usage may not have been sufficiently elicited before they began. But they did report some degree of usage. Houston and Holmes (1974) suggested that manipulation of cognitive strategies may not create the same psychological state as self-generated strategies. This must be considered as a possibility in the present study, particularly in relation to demand characteristics.

Although not statistically significant, the averaged means for changeability and acceptability in the control groups were higher than the averaged means for the experimental groups, which suggests the manipulation may have been a factor. The subjects in the control group may have had less disruption to their secondary appraisal process.

Overall, subjects thought they could accept the situation more than they perceived they could change it. Subjects may have thought there was little

they could do to change the immediate outcome, therefore they were willing to accept the situation. This is contrary to the results obtained by Folkman, Lazarus, Dunkel-Schetter, DeLongis and Gruen (1986), who found that only changeability was related to the satisfactory outcome of an encounter, and that when the situation was appraised as changeable, strategies were used which kept subjects focused on the situation. Rational Action, particularly, may have kept the subjects in the present study focused on the situation, but these subjects still perceived they could accept the situation more than they could change it.

## **CONTROL**

The results failed to support the hypothesis concerning control. Subjects in the Challenge condition did not perceive a greater sense of control than those in the Threat condition. Although statistically insignificant, the results were in the expected direction as the means for all Challenge groups were higher than those for the Threat groups.

However, some significant results were obtained for control. The results showed that the subjects who were given the Fatalism strategy in both the Threat and Challenge conditions thought that they had significantly less control over the outcome of the second test than those in the Challenge Perseverance and No Strategy groups. Those in the Threat Fatalism group also perceived significantly less control than those in the Threat No Strategy group. These results are consistent with the findings of effectiveness. Subjects in the Threat Fatalism group perceived that strategy as the least effective and perceived they had less control than those in the Challenge Perseverance group, who perceived that strategy as most effective and thought they had more control over the outcome. This confirms Folkman's (1984) notion that the degree to which individuals believe they can control outcomes is an important aspect of coping behaviour. If subjects perceived that the strategy was effective they also perceived that they had more control.

Lazarus and Folkman (1984) suggested that challenge appraisals are more likely when there is a sense of control, and Folkman (1984) suggested that generalised beliefs about the control of outcomes are connected to primary

appraisal. The results of the present study are not consistent with these views. Although all subjects appraised the situation as challenging, there were significant differences between some of the groups. This suggests that coping strategies have a greater influence over the perception of control than the subjective appraisal of the situation.

The fact that both the No Strategy groups perceived they had significantly more control than the Threat Fatalism group is interesting. It appears that without the coping strategy instructions subjects perceived a greater sense of control over the situation. The highest perception of control was found in the Challenge No Strategy group. Perhaps the written coping instructions added another restraint to the experimental groups so that they did not perceive the same amount of control as those who did not receive the instructions. This finding is also consistent with the higher means for the control groups in secondary appraisal. This suggests a link between the process of secondary appraisal and control of the outcome.

## **PHYSIOLOGICAL RESPONSE**

One of the two hypotheses concerning pulse rate was supported. There was a significant difference between the Threat and Challenge conditions immediately following the false feedback. This supports Holroyd and Lazarus' (1982) view that pulse rate can be seen as an index of arousal to a stressful encounter. Subjects in the Threat condition had a significantly higher pulse rate than those in the Challenge condition. This indicates that the physiological differences were due to the manipulation.

There was also a significant difference in the Threat and Challenge conditions between the second and third measures. Pulse rate for subjects in both conditions decreased to the same level at Time 3, but it decreased less for those in the Challenge condition as it was lower at Time 2. The third measure was significantly below the first measure for both conditions, so by the end of the experiment pulse rate was lower than baseline level. This supports Cameron and Meichenbaum's (1982) contention that effective coping requires a return to at least a baseline level of functioning. This result may also be due to the high level of stress for the subjects created by the experimental conditions at the time of the first measure, despite the initial

rest period. Pulse rate would have decreased as subjects relaxed and became involved in the task at hand.

Hypothesis 2.2 was not supported. Pulse rate did not have a greater decrease for the experimental groups in comparison to the control groups. This result may be due to the assumption that subjects would use coping strategies of their own so there would be little difference as all subjects were using coping strategies.

## **EMOTIONS**

As the investigation of affective responses was intended to be exploratory, no specific predictions were made. Several interesting aspects were revealed by the results. Firstly, there were some significant changes in the emotional reactions over time. This supports the view that emotions are not constant but change over time (Lazarus, 1977). The suggestion by Lazarus and Launier (1978) that there will be emotional arousal if individuals consider they are in some difficulty is also supported. Some of the emotions (confidence, pleasure, happiness and disappointment) showed significant changes between the Threat and Challenge conditions over time, and others (annoyance, eagerness and anxiety) showed a significant change over time only. There were no significant differences between the groups for strategy which suggests little variation in the effect the assigned strategies had on emotional reactions. This may have been due to the additional coping efforts subjects made. It may also mean that emotions are not affected by the use of different strategies. This is contrary to the findings of Folkman and Lazarus (1985) that threat and challenge emotions were associated with different forms of coping.

The second point is that changes in the positive emotions were more prevalent than changes in the negative emotions. There were no significant effects at all for worry, and anxiety and annoyance showed little change over time. Disappointment was the only negative emotion to show any significant change over time between the Threat and Challenge conditions. Pleasure was the most evident of the positive emotions, and confidence and happiness also showed significant differences between the Threat and Challenge situations. This suggests that not only negative emotions are



involved in coping behaviour. The emotions that are involved may not necessarily be distressing as proposed by Lazarus and Launier (1978). To the subjects in the current study, the positive emotions were more predominant. They showed changes over time, whereas the negative emotions remained relatively static.

In the Threat condition the positive affect decreased, but the negative emotions did not increase to the same extent. At least two reasons can be suggested for this. Firstly, the situation was not sufficiently aversive to alter the negative affect. For ethical reasons it would have been difficult to have made the situation more stressful. Secondly, Folkman and Lazarus (1985) suggested that an appraisal of challenge invokes positive affect. In the current study all subjects perceived the situation to be challenging rather than threatening, so the positive emotions predominated.

Thirdly, it was found that subjects experienced apparently contradictory emotional states at any given time as suggested by Folkman and Lazarus, (1985). This also supports the suggestion by Kremer and Spiridigliozzi (1982) that reliance on anxiety as the only index of stress may be too narrow. The fact that anxiety showed little change over time in the present study is interesting. Again, the situation may not have been sufficiently anxiety provoking. Or, subjects perceived anxiety as less important when they were asked to consider other emotions as well. Previous researchers may have placed too much emphasis on anxiety at the expense of investigating other possibilities.

The fourth point is that pulse rate data did not necessarily correspond to the self-report data of emotions. This supports the contention of Gal and Lazarus (1975) and the findings of Steptoe and Vögele (1986). The present study found significant results following the false feedback for pulse rate but not for anxiety. This was a different effect again from the two investigations on which the procedure was based. Bennett and Holmes (1975) found a significant effect in pulse rate and self-reported anxiety following failure feedback; Kremer and Spiridigliozzi (1982) found a significant increase in self-reported anxiety but not heart rate. These differences may be due to the actual test given to the subjects, as suggested by Kremer and Spiridigliozzi. The present study used a test which was relatively easy, as

did Bennett and Holmes, so subjects would have thought they had done well. Therefore, as could be expected, the results for pulse rate were similar to those found by Bennett and Holmes. The difference in anxiety responses may have occurred because the present study used eight, rather than one or two, emotional responses.

Finally, use of the visual analogue scales in the current study appeared to be a sensitive and quick measurement of subjective feelings. These scales do not seem to have been used in previous studies of coping behaviour. They could be valuable in an area which is plagued with problems of measurement.

### **ADDITIONAL COPING STRATEGIES**

It was presumed that subjects would use coping strategies other than those assigned, so this information was requested during the debriefing. Only one subject stated that he or she was unaware of using any method of coping at all. Twelve percent of subjects stated that they used only the assigned strategy. So the majority of subjects did use more than one strategy which confirms the view that coping is a dynamic process (Folkman, Schaefer, & Lazarus, 1979; Holroyd & Lazarus, 1982).

The strategies subjects stated they used were classified according to McCrae's (1984) typology (see Appendix I). Rational action was the most commonly used: 33% of all subjects and at least one subject in every cell stated they used this form of coping strategy. This included 60% of the subjects in both the Rational Action groups. When subjects were probed, it appeared that the additional strategies were actually consequences of the suggestion given to them through the written coping instructions. This is consistent with the results as Rational Action was reported to be the most used strategy, and was also perceived to be reasonably effective. It is interesting that 40% of subjects from the Challenge control group also used rational action. When left to use their own coping strategies these subjects chose one which was found to be effective in the present study.

Forty percent of subjects in the Challenge Perseverance group stated they used no strategies other than the one assigned to them. This is also consistent with the finding that Perseverance was the most effective

strategy. It appears that some subjects found it adequate. An interesting pattern was that 50% of subjects in the Threat perseverance group used some form of relaxation to help calm themselves. Perhaps the combination of these strategies is a useful method of coping. This also supports the finding that individuals use problem-focused and emotion-focused strategies together (Folkman & Lazarus, 1985).

The methodological data gathered in the debriefing suggests that generally subjects found the procedure clear and the deception plausible. Seventy-three percent of subjects stated that all parts of the procedure were clear to them. The majority of those who found part of the experiment unclear considered some of the questions on the post-experimental questionnaire needed explaining. Also, 7.5% of subjects were certain of the deceptions and thought that their behaviour had been affected. Another sixteen percent of the total sample suspected the deceptions.

## **THEORETICAL IMPLICATIONS**

The present study attempted to assess the situational influences during a testing situation. The procedure of the present study was based on that used by Kremer and Spiridigliozzi (1982). The essential difference between these two studies was in the timing of the manipulation of the coping strategies. Kremer and Spiridigliozzi had their subjects use the coping strategy during the failure feedback, whereas the current study elicited the use of the strategies during a second test. The evidence from the control groups for the success of the manipulation of the coping strategies is not very strong. Control was the only variable in which there was significant differences for the No Strategy groups. However, the trend was generally in the expected direction. In the present study, subjects had a longer time period in which to use the coping strategies, and to use their own, so the effect of the manipulation may have been weakened. Other coping processes also had more time to evolve. For example, the performance of a cognitive task is likely to be seen as more challenging than feedback from a test, partly because subjects would have had more time to respond to their perceptions of primary appraisal and their use of the coping strategies.

Process and outcome were assessed separately in the current study, with an emphasis on how they both relate to the perceived effectiveness and reported use of coping strategies in manipulated Threat and Challenge situations. For the process variables, the subjects appraised the situation as more challenging than threatening, perceived they could accept the situation more than they could change it, and the perception of control differed according to the conditions. The only one of these variables which appeared to relate particularly to the perceived effectiveness of the coping strategies, was control. The manipulation of the situation appeared to have little effect on the process variables.

There was more evidence that the outcome variables were affected by the situation, as pulse rate and four of the emotions showed significant effects for the interaction of situation and time. Test performance was not affected by the situation, but there was a significant difference between the first and second tests. This may have been due to practice effects, or it may have been due to the use of the coping strategies, including the additional coping strategies. The specific strategies did not appear to affect the outcome variables.

It appears that generally the process variables were linked with the coping strategies, whereas the outcome variables were linked with the manipulation of the situation. Pulse rate and some of the emotions were altered significantly according to the experimental situation, not the appraisal of the subjects. According to the theory the appraisal plays a more important role in mediating the outcome than the results of the present study would suggest. There did not appear to be a strong link between primary or secondary appraisal and the effectiveness of the coping strategies. The theory relies quite heavily on subjective variables. This not only makes for more difficult research, but it may be too restricting in terms of advancing knowledge. The present study has helped to point out some of the difficulties involved in reliance on subjective variables, and the results suggest that objective indicators may be more evident than the theory implies.

## SUMMARY AND CONCLUSIONS

There were two major findings from the present study. Firstly, there are differences in the perceived effectiveness and reported use of different coping strategies. The problem-focused strategies were perceived as more effective and were reported as used more frequently than the emotion-focused strategy. These findings have implications at a more practical level. For example, students could be taught to use problem rather than emotion-focused strategies for examinations.

The second major finding was that there is evidence to suggest that threat and challenge can be classified as objective variables and as subjective variables, and the two may not necessarily correspond. Threat and challenge appraisals occurred simultaneously, and all subjects appraised the situation as more challenging than threatening. These results may have implications for future threat studies. It may not be sufficient to rely on external stressors, the appraisal of the subjects obviously plays an important role and it would be useful to consider this in further research.

Although there were no significant results, the findings suggest that secondary appraisal may have been affected by the manipulation of the coping strategies and that acceptability of the situation was more important than changeability for the subjects. Some interesting results were obtained for control, and there is evidence that this is linked to the perceived effectiveness of coping strategies, and the coping strategies may have more influence over control than appraisal. The findings from the present study suggest that the process variables of secondary appraisal and control could be examined more closely, in an attempt to strengthen and confirm these aspects which are currently weak links in the transactional theory of coping.

Pulse rate provided evidence that the manipulation of threat and challenge was effective. This variable also provided an objective index which confirmed previous findings that physiological responses do not necessarily parallel self-report measures. Computerised packages for measuring several psychophysiological responses are now available, so with this advent research may be able to advance more rapidly in attempting to find the links between these responses and coping behaviour.

The results for the affective responses provided evidence that the index used by previous researchers may have been too narrow. Several emotions showed differences between the Threat and Challenge situations. Positive emotions are perhaps more prevalent than has been thought previously as the emphasis has always been on the negative affect.

One of the strengths of the present study is the fact that it was laboratory based. Most of the hypotheses were based on previous research investigated in naturalistic settings. Although most of these were not supported, significant findings were found elsewhere in some cases. This suggests that a laboratory experiment provides different information from field studies. Therefore, the emphasis on field studies may have limited knowledge and restricted the research from obtaining information about the more specific links in the coping process. This is consistent with the contention of Parkes (1986) that current research methods are not adequate to deal with the complexity of transactional models. The present study has attempted to examine the theoretical complexity through an experimental study which provided more opportunity for control of the variables, as well as a complex statistical analysis. Additional information was provided particularly, for some of the links between the perceived effectiveness and reported use of coping strategies, and the variables of primary appraisal, control, and affective responses. Future research would profit from including more laboratory studies which could help to identify these links and then investigate them in naturalistic settings.

The present study has provided new evidence that the appraisal of threat and challenge may differ from an objective situational manipulation. It is important that future research extends this and determines whether or not it is the subjective appraisal which determines the choice of coping strategies, no matter how the situation may be defined objectively. More evidence is needed as to how and when threat and challenge occur simultaneously, and how and when this alters as a stressful situation evolves - is it a result of coping efforts? Repeated measures of threat and challenge appraisal may help to provide these answers. Further research would profit by attempting to determine the distinction between threat and challenge when it is operationally defined. Perhaps a challenge manipulation could be strengthened

by providing subjects with a more competitive situation so that they thought there was more at stake.

More research is required into the distinction between the frequency of use and the perceived effectiveness of coping strategies. It would be useful to know whether or not individuals persist in using ineffective strategies and how this links to adaptation. This knowledge would have important implications for coping skills training and general clinical interventions.

Physiological and emotional responses and the links between them could be determined more adequately. Do emotions produce physiological changes or are these changes merely indicators of general arousal? Several physiological responses need to be recorded simultaneously to determine which are the important ones in coping behaviour and how they are affected by the use of coping strategies. Further research into the role affective behaviour plays would be useful - how do these vary from one stressful encounter to another, and when are positive or negative emotions likely to be more evident? Future research could also profit by the use of visual analogue scales as an index of emotional arousal when changes need to be identified.

Short-term stress only was investigated in the present study. Long-term stress also could be examined in conjunction with short-term stress. Some coping strategies may require time for their full effect to be realised, and different strategies may be needed for short-term versus long-term stress. The processes of coping can continue to be investigated, but it would be useful to examine outcomes at the same time to determine the links between them.

The present study focused on the perceived effectiveness and reported use of coping strategies in threat and challenge situations. Although most of the hypotheses were not supported significant effects were found elsewhere and some unexpected results extended the current knowledge of these variables. There were significant differences in the perceived effectiveness and reported use of the coping strategies, and threat and challenge appraisal differed from the manipulation of the Threat and Challenge situations. Other aspects of a transactional theory of coping were also investigated. Control appears to be related to the perceived effectiveness of the strategies. Pulse

rate and four of the emotions were significantly affected by the Threat and Challenge manipulations. Additional information was provided for affect. The positive emotions showed more changes than the negative affect. Many of the theoretical aspects still remain speculative but it is hoped that the present study has contributed to the current knowledge of coping behaviour.



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**APPENDIX A**

This form is a mood rating scale and the intention is to measure your feelings as they are at the moment. Please rate the way you feel in terms of the dimensions given below. Regard the line as representing the full range of each dimension. Place a mark (/) clearly across each line.

Very Confident	-----	Not at all confident
Very Anxious	-----	Not at all anxious
Very Pleased	-----	Not at all pleased
Very Annoyed	-----	Not at all annoyed
Very Eager	-----	Not at all eager
Very Worried	-----	Not at all worried
Very Happy	-----	Not at all happy
Very Disappointed	-----	Not at all disappointe

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**APPENDIX B**PERCENTILE ESTIMATION AND SCORE REPORT FORM

Remember the score is the number completed minus the number wrong.

Please estimate your percentile  
score for the first test (0-100) .....

Your percentile score was: .....

Please estimate your percentile  
for the second test .....

Your percentile score was: .....

## APPENDIX C

### POST EXPERIMENTAL QUESTIONNAIRE

For each question please circle the number which most accurately reflects your answer.

1. You were given instructions to use a self-statement during the second test.

(a) How often did you use this?

Not at all                      1    2    3    4    5    6    7                      Very often

(b) How effective did you find it?

Not at all effective    1    2    3    4    5    6    7                      Very effective

2. To what extent did you think that the second test was a situation which you could change and do something about?

Could not change                      1    2    3    4    5    6    7                      Could change completely

3. To what extent did you think that the second test was a situation which you had to accept?

Could not accept                      1    2    3    4    5    6    7                      Could accept completely

4. To what extent did you find the second test threatening?

Not at all threatening                      1    2    3    4    5    6    7                      Very threatening

5. To what extent did you find the second test challenging?

Not at all challenging                      1    2    3    4    5    6    7                      Very challenging

6. To what extent do you consider you had control over the outcome of the second test?

No control                      1    2    3    4    5    6    7                      Complete control

7. Please indicate your:

Age:                      .....                      years

Sex:                      .....

APPENDIX D

Massey University PSYCHOLOGY DEPARTMENT

PALMERSTON NORTH, NEW ZEALAND

TELEPHONES: 69-079, 69-089.  
DATEX: NZ 30974, Mas Uni

In reply please quote:

CONSENT FORM FOR EXPERIMENTAL SUBJECTS

I understand the explanation of the experimental procedure.  
I am willing to participate in this experiment and I am  
willing to be attached to a Psychophysiological Recorder.

Signed: ..... Date: .....

## APPENDIX E

### E-1

In this part of the experiment you will be taking part in a special speed and accuracy test. It is special because it has been found to be highly predictive of intelligence and success in advanced university courses. That is, people who score well on this test have been found to perceive, retain, and check study material better and therefore usually do better in their second and third years at university. This test is part of a comprehensive battery of achievement and intelligence tests which is currently being researched. Before taking this test you will be asked to make an estimate of how well you expect to do on the test. You will now have a chance to briefly look over the test before estimating your score.

### E-2

There are 160 items and it is a test to see how quickly and accurately you can check whether pairs of numbers are the same or different. You are not asked to do the name checking test. Your score will be the number completed minus the number wrong. You cannot fail this test. We would like you now to estimate in what percentile you think you will score. A percentile does not indicate the items done correctly on the test. It relates to how well you do compared to other students who sit the test. For example, if you think you will score on the 65th percentile this means you estimate that 65% of the other students doing this test will score below you. The experimenter will pass you an estimation sheet. Please write in your estimate now.

### E-3

Please listen carefully and follow while I read through the instructions on the front page of the test booklet. This booklet contains two short speed and accuracy tests - number checking and name checking. You do only the number checking test. A certain time will be allowed. You must start and stop work immediately you are told. Work as fast as you can without making mistakes.

A practice set will be given to show you how the tests are to be answered. Do not write anything on this booklet. Put your answer to the practice examples in the column headed 'practice' on the left hand side of the answer sheet.

As you may have noticed the test consists of some practice items. Please follow as I read the instructions written under 'practice'. The first test consists of pairs of numbers. If the two numbers in each pair are exactly the same make a cross through the letter 'S' for that item on the answer sheet; if they are different make a cross through the letter 'D'. Be sure to make a cross, not just a stroke. Look at item one on the test booklet. Check the first pair of numbers: 6359.....6359. They are the same, so a cross has been made through the letter 'S' for item one in the practice column on the separate answer sheet. (allow subjects time to check item one).

Now look at item two on the test booklet. The numbers are different, 235.....253, so a cross has been made through the letter 'D' for item two on the answer sheet.

This is how you are to answer all the items. Make no marks on the booklet. If you make a mistake, block it out and mark the correct answer in the usual way. Make it quite clear which answer you mean.

Work as fast as you can without making mistakes. Now answer the first ten practice items only. Mark your answers in the practice column on the answer sheet. Are you ready? Go! (allow 25 seconds for practice items).

Stop work. Keep your answer sheet in a convenient position. Put your pen down for a moment. Turn to the next page. This is the number checking test and is answered in the columns headed number checking. When you finish the first page go on to the next. Be sure to mark your answers in the correct column. A certain time will be allowed for the test. Remember to work quickly and accurately. This is a speed test. Pick up the pen. Are you ready? Go!.

**E-4**

Stop work. Put your pen down. Please wait for the experimenter to come in to collect your answer sheet. She will take it in to the next room to score it. This will take only a couple of minutes.

**E-5**

You may recall that the experimenter explained that you would do two short tests. You have just completed Form A of the ACER speed and accuracy test. You will now complete Form B of the same test. We would like you to make an estimate of how well you expect to do this time. The experimenter will now show you the second test briefly.

**E-6**

Please get ready now to begin the second test. This time there will be no need to do the practice items, so please open the booklet, pick up your pen, are you ready? Go!.

**E-7**

The experimenter will now hand you the last form for you to fill in. Please follow the instructions, take your time and answer these questions as honestly as you can. When you have finished please wait for the experimenter to come in and talk with you.

## APPENDIX F

### Debriefing Interview.

1. Were all phases of the experiment clear, including both the procedure and the purpose?
2. How did you feel generally during the experiment?
3. Was there any aspect of the procedure which you found odd, confusing, or disturbing?
4. Do you think there was more to the experiment than was apparent?.
5. What do you think may have been involved?  
How do you think this may have affected your behaviour?
6. I was interested in some problems I didn't discuss with you in advance. One of the major concerns of this study is to investigate the relationship between coping strategies and different situations:
  - a) the purpose of the study was explained.
  - b) the false feedback was explained according to the condition and the correct percentile was given.
  - c) the other deceptions were explained (the test is not predictive of intelligence and success in advanced university courses as far as is known, and no battery of tests was currently being researched).
  - d) the independent and the dependent variables were explained.
7. Were you aware of using any other strategies?
8. Are there any questions?
9. A verbal assurance was sought from the subjects that they would not reveal any aspect of the experiment to others.



## APPENDIX G

### STRATEGIES AND SITUATIONS: AN EXPERIMENTAL STUDY IN COPING

The purpose of this feedback is to provide you with some more background information and to give you some of the basic findings. results at this stage are very tentative as the data analysis is complex and is yet to be completed. But I hope that these overall findings will have some practical implications for you in that you may be able to generalise them to coping with any future tests or exams.

Coping can be defined as constantly changing efforts to manage stressful situations. It is something we all do whether we are aware of it or not. This study is based on Lazarus' (1966) theory of coping. One of the essential components of this theory is the idea that how we appraise a possible stressful event determines how we cope with it. Researchers have divided this appraisal into three categories: loss, which is harm that has already occurred (e.g. death of a friend); threat, which is harm that is anticipated (e.g. problems finding a job); and challenge, which has a more positive tone but still creates some stress (e.g. marriage).

There are many different coping strategies which we use. Few studies have examined the effectiveness of coping mechanisms. If a coping strategy is not effective then it will not have the desired effect of reducing the stress. So the main aim of the study was to find out whether three different coping strategies were more effective in either a threat or challenge situation.

In the past researchers have concentrated on investigating only anxiety in coping behaviour. Recent research is suggesting that other emotions may be involved. So the secondary aim of the study was to investigate eight emotions and determine the effect of the coping strategies and the situation on these feelings.

#### Method

The study used a 2 x 4 factorial design. This means that there were two independent variables, one with two levels (situation), the other with four

levels (strategies). This created eight conditions and each subject was randomly assigned to one of these groups.

The situation was manipulated through giving you false feedback on the score for the first test. The threat condition were told that they had scored 55% of their estimate. The challenge condition were given a score 95% of their estimate.

The strategies were manipulated by giving you a written statement before the second test. There were four conditions:

- 1] Fatalism: tell yourself that you may as well accept the outcome as nothing can be done about it.
- 2] Perseverance: tell yourself you must keep going and you can try harder.
- 3] Rational Action: think about your performance on the first test. If you were happy with the way you approached this then do the same again for the second test. If you think you can change something to improve your performance then do so.
- 4] Control group: no strategy was given, subjects were told there would be a brief delay.

## Results

### Appraisal of threat or challenge.

Although I attempted to manipulate these as situations, it was important to discover how you as subjects appraised the situation (you were asked this on the last questionnaire). The results showed an interesting trend - those in the threat condition found the second test more challenging than those in the challenge condition. The theory suggests that we alternate between threat and challenge during one stressful event. An exam is a good example of this. You are likely to feel both threatened and challenged (possibly depending on how well you know the work). The results from the present study tend to confirm the theory's explanation that appraisal is important and the same event can be both threatening and challenging.

### Effectiveness of the strategies.

The most effective strategy was Perseverance for those in the challenge condition. The least effective strategy was fatalism for the threat condition. Rational Action was used just as frequently by both threat and challenge groups, but the challenge group found it more effective.

### Pulse Rate and Emotions.

As expected, pulse rate was greater for the threat condition immediately after false feedback, and decreased to the same rate for both conditions after the second test.

The results for the emotions have very complex patterns which need to be analysed more fully. But some basic overall results are available. There were four positive emotions (eager, pleased, confident and happy), and four negative emotions (anxiety, worry, disappointed and annoyed). It appears that both positive and negative emotions are felt to the same extent in threat and challenge situations.

The greatest change in emotions was an increase in disappointment after false feedback, with the threat condition having a greater increase than the challenge. Confidence, annoyance, and worry all showed a difference between the threat and challenge after false feedback. Annoyance, worry and happiness showed little difference between false feedback and completion of the second test.

### **Conclusions**

Only tentative conclusions can be drawn at this stage. But perhaps next time you sit a test or exam you may like to think about the following: it is likely that you will appraise the situation as both threatening and challenging. When you find yourself challenged Perseverance and Rational Action are likely to be more effective coping strategies than Fatalism. You will probably be feeling a mixture of positive and negative emotions. The emotions you are more likely to be aware of when considering the need for coping are anxiety, disappointment, confidence, and pleasure.

Finally, I would like to thank you all once again for your participation. Without your help this research would not have been possible. I hope this has helped to raise your awareness of coping, particularly in a test or exam situation. Remember, if any coping strategy you may use is not working, then change it.

If anyone would like more information please contact me in Room 102, Psychology building, phone extension 7922.

Helen Foster.

## APPENDIX H

TABLE A: Pillai's trace multivariate tests of significance for Analysis I.

	Value	Approx F	Hypoth DF	Error DF	Sig of F
Situation by Strategy	.165	0.567	21	204	.936
Strategy	.920	4.299	21	204	.000
Situation	.119	1.278	7	66	.275

TABLE B: Significant univariate F-tests for the main effect of strategy in Analysis I.

Univariate F-tests with (3,72) D.F.

Variable	Hypoth SS	Error SS	Hypoth MS	Error MS	F	Sig of F
Freq	236.53	165.9	78.84	2.3	34.21	.000
Effect	250.13	165.5	83.37	2.29	36.27	.000
Control	27.85	161.4	9.28	2.24	4.14	.009

TABLE C: Pillai's trace multivariate tests of significance for time effect in Analysis II.

	Value	Approx F	Hypoth DF	Error DF	Sig of F
Situation by					
Strategy by time	.033	0.40	6	144	.875
Strategy by time	.086	1.08	6	144	.377
Situation by time	.545	42.64	2	71	.000
Time	.652	66.63	2	71	.000

TABLE D: Significant univariate F-tests for Analysis II.

Univariate F-tests with (1,72) D.F.

Variable	Hypoth SS	Error SS	Hypoth MS	Error MS	F	Sig of F
Situation by Time						
Estimate	2016.4	1690.9	2016.4	23.48	85.86	.000
Time						
Test	1562.5	2476.8	1562.5	34.4	45.42	.000

TABLE E: Pillai's trace multivariate tests of significance for time effect in Analysis III.

	Value	Approx F	Hypoth DF	Error DF	Sig of F
Situation by Strategy by Time	.755	1.06	54	171	.372
Strategy by Time	.872	1.29	54	171	.107
Situation by Time	.458	2.58	18	55	.004
Time	.764	9.91	18	55	.000

TABLE F: Significant univariate F-tests for contrast between the first and second measures in Analysis III.

Univariate F-tests with (1,72) D.F.

Variable	Hypoth SS	Error SS	Hypoth MS	Error MS	F	Sig of F
Situation by Time						
Pulse	105.62	1568.6	105.62	21.70	4.84	.031
Conf	893.02	11112.5	893.02	154.34	5.78	.019
Pleas	1904.40	21341.4	1904.4	296.40	6.42	.013
Happy	1749.00	18331.6	1749.0	254.60	6.86	.011
Disapp	1788.90	18940.0	1788.9	263.05	6.80	.011
Time						
Pulse	189.22	1568.6	189.22	21.70	8.68	.004
Conf	5760.00	11112.5	5760.00	154.34	37.32	.000
Pleas	7728.40	21341.4	7728.40	296.40	26.07	.000
Annoy	2697.80	10478.25	2697.80	145.53	18.53	.000
Eager	3394.80	11896.25	3394.80	165.22	20.54	.000
Happy	3106.40	18331.65	3106.40	254.60	12.20	.001
Disapp	21413.75	18940.05	21413.75	263.05	81.40	.000

TABLE G: Significant univariate F-tests for contrasts between the second and third measures in Analysis III.

Univariate F-tests with (1,72) D.F.

Variable	Hypoth SS	Error SS	Hypoth MS	Error MS	F	Sig of F
Situation by Time						
Pulse	65.02	802.20	65.02	11.14	5.83	.018
Time						
Pulse	648.02	802.20	648.02	11.14	58.16	.000
Conf	3115.22	8335.60	3115.22	115.77	26.90	.000
Anxiety	688.90	9468.90	688.90	131.51	5.23	.025
Pleasure	4060.22	10502.90	4060.22	145.87	27.83	.000
Disapp	5198.40	13647.20	5198.40	189.54	27.42	.000

TABLE H: Significant univariate F-tests for contrasts between the first and third measures in Analysis III.

Univariate F-tests with (1,72) D.F.

Variable	Hypoth SS	Error SS	Hypoth MS	Error MS	F	Sig of F
Situation by Time						
Pleasure	1288.22	15727.80	1288.22	218.44	5.8	.018
Time						
Pulse	1537.60	1990.80	1537.60	27.65	55.60	.000
Annoy	1311.02	12382.70	1311.02	171.98	7.62	.007
Eager	3422.50	15062.40	3422.50	209.20	16.35	.000
Happy	1404.22	18692.80	1404.22	259.62	5.40	.023
Disapp	5510.75	13005.85	5519.75	180.63	30.50	.000



# APPENDIX I

TABLE I: Total percentage of additional coping strategies used and number of subjects who used these in each group.

Coping Strategy	Total %age	Threat				Challenge			
		Fat	Pers	R.A.	Cont	Fat	Pers	R.A.	Cont
Rational Action	33	2	1	6	2	2	1	6	4
Relaxation	13	0	5	2	1	0	1	1	0
None	12	0	1	0	0	1	4	3	0
Positive Thinking	8	1	1	2	1	1	0	0	0
Perseverance	7	2	0	0	0	2	1	0	0
Intellectual Denial	7	2	0	0	0	2	0	0	1
Distraction	4	0	0	0	0	0	0	3	0
Concentration	4	0	0	0	0	1	0	0	2
Active Forgetting	3	0	0	0	0	1	1	0	0
Faith	3	1	0	0	0	0	1	0	0
Humour	2	0	0	0	0	1	0	0	0
Self-adaptation	2	0	0	0	0	0	1	0	0
Isolation of affect	2	0	0	0	0	0	0	0	1
Unaware	2	0	0	0	1	0	0	0	0