COGNITIVE PROCESSES AS MEDIATORS OF EMOTION: AN EXPERIMENTAL INVESTIGATION OF THE BASIC THEORETICAL ASSUMPTION OF COGNITIVE LEARNING THERAPY

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A thesis submitted for the degree of Doctor of Philosophy of The Australian National University.

April, 1986.

I declare that this thesis reports my original work, that no part of it has been previously accepted or presented for the award of any degree or diploma by any University, and to the best of my knowledge no material previously published or written by another person is included, except where due acknowledgement is given.

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ACKNOWLEDGEMENTS

The author would like to express his gratitude to the following people for their assistance with this project. Dr. Mark Dickerson showed remarkable forbearance while providing constant encouragement and support and generously contributed his time, energy and precise understanding of the english language. Dr. Linda Hort's advice on the experimental design and final manuscript was invaluable and Dr. Penny Davis's insightful critical analysis of the theoretical issues stretched the authors understanding of the topic. I would also like to thank Mr. Ross Cunningham for his advice on statistical matters.

ABSTRACT

The experimental work carried out by the author and reported in this thesis investigated the basic theoretical assumption of the cognitive learning therapists that cognitions mediate emotions. The investigation had three aims. The first aim was to clarify the validity of existing evidence that is cited in support of the cognitive mediational approach to emotion. The most frequently cited evidence has been the extensive research utilizing the self statement mood induction procedure first reported by Velten (1968). However, recent work has suggested that this procedure may not generate actual moods and that the mood changes that have been reported may be due to experimental demand characteristics. Other researchers have demonstrated that self statements are an unreliable method of inducing mood and that the moods generated are not reflected in physiological measures. Furthermore, to date it has not been demonstrated that reading statements generated the kind of cognitive processes thought to be associated with emotional response. The failure of previous research to actually demonstrate that self statements activate the cognitive processes that are thought by cognitive learning therapists to generate mood makes it difficult to access the importance of the criticisms of the self statement research, outlined above, for the cognitive mediational approach to emotion. Two experiments were conducted to establish if there was a relationship between subjects' cognitive evaluation of mood induction statements and reported mood change. The current work demonstrated that the mood changes reported by self statement mood induction subjects were characterized by how believable each subject found the mood induction statements. That is, subjects who found the statements to be believable experienced significantly greater mood changes than subjects who did not

find the mood statements believable. These findings demonstrate a relationship between what subjects believe about the statements and their effectiveness as mood inducers. Therefore, it was concluded that experimental demand characteristics which could be expected to effect both the subjects who believed the statements and those who did not believe the statements, can not adequately account for these findings. It can also be concluded that the reliability of the procedure will be dependent on how believable individual subjects find the mood induction statements. The second aim was to empirically evaluate the cognitive mediational role of the specific cognitive processes identified by cognitive learning therapists as important mediators of emotion. These processes which include beliefs, values, and expectations were divided into two categories defined as evaluative and nonevaluative beliefs. In Experiments 3, 4, and 5 a new experimental paradigm which used false feedback for a computer game task was employed to investigate the impact of these variables on mood. It was shown that the computer game mood induction procedure was an effective paradigm for investigating the cognitive mediational model. The results from these studies demonstrated that both nonevaluative and evaluative beliefs are causally related to mood. The third aim was to investigate whether cognitions are a sufficient or both a sufficient and a necessary condition for emotional responses to occur. It has been claimed that recent work showing that subjects respond emotionally to stimuli that can not be recognized demonstrates that emotions can occur in the absence of cognition. This interpretation of the evidence assumes cognitions can not access these stimuli. Experiments 6, 7, and 8 empirically tested this assumption. The results from these studies failed to provide evidence of either cognitions or emotions accessing nonrecognizable stimuli. These findings suggested that the mere exposure paradigm was not an appropriate

experimental strategy for investigating the broader issue of the primacy of affect or cognition. The ramifications of the current work for the theoretical basis of cognitive learning therapy and the implications it has for future research are discussed.

CONTENTS

CHAPTER 1

COGNITIVE BEHAVIOUR THERAPY AND EMOTION

One of the most significant developments within clinical psychology during the last 20 years has been the growing impact and success of behaviour therapy. The term "behaviour therapy" does not refer to a single approach to therapy, but encompasses a range of views, a variety of procedures and an ongoing discussion of theoretical issues (Wilson, 1978). While behaviour therapy encompasses a diversity of opinion, Wilson (1978) has identified some consistent trends within behaviour therapy that are associated with relatively stable theoretical positions.

The first of these approaches is applied behaviour analysis which is philosophically consistent with radical behaviourism (Wilson, 1978). Radical behaviourism refers to the early Watsonian behavioural approach which excluded private events from psychological research and accepted overt behaviour as the only proper subject of scientific investigation (Mahoney, 1974; Schwartz, 1982; Wilson, 1978). Applied behaviour analysis is based on the principles and procedures of operant conditioning. It has concentrated on the study of the individual organism, avoided the analysis and modification of private events, relied on the principles of reinforcement and punishment as the primary learning influences on behaviour and has arguably concentrated primarily on the modification of less complex behaviours with individuals of limited or impaired cognitive capacity (Wilson, 1978).

The second approach is what Wilson (1978) has called "the neobehaviouristic mediational S-R model". This approach draws heavily on the principles of classical conditioning and applies the theories of Pavlov, Guthrie, Hull, Mowrer and Miller to the practice of behaviour therapy. Intervening variables and hypothetical constructs such as fear

and anxiety are incorporated into a stimulus-response approach that assumes that covert processes follow the same laws as overt behaviours. It has been utilized largely with neurotic disorders.

The third approach identified by Wilson (1978) is social learning theory. Social learning theory proposes that behaviour is developed and maintained by three distinct systems. It incorporates both the classical and operant conditioning approaches mentioned above but also places major importance on cognitive mediational processes. Its distinguishing features are the proposition that the influence of environmental events on behaviour is largely determined by the cognitive processes that govern attention, perception and perceived consequences; a philosophy of reciprocal determinism; the recognition of a causal role for cognitions in determining behaviour; the assertion that behavioural interventions are effective because they generate changes in cognitive processes; and the finding that directly produced behaviour change is the most effective means of altering cognitive mechanisms.

The final approach identified by Wilson (1978) is cognitive behaviour therapy. This approach contends that cognitions are important determinants of behaviour and that the effectiveness of behaviour modification can be enhanced by consideration of cognitive factors. Behaviour is seen as being influenced by the current physiological state of the organism, its past learning history , the existing environmental situation, and a variety of independent cognitive processes (Mahoney, 1974).

The therapeutic procedures developed by cognitive behaviour therapists have been applied to a wide range of clinical disorders including stress, pain, depression, anger, sexuality, somatic disorders, phobias, and eating disorders (Schwartz, 1982). Cognitive behaviour therapists have paid particular attention to the role of cognitive

processes in emotional disorders (Mahoney, 1974). Their position is often illustrated by the quote:

> Men are not moved by things but by the views which they take of them - Epictetus 60 A.D.

It is this assertion by cognitive behaviour therapists that cognitions are causally related to emotional response that is the subject of this investigation. The investigation has been developed in three parts.

In the first part the existing evidence is extended to examine the possibility that the early work by Velten (1968) which suggested a causal relationship between cognitions and emotions, can be explained in terms of experimental demand characteristics. It is shown that experimental artifact can not adequately account for the data linking cognitions to emotional response.

The second part introduces a new methodology to assess the impact on mood of the specific kinds of cognitions (values, beliefs, expectations) which cognitive behaviour therapists claim are frequently associated with emotional response. It is shown that these cognitive processes are causally associated with mood.

The third part examines the proposition that cognitions are sufficient but not necessary in determining emotional responses. It is shown that existing evidence claiming emotional responses occur in the absence of cognitions can not be supported.

This work is conducted within the context that is outlined in the current and following chapters. The following sections of this chapter will review the historical influences that have had a major impact on the study of emotions, the historical trends in the theoretical approach to emotions, and the developments within behaviourism which have led to a cognitive behavioural approach to the treatment of emotional disorders.

1.1 Private Events and Psychological Research

Both cognitions and emotions have been referred to in the literature as private events, that is, they are cognitive-symbolic processes not available to public scrutiny (Mahoney, 1974; Turner, 1967). The significance of the current research into cognitive processes and emotions may be better understood by first tracing the legitimacy of private events as a focus of psychological research.

The original methodology of experimental psychology was established by Wundt in the latter part of the nineteenth century. Its focus was on introspection and considerable attention was given to private events. Indeed, psychology was originally defined as the study of conscious mental events through systematic introspection into subjects' mental processes. It was assumed by the earliest workers in the field that psychology was uniquely relevant to humans and that consciousness could be understood in isolation from non-conscious processes. This approach continued to be respectable until the pervasive influence of evolutionary theory swept aside the assumptions of the early experimentalists by forcing consideration of links between humans and other animals. It was this challenge to the uniqueness of humans that eventually gave rise to behaviourism (Posner & Shulman, 1979).

With the advent of early behaviourism data obtained from introspective analysis were rejected because they did not satisfy the criteria of scientific reference, that is, the contents of consciousness were considered to be private affairs and not subject to public verification (Schwartz, 1982). As has been mentioned above, this early behaviourism which excluded private events from psychological research has subsequently been referred to as radical behaviourism.

The period dominated by radical behaviourism is often regarded as being completely negative for the study of cognition and emotion.

However, it did bring to psychology a new rigor of definition and experimentation (Posner & Shulman, 1979) and an acceptance of the postulation of internal psychological constructs linked by theory to external behaviour (Skinner, 1953). Having accepted the inaccessibility of private events psychologists have treated conscious experience as a theoretical construct with specified testable consequences. Introspective reports, adjective check-lists, verbal protocols and other measures are used as indices of emotional experience in the knowledge that they reflect a postulated theoretical process. This has enabled theorists to address private events without confusing introspection, theoretical processes and conscious experience (Mandler,1979). Consequently, there has been a resurgence of interest in the study of private events within a broad spectrum of psychological research over the last 30 years (Dember, 1974; Lazarus, Coyne and Folkman, 1982; Mahoney, 1974, 1977a; Schwartz, 1982; Zajonc, 1980, 1984). During this period there has been an expansion of interest in emotion as a psychological phenomenonin its own right which has sparked substantial research (Bower, 1981; Izard, Kagan & Zajonc, 1984) and theoretical debate (Lazarus, 1982, 1984; Izard, Kagan & Zajonc, 1984; Zajonc, 1980, 1984). While the impact on psychology of the renewed interest in cognitive processes has been of such significance it has been called a "cognitive revolution" (Dember, 1974).

1.2 Historical Trends in the Study of Emotion

At the end of the 19th century the prevailing view amongst psychologists was that complex ideas, feelings and thoughts were made up of more basic ideas, feeling and thoughts. This fundamental approach characterized the work of people such as Wundt and Locke. Encouraged by William James, the twentieth century has witnessed a radical departure

from fundamentalism such that modern psychology generally accepts its role is to describe the processes and mechanisms that produce thoughts, ideas, actions and feelings. James promoted the view that emotion was not an unanalysable, simple process which corresponded to a sensation that was directly aroused by an exciting object or thought, but a secondary derivative process indirectly aroused. There are still theorists who favour a content view and insist on searching for "fundamental" emotions and their correlates. However, the principal focus over the last 100 years has been on process (Mandler, 1979).

There have been two major and opposing traditions in the study of emotions. The organic tradition which stresses the influence of physiological events and the mental tradition which insists organic events are consequences of psychic events (Mandler, 1979). These terms will henceforth be used in this strictly limited way to distinguish between theories that postulate physiological events as the precursors of emotion and those that suggest that physiological events are consequences of psychic events.

As has been mentioned, the advent of radical behaviourism had an important influence on the theory of emotion. Initially, in American psychology, the limitations it imposed on the study of conscious experience focussed attention on the visceral events that James (1884, 1890, 1894, cited in Mandler, 1979) saw as one of the precursors of emotional experience. The work of James was complemented by that of Lange and this important early work on emotion is often referred to as the James-Lange theory (Mandler, 1979). The James-Lange theory was eventually effectively attacked by Cannon (1914, 1927, 1929, cited in Mandler, 1979). The importance of Cannon's criticism of the view that visceral feedback formed the basis for emotional behaviour, was that it stimulated extensive research into the psychophysiology of emotion. This

saw the emergence of the "organic" or "physiological" theories of emotion (Mandler, 1979).

For the following brief summary of the issues investigated in this area considerable reliance has been placed on the excellent review by Mandler (1979). Researchers interested in the psychophysiology of emotion have investigated the autonomic nervous system (Levi-Montalcini & Angeletti, 1961; Wenzel, 1972; Wynne & Solomon, 1955); visceral patterning (Ax, 1953; Candland, Fell, Keen, Leshner, Plutchik, & Tarpy, 1977; Wolf & Wolff, 1943); autonomic generality (Averill, 1969; Funkenstein, 1956; Levi, 1972; Patkai, 1971; Schachter, 1966); the perception of visceral events (Borkovec & O'Brien, 1977; Hohmann, 1966; Jasnos & Hakmiller, 1975; Mandler & Kremen, 1958; Miller, 1969; Sirota, Schwartz & Shapiro, 1976; Valins & Ray, 1967; Wynne & Solomon, 1955); and the evolutionary-adaptive consequences of autonomic nervous system activity (Frankenhaeuser, 1975; Graham & Clifton, 1966; Higgins, 1971; Lacey, Kagan, Lacey & Moss, 1974; Pick, 1970).

However, since Schachter reintroduced the notion of cognition to organic theory in the 1960's (Schachter, 1966) the trend has been to see physiology as a necessary but not sufficient condition for the generation of emotional states. Therefore, while the radical behaviourist's exclusion of conscious experience has not endured, the concept of visceral events has been retained by current theorists as an important ingredient in emotional arousal. Workers such as Tomkins; Izard and Buechler; Lazarus, Kanner and Folkman; Mandler; and Pribram and Clynes are investigating a variety of views on the relationship between emotion as a subjective experience and changes in autonomic, neuro-endocrine, or neurological processes (Plutchik & Kellerman, 1980).

The mental tradition has also adapted to accommodate external influences. As was mentioned above, a century ago psychologists and

philosophers referred to knowledge and thought, the conscious content of the thinking organism, as "cognition". Now a century later cognitive psychologists view the contents of consciousness as the product not the process of thought. Cognitive theories are currently based on a notion that postulates mechanisms and processes as the basis of cognition. They do not refer exclusively to the conscious content of thinking organisms (Mandler, 1979).

A number of theorists within the mental tradition have attempted to assume the existence of basic processes from which emotional expression and experiences follow. Arnold (1960) developed a phenomenological-cognitive-physiological theory, Plutchik (1977) has attempted to develop a list of cognitive and perceptual processes that must be present in the production of emotional states, Tomkins (1963) argues that certain eliciting stimuli feed into innate neural programmes which generate primary affects and Izard (1971) incorporates neural, visceral, and subjective systems with the aim of placing emotion in the context of personality and motivation theory. All these theories are criticized by Mandler (1979) because they assume the existence of mental processes whose origin they do not attempt to explain.

Those theories within the mental tradition which do raise questions about the mechanisms which produce appraisals, evaluations, visceral response and subjective experience include the conflict, psychodynamic and behavioural theories.

The conflict theories explore variations of the idea that when an important activity of the organism is blocked an emotion follows (Hunt, 1941). The concept is traced to Paulhan, Herbart and Dewey, all of whom wrote in the 19th century (Mandler, 1979). It was revived in the early part of this century by Angier (1927) and Ogden's translation of Paulhan (1930). The conflict theories did not attract further attention until

Hebb's (1949) work with chimpanzees. He suggested that emotional disturbance resulted from interference with central neural structures called 'phase sequences', which were built as a result of prior experience and learning. The next milestone for the conflict theories was Meyer's reformulation which included a cognitive component. He suggested that emotion is aroused " when a tendency to respond is arrested or inhibited" (Meyer, 1956, cited in Mandler, 1979, p. 313). He went on to claim that cognitions differentiated emotional experiences from physiological reactions. Under the influence of Schachter's work this last proposition was further developed by Mandler (1964). He suggested that conflict, interruption or inhibition have undifferentiated visceral consequences with the emotional content being cognitively determined.

Psychoanalytic theory is in itself a conflict theory of emotion, the heart of which is the control of unacceptable instinctive impulses. Since all of psychoanalytic theory represents a general theory of emotion (Mandler, 1979) it would be impossible to do it justice by attempting to describe it here. It is sufficient to note that psychoanalytic theory has only had a general rather than specific impact on the mainstream theories of emotion.

Within the behavioural tradition itself distinct theories of emotion have been less apparent. Various attempts have been made to demonstrate emotions are conditioned (Mower, 1960) or associated with nonreward (Amsel, 1962) and indeed Skinner (1938) noted the emotional consequences that occur during extinction. As has been mentioned above current behavioural approaches include more cognitive explanations. The most prominent of these have been the approach taken by the social learning theorists and that developed by the cognitive behaviour therapists. Social learning theory has tended to concentrate more on the

relationship between cognitions and behaviour than the relationship between cognitions and emotion. On the other hand the cognitive behaviour therapists have given considerable attention to the treatment of emotional distress. It is their approach to emotions that is the focus of this research. However, before considering the cognitive behaviour therapist's approach to emotion in more detail, the events within psychology that led to their development will be outlined.

1.3 Behaviourism and the Cognitive Revolution

Prior to the emergence of cognitive behaviour therapy, behaviourism had developed three theoretical positions about private events.

There was one school of thought that denied the existence of mind, reduced all experience to glandular secretions and muscular movements, argued for exclusive environmental determinism, and the avoidance of conscious process. It has been labeled Watsonian (Dember, 1974; Jenkins, 1979; Mahoney, 1974; Schwartz, 1982) or radical behaviourism (Mahoney, 1974).

There was a second approach that did not deny or affirm the existence of mental events or minds and was characterized by adherence to operationism, macroscopic determinism, logical positivism and pragmatism, and was generally referred to as methodological behaviourism (Mahoney, 1974).

The third variation was one that asserted that statements that appeared to be about minds or mental events turned out to be statements about behaviour. This was referred to as analytical behaviourism (Schwartz, 1982).

Since very few people would argue a Watsonian position today, the common criticism of behaviourism, that behaviourists neglect private events, is no longer valid. In fact, more recently behaviourists have

taken the involvement of private events even further. During the late sixties and early seventies it was not only argued that private events are amenable to empirical research (Homme, 1965; Mahoney, 1970) but necessary to explain complex human behaviour (Bandura, 1969; Jacob & Sachs, 1971; Mahoney, 1974). The cognitive revolution had found its way into behavioural psychology. The incorporation into behavioural psychology of research into private events led to the development of cognitive behaviourism as the fourth theoretical approach to cognitions within behaviourism. At this point it seems appropriate to make a distinction between cognitive behaviourism and cognitive behaviour therapy. Cognitive behaviour therapy may be viewed as the application to therapy of the theoretical principles of cognitive behaviourism. However, it should be noted that on most occasions the therapeutic approaches preceded the theoretical formulations which are now being developed to support them. Indeed, research in the area has been predominantly outcome research aimed at refining therapeutic procedures rather than process research aimed at understanding the mechanisms by which those procedures operate (Mahoney, 1977b). Therefore, the distinction is far from precise and the terms are frequently used interchangeably. It is expedient for the purposes of this research to continue that tendency. In the following section the events current theorists consider critical to the emergence of the cognitive behaviour therapy will be reviewed.

1.4 Historical Factors that Influenced the Development of Cognitive Behaviour Therapy

Schwartz (1982) identified five issues which he believes were prominent influences on the progressive importance of cognitive factors in behaviour modification:

1. Laboratory studies in classical and operant conditioning which suggest that a strict stimulus-response formulation is inadequate. These studies argue that cognitive factors such as awareness, information processing and attitudes are necessary to explain the research findings (Bandura, 1969; Murray & Jacobson, 1971).

2. The 1965 critique and reformulation of learning theory by Breger and McGaugh that suggested the notions of stimulus and response be given up altogether. Instead they argued responses are not learned, but rather information about the environment is acquired, stored and categorized. The nature of this information then mediates specific responses. While their contribution did not fracture the foundations of learning theory and behaviour therapy it did promote some further theoretical soul searching.

3. The difficulty in theoretically accounting for the effectiveness of systematic desensitization. As originally conceived by Wolpe (1958) muscular relaxation was thought to be "reciprocally inhibiting" to anxiety and the procedure a counter-conditioning one. Subsequent studies have shown the only necessary part of the procedure is the imagination of fear relevant scenes (Wilkins, 1971). A range of alternative explanations of desensitization have incorporated cognitive components e.g. beliefs, sense of mastery. While these have not been accepted without question, the fact that doubts have been raised about the adequacy of the traditional learning theory explanation for a fundamental behaviour therapy technique, has played an important role in the entry of cognitive factors into behaviour modification.

4. The fact that the opening issue of Behaviour Therapy in 1970 had a series of articles devoted to the relationship of cognitive and behaviour therapies, is seen as indicating an early concern for cognitive factors amongst behaviour therapists. This "dialogue" between

cognitive and behaviour therapists is seen as important for the further development of cognition in behaviour modification.

5. The fifth milestone identified by Schwartz is a review in the Psychological Bulletin by Ledwidge (1978). The value attached to this article is that it has stimulated a lively debate on the value of the cognitive behavioural approach; thus indicating that the approach was recognized as an established entity and the focus of attention had changed to an evaluation of its merits.

To these specific events Mahoney and Arnkoff (1978) have added two more general trends in behavioural psychology. The first was the behaviourist's emerging interest in the phenomenon of self control which led to the acceptance of a view of human behaviour that was based on a process of reciprocal determinism rather than the existing assumption of environmental determinism. Reciprocal determinism assumes a complex and continuous causal interaction between the organism and its environment whereas environmental determinism viewed the forces that shape a persons life as existing primarily in the external environment. Consequently, humans were seen as an active participant in their own development and no longer as merely a passive recipient of environmental influence. The second trend was a reassessment by behaviourists of the radical behaviourist's neglect of private events. Over the next two decades cognitive behaviourists developed three distinct theoretical positions concerning the status of cognitions which characterize the different approaches currently represented within cognitive behaviour therapy.

1.5 Cognitive Behaviour Therapy and the Theoretical Status of Cognitions

The first approach which is associated with the covert

conditioning therapies, suggests cognitions can be viewed simply as behaviours which operate in accordance with the same laws that govern overt behaviours, the only difference being that they are private rather than public events (Cautela, 1966, 1967, 1973; Homme, 1965; Skinner, 1953; Ullmann, 1970).

The second position which is associated with the cognitive therapies, sees cognitions as higher level structures which organize and generate behaviours and as such have a semi-autonomous existence and operate according to their own set of laws or rules (Beck, 1970; Breger & McGaugh, 1965).

The third approach views cognitions as mediators of behaviours i.e. symbolic representations which serve a mediating role between antecedent stimulus conditions and overt responses (Bandura, Grusec & Menlove, 1966; Mahoney, 1974, 1977a).

It is this third approach that characterizes what Mahoney and Arnkoff (1978) call the cognitive learning therapies. The focus of this thesis is the application to emotions of the theoretical assumptions of the cognitive learning therapies. The cognitive learning therapies and their theoretical position as regards emotions will be reviewed below.

1.6 The Cognitive Learning Therapies

The cognitive learning therapies include the cognitive restructuring (Beck, 1970, 1976; Ellis, 1962; Meichenbaum, 1974), coping skills (Cautela, 1971; Goldfried, 1971; Kazdin, 1973; Meichenbaum, 1975; Suinn & Richardson, 1971) and problem solving therapies (D'Zurilla & Goldfried, 1971; Mahoney, 1974, 1977a; Spivack, Platt, & Shure, 1976; Spivack & Shure, 1974).

These therapeutic approaches, in spite of considerable variation of emphasis , share some common theoretical assumptions (Mahoney & Arnkoff,

1978). The most fundamental assumption, that humans develop adaptive and maladaptive behaviour and affective patterns through cognitive processes, has been traced back to the Greek philosophers and is frequently credited to Epictetus (60 A.D.) who was cited earlier.

Cognitive learning therapists also agree that these cognitive processes can be functionally activated by procedures that are generally isomorphic with those of the human learning laboratory.

Therefore, it becomes the task of the therapist to take on the role of a diagnostician-educator who assesses maladaptive cognitive processes and subsequently arranges learning experiences that will alter cognitions and the behaviour and affect patterns with which they are associated (Mahoney & Arnkoff, 1978).

In summary, one of the most fundamental assumptions of the cognitive learning therapies is that emotions are mediated by cognitions. The empirical evidence available for the cognitive learning therapies position will be considered in the following section.

1.7 The Research Evidence of Cognitions as Mediators of Emotions

The research into the cognitive learning therapist's approach to emotional distress can be divided into two distinct types.

Firstly, there is a considerable body of clinical outcome research. However, most outcome research only assesses the relationship between therapeutic procedures and therapeutic outcome. It usually does not monitor the cognitive processes which it assumes accounts for the efficacy of the techniques being evaluated. Therefore, this research can not be seen as providing direct evidence for the assumptions of the cognitive learning therapies.

Secondly, there is a much more modest selection of laboratory research which purports to directly address the assumption that

cognitions can mediate emotions. There are three different strategies that have been used to investigate the role of cognitions as mediators of emotion.

The first is the mood induction research which has attempted to employ cognitive processes to generate different moods. The most prominent among a number of procedures is the approach developed by Velten (1968). Velten had subjects read and try to imagine themselves experiencing the mood suggested by self statements written on cards. The contention is that mood changes generated by this procedure result from the subjects experiencing the kind of cognitive activity suggested by the statements.

The second is exemplified by a series of studies carried out by Richard Lazarus and his colleagues which showed that emotional responses to stressful films could be manipulated by the commentary that accompanied the film (Koriat, Melkman, Averill, & Lazarus, 1972; Lazarus, 1966; Lazarus & Alfert, 1964; Lazarus, Speisman, Mordkoff, & Davison, 1962; Speisman, Lazarus, Mordkoff, & Davison, 1962). Again the contention was that subjects cognitive activity about the film was determined by the commentary and that their emotional response was determined by that cognitive activity.

The third strategy is the work of Robert Zajonc and his colleagues who argue that affect can occur in the absence of cognition (Zajonc, 1980). They acknowledge cognition as a sufficient cause of emotion but question whether it is a necessary cause. Their position is based on a finding that stimuli which could not be recognized could still elicit a predictable emotional response (Kunst-Wilson & Zajonc, 1980). This work raises the question of whether cognitive processes and the stimuli on which they operate need to be available to conscious awareness in order to mediate emotions.

None of these approaches has attempted to demonstrate which cognitive processes are involved in generating emotions. The first two approaches have merely attempted to show that cognitive input e.g. reading statements and experimental instructions, is associated with differential mood change and the third approach raises questions about the importance of the level of awareness of the eliciting stimulus in order that unspecified cognitive processes may be involved as mediators.

1.8 The Research Problem

While there is general agreement that cognitive processes can elicit emotional responses, we know little about the nature of the cognitions that do so nor whether or not we need to be fully aware of the eliciting stimuli in order for cognitive processes to be involved as mediators.

The current research was designed to investigate both these issues. The first task was to refine the evidence from the mood induction research that suggests cognitions can mediate emotions. The next stage was to consider the type of cognitive processes involved in mediating emotions. The final step was to assess whether or not the stimuli on which these cognitive processes operate need to be available to conscious awareness.

Before proceeding to these experimental questions it is necessary to examine the nature of the concepts of cognition and emotion. These definitional issues will be discussed in the next chapter.

CHAPTER 2

DEFINING COGNITION AND EMOTION

In the previous chapter an overview was given of the major historical influences on the study of emotion, the historical trends in the development of theories of emotion and the conceptual developments within behaviourism which led to the emergence of cognitive behaviourism. The difficult issues of what emotions and cognitions are and how contemporary researchers deal with the interface between emotion and cognition were not addressed. These issues will now be taken up in the current chapter.

2.1 Definition of Emotion

There is no generally agreed definition of emotion in psychology. Writers in the area do agree that emotion is an elusive concept (Izard, Kagan & Zajonc, 1984; Mandler, 1979). The struggle to come to terms with just what the concept of emotion represents within psychology has been a long one. In 1928 Madison Bentley presented a rather pessimistic view of the problem:

> Whether emotion is today more than the heading of a chapter, I am still doubtful. Whether the term stands - in regard of most of us - for a psychological entity upon which we are all researching I do not know. Whether it is the common subject of our varied investigations I am not sure enough to be dogmatic. (Bentley, 1928 cited in Mandler, 1979, p. 279)

Mandler (1979) concludes that nothing much has changed, he states "there is no commonly, even superficially, acceptable definition of what a psychology of emotion is about" (Mandler, 1979, p. 279).

While no agreement has been reached about what defines emotion there is some level of agreement that it is more than the subjective or feeling state that common usage of the term implies and is focused on by dictionary definitions (Izard et al, 1984). At present, the most common

approach to dealing with the difficulty of defining emotion is to adopt a three system approach (Izard et al, 1984; Lang, 1984; Scott, 1980). These major theorists agree that emotion is a response that is characterized by three distinct components. Izard et al (1984) have labeled these components: neurophysiological-biochemical, motor or behavioural-expressive, and subjective-experiential. Different theorists place different emphasis on these three components and identify different processes as the critical elements within these three areas.

Within the neurophysiological-biochemical component emphasis may be placed more on biochemical substrates (Clynes, 1980; Pribram, 1980), the autonomic nervous system (James, 1884, 1890, 1894 cited in Mandler, 1979; Lange, 1922, cited in Mandler, 1979; Mandler, 1975; Schacter and Singer, 1962), the somatic nervous system (Ekman, Friesen & Ellsworth, 1972; Tomkins, 1980) or some combination of these three (Lang, 1984). For the motor or behavioural-expressive component attention has been paid to facial expression (Ekman, Friesen & Ellsworth, 1972; Ekman, Levinson & Friesen, 1983), vocal intonation (Scherer, 1981, 1982; Williams & Stevens, 1981), posture (Hiatt, Campos & Emde, 1979), gestural and instrumental acts (Exline, 1982; Scherer & Ekman, 1982). It is the third component, the subjective-experiential, that is the most difficult to define. There is considerable debate as to whether this component is a feeling state, a cognitive process or a combination of feeling and cognition. It is in this area that there is what is perhaps the clearest disagreement amongst current theorists. At the most fundamental level, those theorists that argue that the subjective component is cognitively based see emotion as a response to sensory input that has been evaluated or appraised by cognitive processes. They argue that the character of the emotional response is dependent on these cognitive appraisals of the raw sensory input. Those authors that do not

accept that emotions are dependent on cognitive appraisals do not appear to define feeling state but merely assume that the cultural meaning the term has acquired is a precise enough definition. These authors accept that emotion is a response to raw sensory input, but have not adequately explained how feeling states are generated from raw sensory input. A more detailed discussion of these issues will be taken up in a later section on the interface between emotion and cognition.

To summarize, the most common approach is to define emotion by focusing on those processes that are seen as characterizing an emotional response, rather than seeing emotion as some kind of internal process that is manifest in terms of these characteristic responses. That is, emotion is described as actually being a combination of such things as language behaviour, organized overt acts and physiological arousal both somatic and visceral rather than these responses being seen as a product of emotion and not emotion itself.

The final issue that must be considered in the discussion on defining emotion is how necessary it is to have a definitive description. It has recently been suggested that the need for a strict definition is less critical than the need for greater insight into the essential and fundamental processes that are common to all emotions (Izard et al, 1984). Izard et al (1984) argue that at present it is not clear where the boundaries of emotional phenomena should be drawn. They contend that to establish boundaries at this point may exclude from consideration aspects of the phenomena that could eventually prove to be essential to understanding the full complexity of emotion. Others have warned of the dangers of theorizing about phenomena that have not been adequately specified (Lazarus, 1984).

The position adopted here is that since the nature of emotion remains the subject of some considerable disagreement, there is nothing

to be gained by arbitrarily adopting one of the current definitions. However, it is necessary to specify the phenomena of interest to this research. Therefore, the current work will specify at each stage what is being referred to as emotion and acknowledge that the phenomena under investigation may not be fully representative of all the concepts generally associated with the term within psychology.

2.2 Definition of Cognition

The nature of cognitions is possibly as elusive a concept to define as the nature of emotion. Historically cognition has been seen as a broad term to describe most mental activity. An early definition by Ryle (1949) described cognitions as "a person's present thinkings, feelings and willings, his perceivings, rememberings, and imaginings" (p. 13). The scope of this early approach is also apparent in this more recent offering which suggested cognition was "a genetic term for any process whereby an organism becomes aware or obtains knowledge of an object" (Raimy, 1975, p.43).

Such broad definitions are characteristic of the approach of cognitive psychologists over the last two decades. The extent of agreement amongst cognitive theorists can be observed in the following two definitions. The first by Neisser (1967) is more explicit than the previous definitions but is just as broad:

> As used here, the term cognition refers to all the processes by which the sensory input is transformed, reduced, elaborated, stored, recovered and used. Such terms as sensation, perception, imagery, retention, recall, problem-solving, and thinking, among others, refer to hypothetical stages or aspects of cognition (p. 4).

The second by Mandler (1975) is more functionally orientated than the others but makes it as clear that cognition is used to refer to a broad range of activity:

> Cognition refers to the complex series of events and translations that are ascribed to the fully functioning human being. These events start with the transformation of environmental input that invariably generate functional mental events. Following these transformations, complex structures that are acquired or innate relate the transformed information to past experience, to outcome, and to future expectations. At the output side, both pre-established action structures and newly integrated behavioural structures receive the transformed output from the mental system, and act on the environment" (p. 12).

As is evident from these two definitions it is generally accepted amongst cognitive psychologists that cognition is not restricted to mental events that are available to awareness and encompasses a broader range of mental activity than that associated with thought and language.

Cognitive learning therapists have concentrated their attention on a narrower range of mental activity. Their primary concern has been with thoughts, attitudes, belief systems, expectations and assumptions (Beck, 1970; Ellis, 1962; Kuiper & MacDonald, 1983; Mahoney, 1974).

These cognitive processes are thought by some therapists to be closer to awareness than some of the more basic processes included in the cognitive psychologist's definitions of cognition. Beck (1970) takes the view that "although the patient may not be immediately aware of the content of his maladaptive attitudes and patterns, this concept is not "unconscious" in the psychoanalytic sense and is accessible to the patients introspection" (p. 186). Beck's therapeutic strategy for emotional distress then follows from this position; that is, therapy concentrates on making clients aware of their maladaptive cognitions and encourages them to change these cognitions. Other therapists who believe internal structures are more likely to be influenced by experiential methods than verbal persuasion (Bandura, 1977, 1978) may be less inclined to postulate that these internal structures are available to awareness.

While the primary concern of cognitive learning therapists has been

with the cognitions listed above they have also identified more fundamental cognitive processes as being the mechanisms by which these cognitions are generated. Researchers have suggested that four classes of cognitive activity contribute to the generation of these cognitions. These are attentional processes, relational processes, response repertoire features, and experiential feedback. The relationship between these processes and thoughts, attitudes, belief systems, expectations and assumptions will be examined further in Chapter 4.

2.3 The Interface Between Cognition and Emotion

In the strictest sense the interface between cognition and emotion is undefinable. The nature of this point of contact depends entirely on what is accepted as cognition and what is accepted as emotion. As has been discussed in the preceeding sections there is a considerable variation in what researchers claim defines cognition and emotion.

It is possible to define either of the terms sufficiently broadly to totally incorporate the other concept. However, in order to talk about the relationship between them it is necessary to establish some kind of definitional boundary for the two concepts. Most approaches to research with either cognition or emotion assume implicitly or explicitly that some differences in emotional and cognitive processes are operationally definable and while they may not agree on the precise boundary certain processes are usually assigned to one concept or the other. For example, in an experiment investigating the impact of cognition on emotion cognitive set or instructions may be used as independent variables and a self report measure of emotion may be used as a dependent variable. Alternatively, a study investigating the impact of emotion on cognition may use a self report or psychophysiological measure of emotion to define different experimental groups and then test

their memory functioning. It would be generally accepted that the variables included in these examples are representations of cognitions and emotions respectively.

Current opinion on the interaction of cognition and emotion falls into one of three categories. There are those authors who argue cognition is a sufficient but not necessary cause of emotion, those that contend that cognition is both a sufficient and necessary cause of emotions and there are those that argue that the issue is irrelevant.

The former group have been most recently represented by the extensive arguments put forward by Zajonc and his colleagues who view cognition as a sufficient but not necessary cause of emotional response (Zajonc, 1980, 1984). The central hypothesis of this position is that emotional experience and expression can result from pure sensory input to the brain. Zajonc (1980) postulates that the neuroanatomical structures that are responsible for this transformation from pure sensory input to emotional response include the right hemisphere, the limbic system, and more specifically the hypothalamus. He claims that these structures in the absence of mediation by higher mental processes can bring about a full emotional response. The intriguing question at this stage left unanswered is just how these neural structures transform pure sensory input into emotion.

The alternative opinion that cognitions are both a sufficient and necessary precursor of emotional response has recently been extensively presented by Lazarus and his colleagues (Lazarus, 1982, 1984). The essence of this position is that in order for pure sensory input to produce an emotional response it must undergo some transformation such that the receiver comprehends that it has implications for his/her well being. That is, the sensory input must have some significance that is understood by the receiver before an emotion can occur. The

transformation of sensory input into a meaningful form is said to be a cognitive activity.

Along with researchers from the first two categories the last group recognize that the relationship between cognition and emotion is bidirectional (Gilligan & Bower, 1984; Meichenbaum & Butler, 1980). That is, cognitions can cause changes in emotion and vice versa. Therefore, this group see the debate over primacy as meaningless. There is ample evidence of cognitions influencing emotions (Hale & Strictland, 1976; Lazarus & Alfert, 1964; Lazarus et al, 1962; Lazarus & Launier, 1978; Velten, 1968) and of emotions influencing cognitions (Gilligan & Bower, 1984; Zajonc, 1980) to support this contention. Unfortunately, this does not resolve the basic argument over primacy. The fact that there is little doubt that there can be chain reactions of cognitions influencing emotions and emotions influencing cognitions does not throw any light on the question of whether each emotion in the chain must be preceded by a cognition or whether each cognition in the chain is necessarily preceded by an emotion. The issue then becomes one of the importance of pursuing the primacy question. It will be argued in Chapter 5 that this issue is of some theoretical importance for cognitive learning therapists.

1.4 The Current Research Problem

The initial research problem is to determine if the evidence available from the Velten style mood induction research provides a valid demonstration of cognitive processes mediating emotions. The contentious issues associated with this research and an experimental investigation of these issues is outlined in the next chapter.

CHAPTER 3

SELF STATEMENT MOOD INDUCTION RESEARCH

In an attempt to demonstrate that cognitive processes mediate emotions researchers have frequently adopted an experimental strategy involving what have become known as mood induction procedures. The general strategy is to apply a procedure which supposedly activates in subjects the cognitive processes thought to be necessary for generating the emotion in question. The strategy has been used to investigate the resultant mood both as a subjective state and for it's effect on behaviour (Goodwin & Williams, 1982).

As was outlined in Chapter 1 the most widely used mood induction procedure is the self-referent statements first described by Velten (1968). Velten had groups of subjects read and try to experience the mood the statements represented. Different sets of statements reflected either happy, or sad events and experiences which were worded so as to relate personally to the subject. A set of emotionally neutral statements were also included as a control. These were referred to as the "elation", "depression", and "neutral" statement sets. Although some subsequent researchers have varied the number of statements (Alderman, 1972; Schare & Lisman, 1984; Sherwood, Schroder, Abrami & Alden, 1981; Sutherland, Newman & Rachman, 1982), the content of statements (Teasdale & Fogarty, 1979), or used a group administration (Brewer, Doughtie & Lubin, 1980; Coleman, 1975) investigators have reported the general procedure to be an effective manipulator of mood as measured by visual analogue scales (Mathews & Bradley, 1983; Teasdale & Fogarty, 1979; Teasdale, Taylor & Fogarty, 1980; Williams, 1980), the depressive multiple adjective check lists (Alderman, 1972; Brewer et al, 1980; Frost, Goolkasian, Ely & Blanchard, 1982; Frost, Graf & Becker, 1979; Hale & Strickland, 1976; Mukherji, Abramson & Martin, 1982; Polivy,

1981; Polivy & Doyle, 1980; Strickland, Hale & Anderson, 1975; Velten, 1968), semantic differential rating scales (Gouaux & Gouaux, 1971; Frost et al, 1979; Natale, 1977) and the Beck depression inventory (Brewer et al, 1980; Finkel, Glass & Merluzzi, 1982; Frost et al, 1979).

In spite of the wide acceptance of the procedure several recent studies have raised doubts about its apparent effectiveness as a mood inducer.

Sutherland et al (1982) reported a significant proportion (32 per cent) of their subjects failed to reach a criterion 10 per cent mood change. Their findings suggest that self statements may not be a reliable mood induction method.

Another recent study failed to establish a relationship between self statement valence and physiological arousal (Rogers & Craighead, 1982). Since most current concepts of emotion (see Izard, Kagan & Zajonc, 1984) include physiological arousal as an essential element this study must bring into question the validity of the self report mood changes documented in the mood induction research.

Still other workers have explored the possibility that the self report mood changes associated with self statement mood induction procedures are in some way due to experimental demand characteristics (Buchwald, Strack & Coyne, 1981; Polivy & Doyle, 1980). These researchers believed that the content of the statements and the experimental instructions would lead subjects to predict the kind of post-induction mood that was expected and that they would be likely to comply with this demand.

Both studies concluded that this possibility could not be rejected. However, Polivy & Doyle (1980) also determined that while demand characteristics contributed to subjects' responding their reported mood shifts were not entirely due to experimental artifact.

These concerns have been sufficient to encourage some researchers to look for improved induction techniques. Autobiographical recollections (Brewer et al, 1980) and personally meaningful music (Sutherland et al, 1982) have both been shown to be superior to the self statement approach (Velten, 1968).

The common element between these two alternative techniques is the personal relevance for the subject of the induction material. In the autobiographical recollections procedure subjects nominated three autobiographical mood-evoking events to be used as mood induction material. In the music procedure subjects were asked to choose from a selection of taped music two pieces that they felt would be capable of influencing their mood. In contrast, the Velten self statements are of a general nature and the procedure does not take into account the personal relevance of the statements for each subject. It has been pointed out that there is a critical difference between saying something to oneself and believing it (Buchwald et al, 1981; Lazarus, Coyne & Folkman, 1982). It would follow that something that is personally relevant to the subject is more likely to be experienced as real than something that is not. This proposition is lent some support by the finding that self referent statements were superior mood inducers to nonself referent statements (Sherwood et al, 1981).

From a cognitive learning theory point of view, the biggest difficulty with using the Velten strategy to demonstrate that cognitions mediate emotions is that subjects are asked to read self statements without taking account of whether or not they believe them. The statements are assumed to reproduce the same constructed reality for subjects as an actual life experience that generates the kind of cognitions represented by the statements. That is, the Velten strategy assumes but does not demonstrate that the self statements generate a

constructed reality that is isomorphic with the content of the statements (Lazarus et al, 1982).

It is apparent that the inconsistent findings from mood induction studies, reported earlier, could result from any of three possibilities. The first is that the Velten statements may no longer be adequate mood induction material. The Velten statements were generated in 1968 and what may have been a socially and culturally acceptable mood statement then may not be as appropriate now. The second and more likely possibility is that the personal relevance of the statements would quite likely depend on prior experience of the statement content and, therefore, be idiosyncratic to individual subjects. In either case it is possible some subjects failed to identify with a significant proportion of the statements; that is, found them unbelievable and did not actually experience the kind of cognitive activity thought to be associated with the particular mood change represented by the statements. The third possibility is that the believability of the mood statements is irrelevant and the mood changes that have been reported are largely due to experimental demand characteristics.

These issues have been investigated in the following two studies. The first addressed the question of whether what are currently considered to be believable mood statements are consistently superior mood inducers to what are considered to be unbelievable mood statements. The second investigated if the differential believability of mood statements was idiosyncratic to individual subjects. Since both these studies involved mood induction statements that were not expected to be effective they were also able to assess the impact of demand characteristics.

3.1 Experiment 1

The value of the Velten approach to cognitive learning theory was that it seemed to demonstrate in a general way that cognitive processes could mediate emotion. If the inconsistencies in the data can be explained in terms of the differential believability of the mood statements then the general conclusions drawn from the data would be reasonable. However, if the mood changes reported in the self statement mood induction studies are largely artefactual then the claim that this type of research provides empirical support for the cognitive learning theory approach to therapy would obviously be invalid.

Based on the assumption that the believability of the Velten mood induction statements would vary, the present study was designed to test the hypothesis that the believability of the mood statements would influence their effectiveness as mood inducers.

In order to hold the potential for demand characteristics constant across the experimental conditions the mood inductions were carried out in groups. By including subjects from all the experimental conditions in the induction groups and by ensuring all the subjects received the same experimental instructions the possibility of demand characteristics being responsible for any group differences was minimized.

It was hypothesized that the more believable mood statements would be more effective mood inducers than the less believable mood statements and that both the more and less believable mood statements would be superior mood inducers to neutral statements.

3.1.1 Method

Subjects

The 85 subjects were volunteers from a group of 150 first year

behavioural science students at the Canberra College of Advanced Education. The subjects had not had any prior contact with the experimental material. The subjects ranged from 18 years to 47 years with a mean age of 25.84 years. There were 33 males and 52 females. The students who took part in the experiment received course credit for participating.

Design

The design was a one-way factorial design with five levels of statement believability (believable elation, unbelievable elation, believable depression, unbelievable depression and neutral).

Materials

Mood induction statements. The 20 most and 20 least believable elation and depression statements, along with 20 neutral statements, from the Velten (1968) experiment were used as mood induction stimuli in this study.

In order to determine how believable mood induction subjects would currently find the statements, the elation and depression statements used by Velten (1968) were rated by 62 second year administration students at the Canberra College of Advanced Education for their degree of believability as mood induction statements (see appendix A-1 for details of this experiment). The 20 highest and 20 lowest rated statements were chosen from each of the original sets of 60 statements and 20 neutral statements were randomly selected from the original neutral set. This provided the five sets of mood induction statements used in this experiment (see Appendix A-2 to A-6 for the sets of statements).

Mood assessment instruments.

Three different types of mood assessment instruments that have been used previously in mood induction research were selected for the current study.[1] These were tests of motor speed (Berndt & Berndt, 1980; Coleman, 1975; Frost et al, 1979; Hale & Strictland, 1976; Natale, 1977, 1978; Teasdale & Rezin, 1978b; Velten, 1968), visual analogue scales (Mathews & Bradley, 1983; Sutherland et al, 1982; Teasdale & Fogarty, 1979; Teasdale, Taylor & Fogarty, 1980; Williams, 1980), and a self report mood scale (Richardson & Taylor, 1982; Robbins, 1980; Teasdale & Rezin, 1978a). The motor speed tests included writing numbers backward from 100 (Velten, 1968), the digit symbol sub test from the Weschler Adult Intelligence Scale (WAIS) (Weschler, 1955) and the letter symbol sub test from the Naylor-Harwood Intelligence Scale (NHAIS) (Naylor & Harwood, 1972). The visual analogue scales were a set of 100 mm lines on which subjects indicated how they were feeling "right now" by placing a mark. The lines were labeled at either end "I am not feeling at all X" and "I am feeling extremely X", where "X" was one of eight (four positive and four negative) commonly used mood adjectives (relaxed, anxious, irritated, calm, frustrated, despondent, excited and happy). The four

[1] As well as being an elusive concept emotion is difficult to measure. To date researchers have relied largely on self report measures of mood. This may be because behavioural, physiological, and self report measures typically show poor correlations (Polivy, 1978). There is a wide range of self report measures that have been used by mood researchers but none has shown outstanding reliability. One method which has been adopted to improve reliability is to use a variety of measures (Coleman, 1975). There is also a substantial and growing body of opinion that emotions don't occur singularly but that the occurance of one emotion will cause other emotions to occur at the same time (Izard, 1972; Polivy, 1978, 1981; Schwartz & Weinberger, 1978). Finally there is considerable evidence that emotions are unipolar rather than bipolar. This evidence dates back to factor analytic studies of the Mood Adjective Check List (Nowlis & Nowlis, 1956) where unipolar factors were found (Nowlis, 1965). These findings guided the selection of measurement instruments for this study that were varied, unipolar, and capable of monitoring a variety of moods.

positive and four negative scales were also combined to produce a Visual Analogue Positive Scale (VAPS) and a Visual Analogue Negative Scale (VANS). The self report mood scale was the Profile of Mood States (POMS)(McNair & Lorr, 1964). The POMS consists of six subscales: tension/anxiety, depression, anger/hostility, vigor, fatigue, and confusion and a total mood score (TMS) which is a combination of the six subscales.

Pre-Induction Mood Assessment

The pre-induction mood assessment consisted of two motor speed tests (writing numbers backward from 100 and digit symbol), all eight visual analogue scales and the POMS.

Post-Induction Mood Assessment

The post-induction mood assessment involved writing numbers backward from 100, letter symbol, the eight visual analogue scales and the POMS.

Procedure

The subjects were randomly assigned to one of the five experimental conditions: believable statements designed to produce elation (believable elation), unbelievable statements designed to produce elation (unbelievable elation), believable statements designed to produce depression (believable depression), unbelievable statements designed to produce depression (unbelievable depression), and neutral statements not expected to influence mood (neutral). The random assignment was restricted to ensure even numbers across experimental conditions. This was done by a procedure of sampling without replacement (Keppel, 1982). That is, as a subject was assigned to a condition that

condition was not available for assignment until all other conditions had been assigned a subject.

The experiment was run in small groups of 10-20 subjects. Each group was comprised of subjects from all five experimental conditions.

Each subject was given a test booklet and a set of mood induction cards. The test booklet contained the experimental instructions and mood assessment instruments.

Subjects were asked to read the initial instructions. After the subjects had read them through the experimenter also read them aloud. The instructions were:

> This exercise is part of a research project which is evaluating techniques used to investigate emotions.
>
> The sets of statements you are about to see are used by researchers to artificially induce different mood states.
>
> However, before doing the exercise I would like to give you a series of simple tasks to assess your current mood.
>
> In order that the information you provide may remain confidential please don't write your name on any of the material.
>
> Your participation in this exercise is completely voluntary so if now or at any stage you would rather not take part please feel free to so indicate.
>
> Are there any Questions?

The initial instructions were followed by the pre-induction mood assessment. After completing the pre-induction mood assessment subjects were given the experimental instructions to read. These were also read aloud by the experimenter after the subjects had read them through. The instructions were:

> Your task is to read each statement and then try to experience the feeling expressed by the statement.
>
> To do this read each card to yourself and then go over the statement again and again in your head with the determination and willingness to really believe it. Try to <u>experience</u> each idea and concentrate your full attention on it. Your success will be largely a question of your willingness to be receptive and responsive to the idea in each

statement, and to allow each idea to act on you without interference.

Different people move into moods in different ways. Whatever induces the mood in you fastest and most deeply is the best way for you to use. Some people simply repeat the statements over and over again to themselves with the intention of experiencing them. Other people find it natural and easy to visualize a scene in which they had or would have had such a feeling or thought. Perhaps some easy combination of repeating the statements and imagining scenes will come to you.

As you move through the cards try to concentrate your full attention on experiencing the feeling expressed by each statement. Try to resist the impulse to reject or resist statements that are contradictory to your own opinions or how you currently feel yourself to be. Try to feel the way someone who <u>believed</u> the statement would most <u>likely feel</u>.

There will be a certain amount of time devoted to each statement. Try to use the time to concentrate on experiencing the feeling expressed in that statement. The experimenter will indicate when to move on to the next statement.

Even if some of the statements seem to be a little unusual for this task try to concentrate on them for the full time period.

In summary, the whole purpose of this exercise is to see whether a person can talk themselves into a mood. Some of these mood statements may have no relation to anything you have ever thought, said or done. However, your task is to concentrate on them and try to experience whatever emotion they may represent, rather than comparing each single statement to your life experience and then deciding whether it applies to you.

If you feel the urge to laugh, it will probably be because humour is a good way to counter unwanted feelings. Please try to resist these reactions. Also, because this is a group exercise, please reserve any questions or comments you have until the exercise has been completed.

After the statements have been read there will be a further series of simple exercises to perform.

<u>IF FOR ANY REASON YOU FEEL YOU CANNOT CONTINUE PLEASE</u>

<u>FEEL FREE TO STOP TAKING PART.</u>

If possible just sit quietly until the end of the exercise. If this is not possible or desirable please indicate to the experimenter it is necessary for you to withdraw.

Do you have any questions ?

When the experimenter has answered any questions please read the first card only.

The subjects were allowed 30 seconds to concentrate on each card. The experimenter indicated when the time period for each card had expired by saying "next". After all the cards had been processed for the prescribed time the post-induction mood assessment was completed.

After the post-induction mood assessment had been completed subjects were debriefed which included giving those subjects who had used depression mood induction statements a list of elation statements to read. Care was taken to ensure that subjects were not experiencing any lingering negative mood effects as a result of taking part in the experiment.

3.1.2 Results

The pre-induction and pre- to post-induction mood data were analyzed by separate one-way analyses of variance. The results of these analyses are outlined below.

Pre-Induction Mood Measure

Contrary to expectations there were some pre-induction mood differences between the experimental groups. However, all the significant pre-induction mood differences were between the neutral and the elation, and the neutral and depression induction groups. There were no significant pre-induction mood differences between any of the elation and depression induction groups. The differences that did occur are detailed below for each of the mood measures.

Visual analogue scales. A one-way analysis of variance revealed a significant between groups effect for the scale relating to the

adjective "despondent" [2], $F(4,80) = 2.6$, $p < .05$ (see Table 1). Contrasts between the groups showed the neutral group to be significantly different from the believable elation, unbelievable elation, and unbelievable depression groups, $t(80) = 2.82$, 2.50, 2.54 and $p < .006$, .02, .01 respectively.

Table 1
Pre-Induction Visual Analogue Scale Mean Scores for the Five Experimental Groups.

	Mood Induction Statement Valence							
Visual Analogue Scales	Believable Elation	Unbelievable Elation	Believable Depression	Unbelievable Depression	Neutral	F Ratio	p<[a]	Contrast[b]
Relaxed	62.5	61.5	54.5	57.8	47.0	1.05	NS	
Anxious	31.5	33.3	28.1	32.5	42.2	0.66	NS	
Irritated	24.4	24.1	14.5	16.0	32.8	1.48	NS	
Calm	68.2	61.7	60.1	63.2	50.5	1.00	NS	
Frustrated	32.1	20.9	20.1	19.4	37.4	1.71	NS	
Despondent	20.1	23.1	29.8	22.7	45.9	2.62	.04	dij
Excited	38.1	25.1	24.1	28.2	33.0	1.06	NS	
Happy	53.8	51.5	57.0	55.4	50.4	0.21	NS	
VAPS	55.7	49.9	48.9	51.1	45.2	0.52	NS	
VANS	27.0	25.3	23.1	22.6	39.6	0.12	NS	

[a] Confidence level for contrasts $p < .02$ to account for familywise error

[b] believable elation -v- believable depression = a ; believable elation -v- unbelievable depression = b ; believable elation -v- unbelievable elation = c ; believable elation -v- neutral = d ; believable depression -v- unbelievable depression = e ; believable depression -v- unbelievable elation = f ; believable depression -v- neutral = g ; unbelievable depression -v- unbelievable elation = h ; unbelievable depression -v- neutral = i ; unbelievable elation -v- neutral = j

[2] From now on the scales representing the adjectives relaxed, anxious, irritated, calm, frustrated, despondent, excited, and happy will be referred to as the "relaxed scale" etc.

Profile of Mood States (POMS). A one-way analysis of variance showed a significant between groups effect for the depression, $F(4,80) = 4.8$, $p < .002$, anger/hostility, $F(4,80) = 4.7$, $p < .002$, and confusion, $F(4,80) = 3.1$, $p < .02$, scales (see Table 2). Contrasts between the groups revealed the neutral group to be significantly different from all the other mood induction groups for all three of these scales. That is, there was a significant difference between the neutral group and the believable elation, unbelievable elation, believable depression, and unbelievable depression groups for the depression scale, $t(80) = 3.34$, 3.38, 3.5, 3.6 and $p < .001$, .001, .001, .001, the anger/hostility scale, $t(80) = 2.02$, 2.92, 3.5, 3.8 and $p < .05$, .005, .001, .0001, and the confusion scale, $t(80) = 2.42$, 2.57, 3.27, 2.39 and $p < .02$, .02, .01, .002 respectively.

Motor speed. A one-way analysis of variance indicated that there were no significant differences between any of the groups on either of the two motor speed tests (see Table 3).

Pre- to Post-Induction Mood Change

To remove potential bias resulting from nonsignificant pretreatment differences in individual mood states and to control for the significant mood differences between the neutral and induction groups, mood change scores, from pre- to post-induction, were calculated. This was done such that irrespective of mood valence or scoring convention, a positive score represented a mood change in a positive direction and a negative score represented a mood change in a negative direction for all scales. Therefore, on a positive scale such as "happy", a positive mood change score means the subject became happier and a negative mood change score means the subject became less happy. Alternatively, on a negative scale such as "disappointed", a positive mood change score means the subject

Table 2
Pre-Induction POMS Scale Mean Scores for the Five Experimental Groups.

	Mood Induction Statement Valence							
POMS	Believable Elation	Unbelievable Elation	Believable Depression	Unbelievable Depression	Neutral	F Ratio	p<[a]	Contrast[b]
Tension/ anxiety	9.2	7.7	8.2	9.2	13.4	1.53	NS	
Depression	6.0	5.9	5.5	5.2	15.6	4.79	.002	dgij
Anger/ hostility	7.2	4.9	3.4	2.7	12.4	4.66	.002	dgij
Vigor	14.4	11.7	14.4	16.8	13.0	1.37	NS	
Fatigue	9.9	10.7	10.1	8.4	12.5	0.72	NS	
Confusion	7.2	7.2	6.9	5.8	11.1	3.08	.02	dgij
TMS	4.2	4.1	3.3	2.4	8.7	3.66	.009	dgij

[a] Confidence level for contrasts p< .02 to account for familywise error.

[b] believable elation -v- believable depression = a ; believable elation -v- unbelievable depression = b ; believable elation -v- unbelievable elation = c ; believable elation -v- neutral = d ; believable depression -v- unbelievable depression = e ; believable depression -v- unbelievable elation = f ; believable depression -v- neutral = g ; unbelievable depression -v- unbelievable elation = h ; unbelievable depression -v- neutral = i ; unbelievable elation -v- neutral = j

became less disappointed and a negative mood change score means the subject became more disappointed.

Contrary to expectations the significant pre- to post-induction mood change differences were only between the elation, depression, and neutral groups. There were no significant differences between the believable and unbelievable elation and the believable and unbelievable depression groups respectively. These results are outlined below for each of the mood measures. The significance level for all contrasts was set at p< .02 to account for familywise error.

Table 3
Pre-Induction Motor Speed Test Mean Scores for the Five Experimental Groups.

	Mood Induction Statement Valence							
Motor Speed Tests	Believable Elation	Unbelievable Elation	Believable Depression	Unbelievable Depression	Neutral	F Ratio	p<[a]	Contrast[b]
Writing No.	54.4	52.5	52.5	55.1	53.6	0.49	NS	
Digit Symbol	60.0	58.1	56.7	59.6	64.1	1.59	NS	

[a] Confidence level for contrasts p< .02 to account for familywise error

[b] believable elation -v- believable depression = a ; believable elation -v- unbelievable depression = b ; believable elation -v- unbelievable elation = c ; believable elation -v- neutral = d ; believable depression -v- unbelievable depression = e ; believable depression -v- unbelievable elation = f ; believable depression -v- neutral = g ; unbelievable depression -v- unbelievable elation = h ; unbelievable depression -v- neutral = i ; unbelievable elation -v- neutral = j

Visual analogue scales. A one-way analysis of variance of the change scores showed significant between groups effects for five scales. These were relaxed, $F(4,80) = p< .006$, irritated, $F(4,80) = 3.3$, $p< .01$, happy, $F(4,80) = 2.9$, $p< .03$, VAPS, $F(4,80) = 2.6$, $p< .05$, and VANS, $F(4.80) = 3.0$, $p< .02$ (see Table 4). Contrasts between the groups indicated the pattern of group differences varied across the different mood scales with the general picture being some differences between the elation and depression groups and also between these groups and the neutral group. However, there was no consistency within this pattern. For the relaxed scale the unbelievable depression group was significantly different from the believable elation, unbelievable elation, believable depression, and neutral groups, $t(80) = 2.41, 3.43, 3.39, 2.67$ and $p< .02, .001, .001, .009$. For the irritated scale the believable elation group was significantly different from the unbelievable depression group, $t(80) = 2.46$, $p< .02$ and the unbelievable

Table 4
Pre- to Post-Induction Visual Analogue Scale Mean Change Scores for the Five Experimental Groups

	Mood Induction Statement Valence							
Visual Analogue Scales	Believable Elation	Unbelievable Elation	Believable Depression	Unbelievable Depression	Neutral	F Ratio	p<[a]	Contrast[b]
Relaxed	0.5	8.1	7.8	-17.5	2.4	3.94	.006	behi
Anxious	4.2	7.5	-2.3	-12.2	-5.2	1.97	NS	
Irritated	-2.7	3.3	-12.2	-26.7	-22.0	3.32	.01	bhj
Calm	-0.4	8.9	2.3	-11.8	-4.6	1.13	NS	
Frustrated	3.1	0.4	-7.9	-16.2	-13.9	1.56	NS	
Despondent	0.4	0.3	-12.2	-10.1	2.6	1.32	NS	
Excited	10.7	11.5	-5.6	0.2	-0.2	1.60	NS	
Happy	5.9	1.0	-21.0	-7.1	-5.1	2.91	.03	af
VAPS	4.2	7.4	-4.1	-9.0	-1.9	2.45	.05	h
VANS	1.3	2.9	-8.7	-16.3	-9.6	3.00	.02	bh

[a] Confidence level for contrasts p< .02 to account for familywise error

[b] believable elation -v- believable depression = a ; believable elation -v- unbelievable depression = b ; believable elation -v- unbelievable elation = c ; believable elation -v- neutral = d ; believable depression -v- unbelievable depression = e ; believable depression -v- unbelievable elation = f ; believable depression -v- neutral = g ; unbelievable depression -v- unbelievable elation = h ; unbelievable depression -v- neutral = i ; unbelievable elation -v- neutral = j

elation group was significantly different from both the unbelievable depression and neutral groups, $t(80) = 3.06$, 2.58 and $p < .003$, .01 respectively. For the happy scale the believable depression group was significantly different from the believable and unbelievable elation groups, $t(80) = 3.19$, 2.61 and $p < .002$, .01 respectively. For the VAPS and the unbelievable depression group was significantly different from the unbelievable elation group, $t(80) = 2.78$ and $p < .007$. For the VANS

the unbelievable depression group was significantly different from both the believable and unbelievable elation groups, $t(80) = 2.68, 2.9$ and $p < .009, .004$ respectively.

Profile of Mood States (POMS). A one-way analysis of variance revealed significant between group differences for the depression, $F(4,80) = p < .005$, vigor, $F(4,80) = 7.4$, $p < .0001$, fatigue, $F(4,80) = 3.7$, $p < .01$, confusion, $F(4,80) = 4.1$, $p < .005$, and TMS, $F(4,80) = 5.3$, $p < .0008$ scales (see Table 5). Contrasts between the groups showed that the pattern of relationships between the groups for the individual scales was generally significant differences between the depression groups and both the elation groups and the neutral group. That is, for the depression scale the believable depression group was significantly different from the unbelievable elation and neutral groups, $t(80) = 2.83, 3.35$ and $p < .006, .001$ respectively and the unbelievable depression group was significantly different from the neutral group $t(80) = 2.62$, $p < .01$. For the vigor scale the believable and unbelievable depression groups were significantly different from the believable elation, unbelievable elation, and neutral groups, $t(80) = 3.33, 4.10, 3.06$ and $p < .001, .0001, 0.003$ and $t(80) = 3.24, 4.01, 2.97$ and $p < .002, .0001, .004$ respectively. For the fatigue scale both the believable and unbelievable depression groups were significantly different from the unbelievable elation, and neutral groups, $t(80) = 2.85, 2.79$ and $p < .006, .007$ and $t(80) = 2.43, 2.37$ and $p < .02, .02$ respectively. For the confusion scale the believable depression group was significantly different from the believable elation, unbelievable elation, and neutral groups, $t(80) = 2.73, 3.10, 2.50$ and $p < .008, .003, .01$ respectively and the unbelievable depression group was significantly different from the believable and unbelievable elation groups, $t(80) = 2.73, 3.10$ and $p < .008, .003$ respectively. For the TMS

Table 5
Pre- to Post-Induction POMS Mean Change Scores for the Five Experimental Groups

	Mood Induction Statement Valence							
POMS	Believable Elation	Unbelievable Elation	Believable Depression	Unbelievable Depression	Neutral	F Ratio	p<[a]	Contrast[b]
Tension/ anxiety	2.1	1.8	-0.4	-1.5	0.5	1.46	NS	
Depression	0.2	2.0	-6.5	-4.3	3.5	4.01	.005	fgi
Anger/ hostility	0.06	1.1	-2.5	-4.0	1.5	2.13	NS	
Vigor	0.7	2.2	-5.9	-5.7	0.2	7.44	.0001	abfghi
Fatigue	2.1	3.3	-2.3	-1.5	3.2	3.65	.009	fghi
Confusion	1.7	2.2	-2.7	-1.9	1.3	4.05	.005	abfgh
TMS	1.1	2.1	-3.4	-3.2	1.7	5.32	.0008	abfghi

[a] Confidence level for contrasts p< .02 to account for familywise error

[b] believable elation -v- believable depression = a ; believable elation -v- unbelievable depression = b ; believable elation -v- unbelievable elation = c ; believable elation -v- neutral = d ; believable depression -v- unbelievable depression = e ; believable depression -v- unbelievable elation = f ; believable depression -v- neutral = g ; unbelievable depression -v- unbelievable elation = h ; unbelievable depression -v- neutral = i ; unbelievable elation -v- neutral = j

scale the believable and unbelievable depression scales were significantly different from the believable elation, unbelievable elation, and neutral groups, $t(80) = 2.70, 3.30, 3.04$ and $p < .008, .001, .003$ and $t(80) = 2.58, 3.17, 2.92$ and $p < .01, .002, .005$ respectively.

Motor speed. There were no significant differences between the groups for the pre- to post-induction mood change scores of either the writing numbers or copying symbols tests (see Table 6).

Table 6
Pre- to Post-Induction Motor Speed Test Mean Change Scores for the Five Experimental Groups

	Mood Induction Statement Valence							
Motor Speed Tests	Believable Elation	Unbelievable Elation	Believable Depression	Unbelievable Depression	Neutral	F Ratio	p<[a]	Contrast[b]
Writing No.	3.4	3.8	2.4	3.1	4.4	.04	NS	
D/L Symbol	-1.7	-0.2	0.7	0.1	-1.4	0.55	NS	

[a] Confidence level for contrasts p< .02 to account for familywise error

[b] believable elation -v- believable depression = a ; believable elation -v- unbelievable depression = b ; believable elation -v- unbelievable elation = c ; believable elation -v- neutral = d ; believable depression -v- unbelievable depression = e ; believable depression -v- unbelievable elation = f ; believable depression -v- neutral = g ; unbelievable depression -v- unbelievable elation = h ; unbelievable depression -v- neutral = i ; unbelievable elation -v- neutral = j

3.1.3 Discussion

The results from this study failed to support the major hypothesis that the statements that had been rated as more believable would be more effective mood inducers than the statements that had been rated as less believable. The second hypothesis that all the mood induction statements would be superior mood inducers to the neutral statements was supported. The results from the believability rating of the Velten statements (see Appendix A-1) showed the high and low rating groups of statements from both the elation and depression mood induction statement sets were significantly different in terms of their believability. This significant difference between the two sets of elation statements and the two sets of depression statements respectively, confirmed the assumption that the statements believability varies for experimental subjects. These findings and their implications for cognitive learning theory and the

mood induction procedure itself will be expanded below.

It is apparent from the significant difference between the elation and depression groups' mood change on both the visual analogue scales and the POMS (see Table 4 and 5), that both the sets of elation statements generated a more elated and that both the sets of depression statements generated a more depressed self reported mood respectively. However, there was no consistent pattern of results across the different sets of elation and depression statements. The believable statements were more effective as mood inducers than the unbelievable statements for some of the mood scales and less effective for other mood scales. That is, there was a difference between the elation and depression statement sets but the different sets of elation and the different sets of depression statements themselves did not have a differential impact on mood (see Tables 4, 5, and 6).

The failure to find any significant difference between the mood changes reported by the believable and unbelievable elation and depression groups, means there is no evidence from this study to support the hypothesis that the believability of the statements influences their effectiveness as mood inducers. If statements that were expected to have a differential impact on mood are equally effective as mood inducers then it is possible that the self reported mood changes observed here are a function of some factor other than the statements' believability. Therefore, these findings are consistent with the view that experimental demand characteristics could account for the self reported mood changes that result from self referent statement mood induction procedures (Buchwald et al, 1981; Polivy et al, 1980). The obvious implication of these findings for the cognitive learning therapists is that if the self statements are not responsible for the mood changes reported in the mood induction research, this evidence can not be used in support of their assumption that cognitive processes mediate emotion.

The data is also supportive of previous findings about the procedure itself. The reliability of the self referent mood induction procedure had been questioned by a study that showed it was inconsistent as a mood inducer across individual subjects (Sutherland et al, 1982). The inconsistent findings for the effectiveness of the different statement sets in this study must be seen as further evidence for questioning the reliability of this mood induction procedure.

Also, the failure to find an effect of mood induction on psychomotor functioning as measured by the motor speed tests, would appear to support the findings of Rogers and Craighead (1982). They queried the validity of the self reported mood changes attributed to self referent statement mood inductions after failing to find a relationship between self statement valence and physiological arousal.

However, there may be an alternative explanation for the failure of the motor speed tests that could also account for the indifferent results obtained by previous researchers who used these measures of psychomotor functioning. Writing speed has been shown to differentiate depression induction subjects from controls when used as a within subject measure of change (Natale, 1977, 1978) but not when used as a between subject measure (Coleman, 1975; Frost et al, 1979; Velten, 1968). As it has been shown that the complete Velten statement sets are more effective than reduced sets (Schare & Lishman, 1984), the failure of writing speed which was used here as a within subject measure of change, to differentiate between the elation and depression induction groups may have been due to the reduced number of statements used in the present research. The previous studies that have found writing speed to be a sensitive index (Natale, 1977, 1978) used complete sets of statements. These may have produced mood changes of greater intensity and thereby effected psychomotor functioning as well as self reported

mood. Since the purpose of this study was to compare the effectiveness of subsets of statements, the reduced effectiveness of smaller statement sets could not be avoided. Hale and Strictland (1976) also failed to find a differential effect of mood induction on symbol copying. It is possible the symbol tests which are more complex tasks than writing numbers are not sufficiently sensitive to register the level of mood change associated with self referent statement mood inductions.

It can be concluded that the results from this study are consistent with the general pattern of results from those previous studies that have used a Velten style mood induction procedure. There appears to be a between groups effect for subjective (self report) mood change measures for the elation and depression induction conditions and less convincing evidence in terms of objective mood change measures (psychomotor functioning). In addition to finding a similar pattern of results to the previous studies, in this study the believability of the mood induction statements did not appear to influence their effectiveness as mood inducers.

However, on the basis of this evidence it would be premature to reject the major hypothesis supported by the cognitive learning theorists (Buchwald et al, 1981; Lazarus et al, 1982) that the believability of mood induction statements influences their effectiveness as mood inducers. It is necessary to acknowledge that the current methodology does not take account of the possibility that the believability of the statements may be totally idiosyncratic. That is, this experiment did not assess how believable each subject found the statements but tested the assumption that statements would be universally more or less believable. This may not be the case. Therefore, it was necessary to conduct a follow up experiment that assessed the believability of the statements for each individual

subject.

3.2 Experiment 2

There is no evidence from Experiment 1 to support the view that mood induction statements are intrinsically more or less believable for mood induction subjects. However, if the believability of the statements was determined by prior experience of the individual statement content or some other idiosyncratic variable, then the believability of the statements could also be idiosyncratic to each individual subject.

The current experiment was designed to test this proposition. It was hypothesized that there would be a differential mood change between the believable elation and unbelievable elation, and the believable depression and unbelievable depression mood induction groups when subject assignment to these groups was based on the each subject's own ratings of the statements' believability rather than on the statements prior believability evaluation. The previously rated statement sets were also retained for this study in order that the results could be checked against those of Experiment 1.

3.2.1 Method

Subjects

The 100 subjects were volunteers from a group of 280 first year behavioural science students at the Canberra College of Advanced Education. The subjects had not had any prior contact with the experimental materials. The subjects age ranged from 17 to 47 years with a mean age of 23 years. There were 44 males and 56 females. The students who took part in the experiment received course credit for

participating.

Design

The experimental design was the same as that used in Experiment 1.

Materials

The mood induction statements and mood measures were the same as those used in Experiment 1. However, the visual analogue scales were revised and extended. Three of the adjectives were replaced and two additional ones were added. "Despondent" was replaced with "disappointed" because some of the subjects in Experiment 1 were unfamiliar with the adjective "despondent", "anxious" and "calm" were replaced with "tense" and "lighthearted", and "discouraged" and "pleased" were added to give a better coverage of nonclinical mood states.

A seven point scale was added to measure how believable the induction statements were to each individual subject. The details of this scale are outlined below.

Procedure

The procedure and instructions were the same as those used in Experiment 1. However, after the post-induction mood assessment was completed subjects rated the believability of each of the statements they had used on a seven point rating scale. Subjects were given the following instructions to read. After subjects read them through they were also read aloud by the experimenter. The instructions were:

> Your task now is to read each statement again and to rate how believable it was for you as a mood induction statement.
>
> For example, if you thought the statement:
>
> "This is the greatest day of my life"

was extremely believable (i.e. it is believable to imagine the statement easily applying to you) then you would rate it as follows:

1	2	3	4	5	6	7
extremely believable	believable	somewhat believable	neither	somewhat unbelievable	unbelievable	extremely unbelievable

However, if you thought it was an extremely unbelievable mood statement (i.e. it is unbelievable to imagine the statement easily applying to you) then you would rate it:

1	2	3	4	5	6	7
extremely believable	believable	somewhat believable	neither	somewhat unbelievable	unbelievable	extremely unbelievable

If you really cannot decide how believable/unbelievable it was as a mood statement then you would rate it:

1	2	3	4	5	6	7
extremely believable	believable	somewhat believable	neither	somewhat unbelievable	unbelievable	extremely unbelievable

If there isn't a word that exactly represents how you would rate the statement circle the number above the word that is closest to your evaluation.

There are no right or wrong responses to these statements, but it is important you answer as truthfully and as accurately as you can.

Make sure you respond to all the statements and only circle one number for each statement.

Remember, your task is to rate how believable the statements were for you as mood induction statements not how well the statement describes your current feeling.

After completing this task the subjects were debriefed which included giving those subjects who had used depression mood statements a list of elation statements to read. Care was taken to ensure that subjects did not leave the experiment while experiencing any experimentally induced negative mood effects.

3.2.2 Results

The mean statement believability ratings were calculated for each of the statement sets and these were compared to the previous ratings (see Appendix A-1 for original ratings). The rating data indicated that the statements are not consistently believable or unbelievable across individual subjects. Therefore, subjects' own ratings were used to assign the subjects to groups that found the statements believable or unbelievable. The pre-induction and pre- to post-induction mood data were again analyzed by separate one-way analyses of variance. This was done first for groups based on the original statement sets and second for groups based on each subject's own statement believability ratings. These data are presented below.

Statement Analysis

When the original believability ratings of the statement sets (see Appendix A-1) are compared to the ratings by subjects in this experiment there are considerable differences. The believable elation and depression sets receive similar ratings by both groups of subjects. In the original evaluation subjects discriminated between the believable and unbelievable elation, and between the believable and unbelievable depression sets. However, in this experiment subjects did not distinguish between the two elation statement sets. Also, the difference in the ratings between the two depression statement sets by subjects in this experiment is reduced, with the unbelievable statement set being seen as more believable in the present study.

Subjects were then reassigned to believable and unbelievable groups according to their own statement believability ratings. All subjects who received an elation induction were rank ordered according to their mean

statement believability score. A median split was used to reassign subjects to either believable or unbelievable statement groups. The same procedure was followed for the depression groups. The average believability ratings of statements in these reassigned groups were calculated. The mean believability ratings for the believable and unbelievable elation and depression groups were then similar to the original statement ratings (see Table 7).

The mood data were analyzed first for groups based on the original statement sets and second for groups based on subjects' own statement ratings.

Table 7
Mean Believability Ratings for Mood Induction Statements by Set and Rater

	Statement Sets				
Statement Rating	Believable Elation	Unbelievable Elation	Neutral	Unbelievable Depression	Believable Depression
Original	2.9	3.9	-	4.2	3.1
Current	3.0	3.1	3.5	3.8	3.0
Reassigned	2.4	3.8	3.5	4.3	2.5

Mood Scores of Groups Based on Original Statement Sets

Pre-Induction Mood Measure

Again contrary to expectations there were some minor pre-induction mood differences between the experimental groups. These are outlined below for each of the mood measures.

Visual analogue scales. A one-way analysis of variance revealed a significant between groups effect for the happy scale, $F(4,92) = 2.59$,

$p < .04$ (see Table 8). Contrasts between the groups revealed that the neutral group was significantly less happy than the unbelievable elation group, $t(92) = 2.88$, $p < .005$. There were no significant differences between the groups for any of the other individual scales or the two combined scales VAPS and VANS.

Table 8
Experiment 2 Pre-Induction Visual Analogue Scale Mean Scores for the Five Experimental Groups Based on Original Ratings

	Mood Induction Statement Valence							
Visual Analogue Scales	Believable Elation	Unbelievable Elation	Believable Depression	Unbelievable Depression	Neutral	F Ratio	p<[a]	Contrast[b]
Pleased	54.5	59.4	53.2	59.0	46.9	1.25	NS	
Relaxed	46.3	50.4	53.4	59.1	48.3	0.72	NS	
Tense	48.5	46.7	45.9	39.9	51.0	0.43	NS	
Irritated	30.1	21.8	23.0	30.1	31.8	0.58	NS	
Lighthearted	43.2	58.8	38.5	50.8	45.1	1.77	NS	
Frustrated	33.9	31.0	34.6	31.4	39.6	0.24	NS	
Disappointed	28.9	28.6	25.7	20.9	28.7	0.32	NS	
Excited	31.2	48.2	28.5	31.8	32.2	2.14	NS	
Happy	53.7	67.7	53.9	63.3	46.1	2.59	.04	j
Discouraged	37.2	30.3	29.5	29.4	37.9	0.38	NS	
VAPS	46.0	56.9	45.5	52.8	43.7	2.18	NS	
VANS	64.3	68.3	68.3	69.6	62.2	0.40	NS	

[a] Confidence level for contrasts $p < .02$

[b] believable elation -v- believable depression = a ; believable elation -v- unbelievable depression = b ; believable elation -v- unbelievable elation = c ; believable elation -v- neutral = d ; believable depression -v- unbelievable depression = e ; believable depression -v- unbelievable elation = f ; believable depression -v- neutral = g ; unbelievable depression -v- unbelievable elation = h ; unbelievable depression -v- neutral = i ; unbelievable elation -v- neutral = j

Profile of Mood States (POMS). A one-way analysis of variance showed that there were no significant between group differences for any of the POMS scales (see Table 9).

Table 9
Experiment 2 Pre-Induction POMS Scale Mean Scores for the Five Experimental Groups Based on Original Ratings

	Mood Induction Statement Valence							
POMS	Believable Elation	Unbelievable Elation	Believable Depression	Unbelievable Depression	Neutral	F Ratio	p<[a]	Contrast[b]
Tension/ anxiety	11.3	9.2	9.4	9.1	12.8	1.14	NS	
Depression	10.1	8.3	9.1	11.6	13.5	0.72	NS	
Anger/ hostility	6.7	7.0	4.9	5.9	7.4	0.34	NS	
Vigor	12.1	15.4	12.1	14.3	13.2	0.69	NS	
Fatigue	9.6	9.7	10.1	13.9	11.4	1.16	NS	
Confusion	11.2	9.2	9.7	10.6	12.4	1.25	NS	
TMS	36.8	27.9	31.1	36.7	44.3	0.63	NS	

[a] Confidence level for contrasts p< .02

[b] believable elation -v- believable depression = a ; believable elation -v- unbelievable depression = b ; believable elation -v- unbelievable elation = c ; believable elation -v- neutral = d ; believable depression -v- unbelievable depression = e ; believable depression -v- unbelievable elation = f ; believable depression -v- neutral = g ; unbelievable depression -v- unbelievable elation = h ; unbelievable depression -v- neutral = i ; unbelievable elation -v- neutral = j

Motor speed. A one-way analysis of variance showed a significant between groups effect for the digit symbol test $F(4,92) = 3.12$, $p < .02$ (see Table 10). Contrasts between the groups showed the believable depression group to be significantly different from the believable elation, unbelievable depression and neutral group, $t(92) = 2.38, 2.43,$

3.11 and p< .02, .02, .002 respectively. There was no significant between groups effect for the writing numbers test.

Table 10
Experiment 2 Pre-Induction Motor Speed Test Mean Scores for the Five Experimental Groups Based on Original Ratings

	Mood Induction Statement Valence							
Motor Speed Tests	Believable Elation	Unbelievable Elation	Believable Depression	Unbelievable Depression	Neutral	F Ratio	p<[a]	Contrast[b]
Writing No.	52.2	54.0	52.7	51.5	54.5	0.44	NS	
Digit Symbol	65.9	62.3	59.2	66.3	67.9	3.12	.02	g

[a] Confidence level for contrasts p< .02

[b] believable elation -v- believable depression = a ; believable elation -v- unbelievable depression = b ; believable elation -v- unbelievable elation = c ; believable elation -v- neutral = d ; believable depression -v- unbelievable depression = e ; believable depression -v- unbelievable elation = f ; believable depression -v- neutral = g ; unbelievable depression -v- unbelievable elation = h ; unbelievable depression -v- neutral = i ; unbelievable elation -v- neutral = j

Pre- to Post-Induction Mood Change

Mood change scores were calculated in the same way as in Experiment 1. The results are similar to those obtained in Experiment 1. There were substantial differences between the elation groups and the depression and neutral groups. There were no differences between the believable and unbelievable elation groups nor between the believable and unbelievable depression groups. These results are detailed below for each of the mood measures.

Visual analogue scales. A one-way analysis of variance revealed a significant between groups effect for six individual scales and the two combined scales. These were pleased, relaxed, disappointed, excited, happy, discouraged, VAPS and VANS scales, $F(4,92) = 5.45, 3.75, 2.75,$

3.67, 5.78, 3.53, 3.86, 6.92 and $p < .0006$, .007, .03, .008, .0003, .01, .006, .0001 respectively (see Table 11). Contrasts between the groups showed the believable and unbelievable elation groups were significantly different from the believable and unbelievable depression groups on the relaxed scale, $t(92) = 3.03$, 3.13 and $p < .003$, .002 and $t(92) = 3.45$, 3.54 and $p < .001$, .001 respectively, and the happy scale, $t(92) = 3.19$, 3.76 and $p < .002$, .001 and $t(92) = 2.98$, 3.55 and $p < .004$, .001 respectively. The unbelievable elation group was significantly different from the believable and unbelievable depression groups on the discouraged scale, $t(92) = 3.14$, 2.9 and $p < .002$, .005 respectively, and the disappointed scale, $t(92) = 2.37$, 2.73 and $p < .02$, .008 respectively, and the unbelievable depression and neutral group on the relaxed scale, $t(92) = 2.92$, 3.28 and $p < .004$, .001 respectively. The believable elation group was significantly different from the believable and unbelievable depression groups and the neutral group on the excited scale, $t(92) = 3.31$, 3.19, 2.7 and $p < .001$, .002, .008 respectively. All of the differences were in the hypothesized direction. For the VAPS the believable and unbelievable elation groups were significantly different from the believable and unbelievable depression groups and the neutral group, $t(92) = 2.86$, 3.88, 2.6 and $p < .005$, .001, .01 and $t(92) = 3.03$, 4.04, 2.78 and $p < .003$, .001, .007 respectively. For the VANS the unbelievable elation group was significantly different from the believable and unbelievable depression and the neutral group, $t(92) = 3.01$, 3.04, 2.36 and $p < .003$, .003, .02 respectively.

Profile of Mood States (POMS). A one-way analysis of variance revealed the change scores were significantly different for four of the scales. These were depression, vigor, fatigue, and TMS, $F(4,92) = 4.2$, 7.89, 2.75, 4.93 and $p < .004$, .0001, .04, .001 respectively (see Table 12). Contrasts between the groups indicated the elation groups and

Table 11
Experiment 2 Pre-to Post Induction Visual Analogue Scale Mean Change Scores for the Five Experimental Groups Based on Original Ratings

	Mood Induction Statement Valence							
Visual Analogue Scales	Believable Elation	Unbelievable Elation	Believable Depression	Unbelievable Depression	Neutral	F Ratio	p<[a]	Contrast[b]
Pleased	7.2	10.4	-16.3	-17.7	-3.5	5.45	.0006	abfh
Relaxed	6.3	13.2	-2.1	-8.1	-10.1	3.75	.007	hj
Tense	8.9	15.2	4.5	-2.0	0.1	1.45	NS	
Irritated	-0.1	6.7	-12.3	-8.7	-9.4	1.48	NS	
Lighthearted	3.1	5.8	3.7	-12.8	-11.6	2.07	NS	
Frustrated	9.2	8.0	-5.8	-8.1	-1.9	1.41	NS	
Disappointed	4.1	8.7	-11.9	-16.1	-6.3	2.75	.03	h
Excited	23.3	6.6	-4.8	-4.4	0.4	3.67	.008	abd
Happy	9.0	7.8	-13.4	-18.1	-1.8	5.78	.0003	abfh
Discouraged	6.8	15.3	-13.8	-12.8	-2.0	3.53	.01	fh
VAPS	7.7	8.8	-6.6	-12.2	-5.3	6.58	.0001	abdfhj
VANS	5.8	10.8	-7.9	-8.6	-3.9	3.76	.007	fhj

[a] Confidence level for contrasts p< .02 to account for familywise error

[b] believable elation -v- believable depression = a ; believable elation -v- unbelievable depression = b ; believable elation -v- unbelievable elation = c ; believable elation -v- neutral = d ; believable depression -v- unbelievable depression = e ; believable depression -v- unbelievable elation = f ; believable depression -v- neutral = g ; unbelievable depression -v- unbelievable elation = h ; unbelievable depression -v- neutral = i ; unbelievable elation -v- neutral = j

particularly the unbelievable elation group tended to be more elated than the depression and neutral groups. For the depression scale the unbelievable depression group was significantly different from the believable and unbelievable elation and neutral groups, $\underline{t}(92) = 2.38$, 3.41, 2.66 and $p < .02$, .001, .009 respectively and the believable

depression was significantly different from the unbelievable elation group, $t(92) = 2.87$, $p < .005$. For the vigor scale the believable and unbelievable elation groups were significant different from the believable and unbelievable depression and the neutral groups, $t(92) = 4.22, 4.19, 2.92$ and $p < .001, .001, .004$ and $t(92) = 3.6, 3.59, 2.32$ and $p < .001, .001, .02$ respectively. For the fatigue scale the unbelievable elation group was significantly different from the believable and unbelievable depression groups, $t(92) = 2.92, 2.76$ and $p < .004, .007$ respectively. For the TMS scale the believable elation group was significantly different from the unbelievable depression group, $t(92) = 2.84$, $p < .006$ and the unbelievable elation group was significantly different from the believable and unbelievable depression and neutral groups, $t(92) = 3.12, 3.92, 2.39$ and $p < .002, .001, .02$ respectively.

Motor speed. A one-way analysis of variance showed a significant between groups difference for the change score of the symbol tests, $F(4,91) = 3.99$, $p < .005$ (see Table 13). Contrasts showed the unbelievable depression group to be significantly different from the believable elation, unbelievable elation, believable depression, and neutral groups, $t(92) = 2.81, 3.18, 3.69, 2.64$ and $p < .006, .002, .001, .01$ respectively. There was no between groups effect for the writing numbers test.

Mood Scores of Groups Based on Subjects Own Believability Ratings

Pre-Induction Mood Measure

Again there were some minor pre-induction mood differences between the experimental groups. These are outlined below for each of the mood measures.

Visual analogue scales. A one-way analysis of variance revealed a

Table 12
Experiment 2 Pre-to Post-Induction POMS Scale Mean Change Scores for the Five Experimental Groups Based on Original Ratings

	Mood Induction Statement Valence							
POMS	Believable Elation	Unbelievable Elation	Believable Depression	Unbelievable Depression	Neutral	F Ratio	p<[a]	Contrast[b]
Tension/ anxiety	1.3	4.3	1.0	-0.9	0.6	2.14	NS	
Depression	1.2	3.9	-3.4	-4.9	1.9	4.21	.004	fhi
Anger/ hostility	0.2	2.3	0.9	-3.2	-1.0	2.17	NS	
Vigor	4.3	3.1	-4.2	-4.4	-1.6	7.89	.0001	abdfhj
Fatigue	0.4	3.4	-1.7	-1.6	-0.4	2.75	.03	fh
Confusion	2.1	1.9	-0.1	0.2	-0.5	2.07	NS	
TMS	9.3	18.9	-7.5	-14.8	-1.1	4.93	.001	bfh

[a] Confidence level for contrasts p< .02 to account for familywise error

[b] believable elation -v- believable depression = a ; believable elation -v- unbelievable depression = b ; believable elation -v- unbelievable elation = c ; believable elation -v- neutral = d ; believable depression -v- unbelievable depression = e ; believable depression -v- unbelievable elation = f ; believable depression -v- neutral = g ; unbelievable depression -v- unbelievable elation = h ; unbelievable depression -v- neutral = i ; unbelievable elation -v- neutral = j

significant between groups effect for the happy scale, $F(4,92) = 2.77$, $p < .03$ (see Table 14). Contrasts between the groups revealed that the believable elation and unbelievable depression groups were significantly different from the neutral group, $t(92) = 2.53$, 2.7 and $p < .01$, .008 respectively.

Profile of Mood States (POMS). A one-way analysis of variance showed a significant main effect for the tension scale, $F(4,92) = 2.72$, $p < .03$ (see Table 15). Contrasts revealed the unbelievable depression group was significantly different from the believable depression and neutral groups, $t(92) = 2.57$, 2.99 and $p < .01$, .004 respectively.

Motor speed. A one-way analysis of variance showed there were no significant main effects for the writing numbers or digit symbol tests (see Table 16).

Table 13
Experiment 2 Pre-to Post-Induction Motor Speed Test Mean Change Scores for the Five Experimental Groups Based on Original Ratings

	Mood Induction Statement Valence							
Motor Speed Tests	Believable Elation	Unbelievable Elation	Believable Depression	Unbelievable Depression	Neutral	F Ratio	p<[a]	Contrast[b]
Writing No.	3.2	5.1	1.3	3.2	2.2	1.08	NS	
Digit Symbol	-4.0	-3.4	-2.7	-8.3	-4.3	3.99	.005	behi

[a] Confidence level for contrasts p< .02 to account for familywise error

[b] believable elation -v- believable depression = a ; believable elation -v- unbelievable depression = b ; believable elation -v- unbelievable elation = c ; believable elation -v- neutral = d ; believable depression -v- unbelievable depression = e ; believable depression -v- unbelievable elation = f ; believable depression -v- neutral = g ; unbelievable depression -v- unbelievable elation = h ; unbelievable depression -v- neutral = i ; unbelievable elation -v- neutral = j

Table 14
Experiment 2 Pre-Induction Visual Analogue Scale Mean Scores for the Five Experimental Groups Based on Subjects Ratings

	Mood Induction Statement Valence							
Visual Analogue Scales	Believable Elation	Unbelievable Elation	Believable Depression	Unbelievable Depression	Neutral	F Ratio	p<[a]	Contrast[b]
Pleased	57.7	56.1	53.2	58.6	46.9	1.09	NS	
Relaxed	45.2	51.5	53.3	58.9	48.3	0.81	NS	
Tense	51.1	44.2	50.9	35.1	51.0	1.29	NS	
Irritated	24.3	27.6	30.7	21.9	31.8	0.47	NS	
Lighthearted	52.9	49.0	40.9	47.8	45.1	0.55	NS	
Frustrated	26.9	38.0	44.8	21.3	39.6	2.06	NS	
Disappointed	28.7	28.8	29.9	17.0	28.7	0.84	NS	
Excited	42.2	37.2	35.1	24.9	32.2	1.36	NS	
Happy	65.0	56.3	50.4	66.3	46.1	2.77	.03	di
Discouraged	27.9	39.6	40.7	18.2	37.9	2.06	NS	
VAPS	52.6	50.1	46.6	51.3	43.7	0.89	NS	
VANS	68.2	64.4	60.6	77.3	62.2	1.90	NS	

[a] Confidence level for contrasts p< .02 to account for familywise error

[b] believable elation -v- believable depression = a ; believable elation -v- unbelievable depression = b ; believable elation -v- unbelievable elation = c ; believable elation -v- neutral = d ; believable depression -v- unbelievable depression = e ; believable depression -v- unbelievable elation = f ; believable depression -v- neutral = g ; unbelievable depression -v- unbelievable elation = h ; unbelievable depression -v- neutral = i ; unbelievable elation -v- neutral = j

Table 15
Experiment 2 Pre-Induction POMS Scale Mean Scores for the Five Experimental Groups Based on Subjects Own Ratings

	Mood Induction Statement Valence							
POMS	Believable Elation	Unbelievable Elation	Believable Depression	Unbelievable Depression	Neutral	F Ratio	p<[a]	Contrast[b]
Tension/ anxiety	11.0	9.6	12.0	6.5	12.8	2.72	.03	ei
Depression	9.3	9.1	13.6	6.9	13.5	1.47	NS	
Anger/ hostility	6.2	7.5	6.4	4.4	7.4	0.52	NS	
Vigor	14.1	13.3	11.7	14.6	13.2	0.39	NS	
Fatigue	10.1	9.2	12.1	11.7	11.4	0.54	NS	
Confusion	9.9	10.5	11.5	8.7	12.4	1.58	NS	
TMS	32.4	32.5	43.8	23.6	44.3	1.24	NS	

[a] Confidence level for contrasts p< .02 to account for familywise error

[b] believable elation -v- believable depression = a ; believable elation -v- unbelievable depression = b ; believable elation -v- unbelievable elation = c ; believable elation -v- neutral = d ; believable depression -v- unbelievable depression = e ; believable depression -v- unbelievable elation = f ; believable depression -v- neutral = g ; unbelievable depression -v- unbelievable elation = h ; unbelievable depression -v- neutral = i ; unbelievable elation -v- neutral = j

Table 16
Experiment 2 Pre-Induction Motor Speed Test Mean Scores for the Five Experimental Groups Based on Subjects Own Ratings

	Mood Induction Statement Valence							
Motor Speed Tests	Believable Elation	Unbelievable Elation	Believable Depression	Unbelievable Depression	Neutral	F Ratio	p<[a]	Contrast[b]
Writing No.	52.4	53.6	52.1	52.2	54.5	0.32	NS	
Digit Symbol	65.4	62.9	62.8	62.1	67.9	1.35	NS	

[a] Confidence level for contrasts p< .02 to account for familywise error

[b] believable elation -v- believable depression = a ; believable elation -v- unbelievable depression = b ; believable elation -v- unbelievable elation = c ; believable elation -v- neutral = d ; believable depression -v- unbelievable depression = e ; believable depression -v- unbelievable elation = f ; believable depression -v- neutral = g ; unbelievable depression -v- unbelievable elation = h ; unbelievable depression -v- neutral = i ; unbelievable elation -v- neutral = j

Pre- to Post-Induction Mood Change

Mood change scores were calculated in the same way as in Experiment 1. The believable elation group's mood change was consistently greater than the unbelievable elation group and significantly different to both the believable and unbelievable depression groups and the neutral group. The unbelievable depression group tended to be a more effective mood inducer than the believable depression group. The difference between the depression groups and the neutral group while in the hypothesized direction, tended not to reach significance. These results are detailed below for each of the mood measures.

Visual analogue scales. A one-way analysis of variance revealed a significant between groups effect for six individual scales and the two combined scales. These were the pleased, relaxed, disappointed, excited,

happy, discouraged, VAPS and VANS scales, $F(4,92) = 6.11, 4.72, 2.85, 2.96, 5.96, 3.46, 6.82, 4.01$ and $p < .0002, .002, .03, .02, .0003, .01, .0001, .005$ respectively (see Table 17). Contrasts between the groups showed for the pleased scale the believable elation group was significantly different from the believable and unbelievable depression and neutral groups, $t(92) = 4.19, 3.97, 2.37$ and $p < .001, .001, .02$ respectively and the unbelievable elation group was significantly different from the believable and unbelievable depression groups, $t(92) = 2.68, 2.46$ and $p < .009, .02$ respectively. For the relaxed scale the believable elation group was significantly different from the believable and unbelievable depression and neutral groups, $t(92) = 3.09, 3.3, 3.97$ and $p < .003, .001, .001$ respectively. For the disappointed scale the believable elation group was significantly different from the believable and unbelievable depression groups, $t(92) = 2.85, 2.61$ and $p < .005, .01$ respectively. For the excited scale the believable depression group was significantly different from the believable and unbelievable elation groups, $t(92) = 2.85, 2.75$ and $p < .005, .007$ respectively. For the happy scale the believable depression group was significantly different from the believable and unbelievable elation groups, $t(92) = 3.27, 2.68$ and $p < .002, .009$ respectively and the unbelievable depression group was significantly different from the believable and unbelievable elation and neutral groups, $t(92) = 4.07, 3.49, 2.35$ and $p < .001, .001, .02$ respectively. For the discouraged scale the unbelievable elation group was significantly different from the believable and unbelievable depression groups, $t(92) = 2.97, 2.94$ and $p < .004, .004$ respectively. For the VAPS the believable elation group was significantly different from the believable and unbelievable depression and neutral groups, $t(92) = 4.08, 4.2, 3.41$ and $p < .001, .001, .001$ respectively and the unbelievable elation group was significantly different from the

believable and unbelievable depression groups, $t(92) = 2.71$, 2.84 and $p <$ .008, .006 respectively. For the VANS the believable elation group was significantly different from the believable and unbelievable depression and neutral groups, $t(92) =$ 2.87, 3.47, 2.51 and $p(92) = .005$, .001, .01 respectively and the unbelievable elation group was significantly different from the unbelievable depression group, $t(92) = 2.38$, .02.

Table 17
Experiment 2 Pre-to Post Induction Visual Analogue Scale Mean Change Scores for the Five Experimental Groups Based on Subjects Own Ratings

	Mood Induction Statement Valence							
Visual Analogue Scales	Believable Elation	Unbelievable Elation	Believable Depression	Unbelievable Depression	Neutral	F Ratio	p(a	Contrast[b]
Pleased	14.7	2.9	-17.8	-16.1	-3.5	6.11	.0002	abdfh
Relaxed	17.6	1.9	-4.2	-5.7	-10.1	4.72	.002	abd
Tense	19.7	4.4	5.0	-2.2	0.1	2.26	NS	
Irritated	9.3	-2.7	-9.0	-12.3	-9.4	1.78	NS	
Lighthearted	1.1	7.8	-0.5	-7.8	-11.6	1.47	NS	
Frustrated	11.4	5.7	0.3	-14.3	-1.9	2.14	NS	
Disappointed	10.4	2.4	-14.7	-12.9	-6.3	2.85	.03	ab
Excited	15.4	14.5	-9.4	0.2	0.4	2.96	.03	af
Happy	10.7	6.3	-12.7	-18.5	-1.8	5.96	.0003	abfhi
Discouraged	7.4	14.7	-13.3	-13.4	-2.0	3.46	.01	fh
VAPS	11.9	4.7	-8.9	-9.6	-5.3	6.82	.0001	abdfh
VANS	11.6	4.9	-6.3	-10.1	-3.9	4.01	.005	abh

[a] Confidence level for contrasts $p < .02$ to account for familywise error

[b] believable elation -v- believable depression = a ; believable elation -v- unbelievable depression = b ; believable elation -v- unbelievable elation = c ; believable elation -v- neutral = d ; believable depression -v- unbelievable depression = e ; believable depression -v- unbelievable elation = f ; believable depression -v- neutral = g ; unbelievable depression -v- unbelievable elation = h ; unbelievable depression -v- neutral = i ; unbelievable elation -v- neutral = j

Profile of Mood States (POMS). A one-way analysis of variance revealed the change scores were significantly different for four of the scales. These were depression, vigor, fatigue, and TMS, $F(4,92) = 4.98$, 8.51, 2.69, 6.08 and $p < .001$, .0001, .04, .0002 respectively (see Table 18). Contrasts between the groups indicated that for the depression scale the believable elation group was significantly different from the believable and unbelievable depression groups, $t(92) = 3.32$, 3.91 and $p < .001$, .001 respectively and the unbelievable depression group was significantly different from the neutral group, $t(92) = 2.69$, $p < .008$. For the vigor scale the believable elation group was significantly different from the believable and unbelievable depression and neutral groups, $t(92) = 4.68$, 4.65, 3.39 and $p < .001$, .001 respectively and the unbelievable elation group was significantly different from the believable and unbelievable depression groups, $t(92) = 3.27$, 3.24 and $p < .002$, .002 respectively. For the fatigue scale the believable elation group was significantly different from the believable and unbelievable depression groups, $t(92) = 2.97$, 2.57 and $p < .004$, .01 respectively. For the TMS scale the believable elation was significantly different from the believable and unbelievable depression, the unbelievable elation, and the neutral groups, $t(92) = 3.77$, 4.56, 2.31, 3.02 and $p < .001$, .001, .02, .003 respectively and the unbelievable depression group was significantly different from the neutral group, $t(92) = 2.3$, .02.

Motor speed. A one-way analysis of variance showed a significant between groups difference for the change score of the writing speed test, $F(4,92) = 2.45$, $p < .05$ (see Table 19). Contrasts showed the believable elation group was significantly different from the believable depression and unbelievable elation groups, $t(92) = 2.86$, 2.31 and $p < .005$, .02 respectively. There was no between groups effect for the change scores of symbols tests.

Table 18
Experiment 2 Pre-to Post-Induction POMS Scale Mean Change Scores for the Five Experimental Groups Based on Subjects Own Ratings

	Mood Induction Statement Valence							
POMS	Believable Elation	Unbelievable Elation	Believable Depression	Unbelievable Depression	Neutral	F Ratio	p<[a]	Contrast[b]
Tension/ anxiety	4.4	1.2	1.1	-0.9	0.6	2.28	NS	
Depression	5.0	-3.4	-4.8	0.1	1.9	4.98	.001	abi
Anger/ hostility	2.6	-0.2	0.8	-2.9	-1.0	2.26	NS	
Vigor	5.2	-4.3	-4.3	2.3	-1.6	8.51	.0001	abdfh
Fatigue	3.3	0.5	-2.0	-1.3	-0.4	2.67	.04	ab
Confusion	3.2	0.9	0.1	0.1	-0.5	3.18	.02	abd
TMS	23.7	4.7	-7.7	-14.2	-1.1	6.08	.0002	abcdh

[a] Confidence level for contrasts p< .02 to account for familywise error

[b] believable elation -v- believable depression = a ; believable elation -v- unbelievable depression = b ; believable elation -v- unbelievable elation = c ; believable elation -v- neutral = d ; believable depression -v- unbelievable depression = e ; believable depression -v- unbelievable elation = f ; believable depression -v- neutral = g ; unbelievable depression -v- unbelievable elation = h ; unbelievable depression -v- neutral = i ; unbelievable elation -v- neutral = j

Table 19
Experiment 2 Pre-to Post-Induction Motor Speed Test Mean Change Scores for the Five Experimental Groups Based on Subjects Own Ratings

	Mood Induction Statement Valence							
Motor Speed Tests	Believable Elation	Unbelievable Elation	Believable Depression	Unbelievable Depression	Neutral	F Ratio	p<[a]	Contrast[b]
Writing No.	6.3	2.0	0.8	3.5	2.2	2.45	.05	ac
Digit Symbol	-3.1	-4.3	-4.7	-5.8	-4.3	0.73	NS	

[a] Confidence level for contrasts p< .02 to account for familywise error

[b] believable elation -v- believable depression = a ; believable elation -v- unbelievable depression = b ; believable elation -v- unbelievable elation = c ; believable elation -v- neutral = d ; believable depression -v- unbelievable depression = e ; believable depression -v- unbelievable elation = f ; believable depression -v- neutral = g ; unbelievable depression -v- unbelievable elation = h ; unbelievable depression -v- neutral = i ; unbelievable elation -v- neutral = j

3.2.3 Discussion

The results of this experiment suggest that mood states can be manipulated by cognitive means and that the results obtained from self referent mood induction procedures can not be totally attributed to experimental demand characteristics. Specifically, the present investigation begins to demonstrate the relationship predicted by cognitive learning theorists between the believability of the mood induction stimuli and mood change (Buchwald et al, 1981; Lazarus et al, 1982). Elation subjects who rated the mood induction statements as more highly believable consistently reported a greater positive mood change than both the elation subjects who found the statements less believable and the control subjects. These results were found for both the subjective self report mood measures and the more sensitive of the

objective measures of psychomotor functioning.

The major inconsistency in the results was the opposite finding for the depression induction groups. Again the level of statement believability tended to distinguish between the groups in terms of mood change. However, the less believable depression group consistently reported greater negative mood changes than the more believable group. There would appear to be two possible explanations for this result. It is possible there was a problem with how subjects interpreted the statement rating task. They may have tended to equate unbelievable with most negative and, therefore, rated the most effective depression statements as unbelievable. On the other hand if subjects' believability ratings accurately represent the depression statements then one would have to consider the possibility that positive and negative emotions are mediated by different cognitive processes. This possibility has received recent support by research which claims to demonstrate the relative independence of positive and negative affect (Diener & Emmons, 1985). These authors do not offer an explanation of how these independent mood states are mediated. They suggest it is necessary for researchers to focus on the processes that underlie both positive and negative affect in order that these findings of independence may be understood. If positive and negative affect are independent it is possible that they are mediated by different processes. The following studies will examine more closely the specific kinds of cognitive processes associated with both positive and negative affect which will enable this issue to be pursued.

In spite of this inconsistency in the data it seemed that by using the Velten mood induction approach it had been possible to show that the believability of the self referent statements was important to subjects' emotional responses. Furthermore, the results make it clear that the

believability of these stimuli are subject specific. Statements are not generally more or less believable but are more or less believable to each individual subject and their degree of believability determined their effectiveness as mood inducers. It is clear that it does not matter which statements are used as mood induction stimuli as long as the subject finds them believable.

The results from this experiment also demonstrate that this mood induction procedure does not produce discrete mood states. A range of positive and negative emotions were manipulated by the elation and depression induction procedures. These findings are consistent with a growing body of opinion which suggests moods tend to occur in clusters rather than as discrete states (Boyle, 1985; Polivy, 1981).

It can be concluded that the Velten mood induction strategy does demonstrate in a general way the involvement of cognitive processes in mediating emotion. The findings obtained in these studies cannot be adequately explained by experimental demand characteristics nor can the validity of the induced moods be dismissed. The demonstration by this study that the individual subject's perception of the mood induction stimuli characterize their emotional responses is compelling evidence of the importance of cognitive mediation.

CHAPTER 4

SPECIFIC COGNITIVE PROCESSES AS MEDIATORS OF EMOTION

The evidence from Experiment 2 supports the general view (Izard et al, 1984) that cognitions are a sufficient condition for generating an emotional response. Furthermore, it strengthens the view that the most basic assumption of the cognitive learning therapies, that cognitions can mediate emotions, is given general support by the findings from the self statement mood induction research. Specifically the current research demonstrated that what subjects believed about the mood induction stimuli made a substantial contribution to determining the nature of their emotional response. That is, how believable individual subjects found the mood induction statements characterized their effectiveness as mood inducers. However, the precise nature of what the concept of believability represents has so far not been addressed. It is the purpose of the current chapter to pursue the question of which specific cognitive processes may be expected to contribute to the generation of subjects beliefs about such stimulus events.

4.1 The Concept of Belief

So far in the literature the term "belief" has defied an unambiguous definition and this is unlikely to change. For instance, it will be argued here that the term has been used to describe two quite separate notions. First, belief has been used to describe what could be called a person's symbolic representation of reality. That is, what is accepted as true or false and what is, therefore, known as real (Rachlin, 1977). Second, belief has been used to describe what could be called a person's symbolic representation of information about that reality. That is, a person's opinions, expectations and values that are

used to interpret their symbolic representation of reality (Ellis, 1977; Mahoney, 1977c).

Various writers have referred to this kind of distinction and have used different labels to differentiate these two processes. Abelson (1963) spoke of "cold" cognition and "hot" cognition, whereas Lazarus (1982) refers to the distinction between "knowing" and "appraising". Wessler (1982) acknowledged Abelson's contribution but preferred the terms "nonevaluative" and "evaluative" cognition. For the purposes of this discussion from now on the terms "nonevaluative belief" and "evaluative belief" will be used when referring to this distinction. For example, the belief "that object is a snake" is a nonevaluative belief while "snakes are dangerous ... I don't like snakes ... snakes make my skin crawl" are examples of evaluative beliefs.

4.2 Cognitive Processes and Belief

The cognitions listed in Chapter 2 (thoughts, attitudes, belief systems, expectations, and assumptions) as the ones cognitive learning therapists have identified as being central to emotional responding are primarily examples of a person's symbolic representation of information about their reality. As such they represent evaluative beliefs.

In his seminal work on cognitive learning theory Mahoney (1974) discussed a more comprehensive range of cognitive processes that were seen as making important contributions to the construction of reality. The processes specified by Mahoney could clearly be identified as being representative of both nonevaluative and evaluative beliefs. Although cognitive learning theory encompasses both adaptive and maladaptive mediation the examples used by Mahoney concentrated on the more clinically relevant dysfunctional mediation. Each of the different kinds of process identified by Mahoney (1974) will be summarized below.

The first kind of cognitive processes discussed by Mahoney are essential mechanisms for establishing nonevaluative beliefs. Because of its physiological limitations as an information processor, the human organism receives far more sensory input than can be the subject of its focused attention. Therefore, it engages in a selection process to determine which sensory input is attended to. The basis of this selection is the level of innate or acquired adaptive importance of the stimuli. These selection processes can result in an inaccurate construction of reality if the organism fails to attend to performance-relevant stimuli, attends to stimuli that are irrelevant or detrimental to performance, or inaccurately labels the stimuli that are attended to.

The second kind of cognitive activity identified by Mahoney principally relate to the mechanisms by which evaluative beliefs influence responding. Having attended to a stimulus and encoded it the organism may engage in extensive processing of the stimulus. The possibility of mediational dysfunction is extended to these transformations. Stimuli may be incorrectly classified such that subsequent interpretation of their significance is inaccurate. They may be compared to prior experience or internal standards which may result in an unrealistic evaluation. The capacity of an organism to adaptively process attended to stimuli is also affected by memory capacity. Deficient or inadequate storage of information concerning a stimulus and its context, response options, and possible consequences can be responsible for maladaptive mediation. Humans also frequently draw conclusions that are inferred from rather than demonstrated by the raw data. They anticipate outcomes and consequences, and generate assumptions about alleged regularities in the world that guide responding. To the extent that these processes reflect real-world relationships they serve an adaptive function. However, when the

perception of reality and reality itself are discrepant these mediational processes become dysfunctional.

Mahoney goes on to identify two further kinds of processes that are of less direct relevance to the current work. The first of these is what Mahoney calls "response repertoire features". At first reading this label has a distinct behavioural rather than cognitive connotation. However, the proposition is that responses are based on generalized strategies and that even if the selection and processing of stimuli is adequate, maladjustment can result if appropriate response strategies are not available. The second is the impact of experiential feedback. That is, the consequences of stimulus-response combinations provide a source of information that influences the manner in which sensory input is subsequently attended to, evaluated, and responded to both behaviourally and emotionally.

4.3 The Relationship Between Cognitive Processes and Emotional Response

These four classes of cognitive activity represent fundamental processes and mechanisms that select, transform, and interpret raw sensory input prior to response generation. Cognitive learning therapists maintain that the cognitive mediational theory of human responding includes emotional responses. The processes reviewed here should be considered to be a comprehensive but not exhaustive representation of the interaction of cognitions and emotions. It is entirely reasonable to assume that there would be variables which have not been specified in this analysis which could conceivably have an impact on emotional responses. For example, emotions are generated in response to internal events as well as raw sensory input. It is intended here to merely acknowledge that events stored in memory can precipitate

emotional responses and to assert that a more detailed discussion of those mechanisms is beyond the scope of the current work. Furthermore, it must be remembered that cognitive theorists acknowledge that a human's current emotional state can also influence the way in which stimuli are selected and processed. Notwithstanding this, it is suggested that the relationships discussed above are representative of the kind of events that determine the nature of emotional responses. These relationships are illustrated by the diagrammatic representation provided in Figure 1. This shows the sensory input or internal event being subject to a selection process which results in a constructed reality (nonevaluative belief) being generated. It is the interaction of this nonevaluative belief with associated evaluative beliefs that controls the emotional response.

4.4 The Current Research Problem

The current work will focus on the hypothesized relationships illustrated in Figure 1 at the level of nonevaluative and evaluative beliefs and will address two primary questions. As foreshadowed in the introductory chapters, the first question to be addressed is whether or not nonevaluative and evaluative beliefs are related in a causal way to emotional responses. The second question to be addressed, assuming a causal relationship is established between nonevaluative and evaluative beliefs and emotional responses, is whether or not this relationship constitutes merely a sufficient, or both a sufficient and necessary condition for emotions. These questions will be pursued sequentially in the subsequent chapters. The next series of studies empirically investigates the hypothesized meditational role of nonevaluative and evaluative beliefs for emotion.

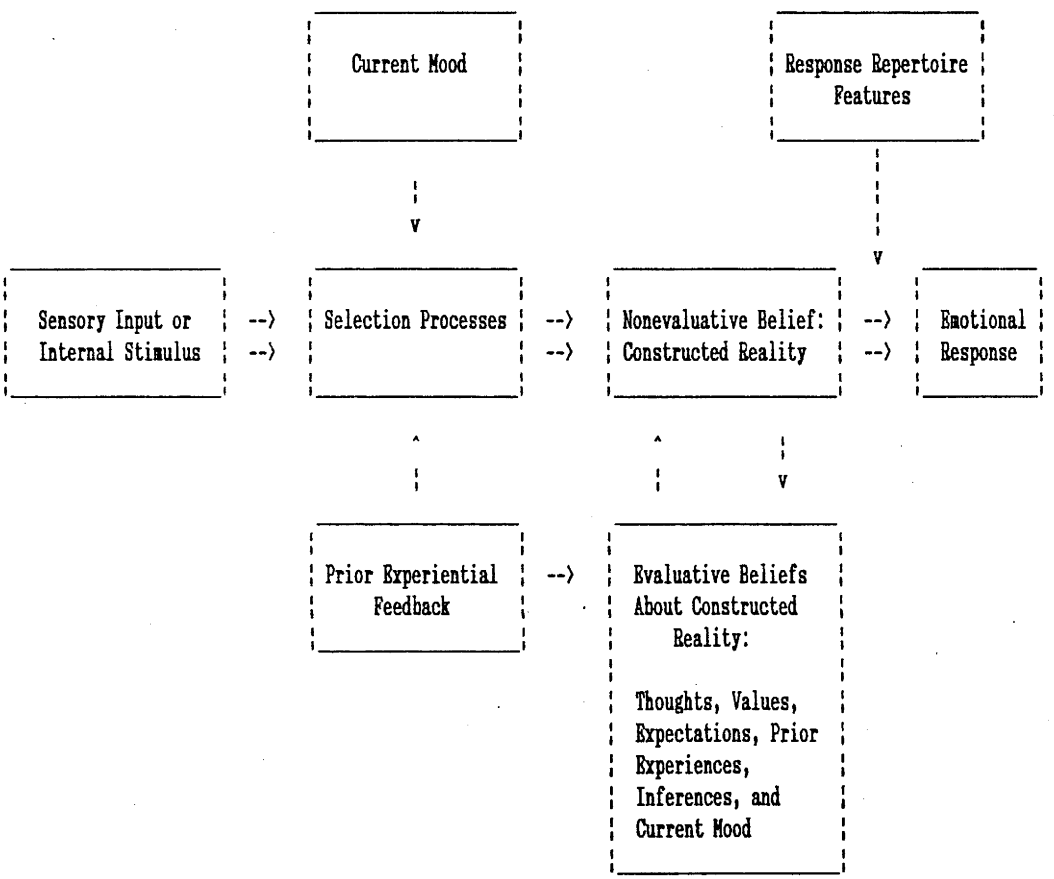

Figure 1. Diagrammatic representation of the hypothesized relationship between fundamental cognitive processes, nonevaluative and evaluative beliefs, and emotional responses.

4.5 The Experimental Paradigm

The mood induction procedure used in Experiments 1 and 2 is not a suitable paradigm for the investigation of the mediational role of beliefs for emotion. In the previous experiments the experimental procedure required subjects to act "as if" a stimulus situation existed. It was shown that under these conditions the believability of the stimuli varied considerably across individual subjects. Also it is well established that mood induction research is sensitive to experimental demand characteristics (Buchwald et al, 1981; Polivy & Doyle, 1980). To remove these potential sources of experimental error it is necessary to adopt an experimental approach where the mood induction stimuli were actual rather than "as if" experiences and where the subjects are not aware of the experimenter's intentions. Furthermore, the considerable range of statement content in the previous paradigm makes it impractical to assess subjects' nonevaluative and evaluative beliefs about the experimental stimuli. In order for the impact of nonevaluative and evaluative beliefs on emotional responding to be assessed the experimental approach has to also allow for these cognitive variables to be systematically controlled or monitored. The possibility of achieving this objective would be substantially improved if the experimental stimulus was restricted to a single event.

The finding of a suitable experimental paradigm to investigate the issue of effect of belief on emotion was the first problem that had to be addressed by this research. There was only one strategy reported in the literature that appeared to have the potential to meet the criteria required. In a study investigating affect and the accessibility of material in memory, success and failure at a computer game was used as an actual experience for generating positive and negative moods (Isen, Shalker, Clark, & Karp 1978). Subjects' perceptions of success and

failure were manipulated by false feedback in order to generate the positive and negative moods respectively. Unfortunately, these experimenters did not actually measure mood but merely assumed that their manipulations of feedback generated the hypothesized mood states. However, false feedback has been used successfully as an experimental paradigm for generating negative mood in studies investigating the learned helplessness model of depression (Abramson, Seligman & Teasdale, 1978). Therefore, while the efficacy of computer games and false feedback as an experimental approach for inducing mood had not been clearly demonstrated there is sufficient evidence available to warrant optimism about the use of this as an experimental procedure.

Therefore, the strategy adopted was to have subjects play a computer game and to exercise control over their perception of their scores on the game by providing false feedback. In this way subjects' nonevaluative beliefs about success and failure at the task would be under experimental control. Subjects' evaluative beliefs about success and failure at the computer game could also be monitored. It was thought that these would be reflected by their value and expectation of success at computer games and that measures of these variables could be used to differentiate subjects' level of evaluative belief. The use of this procedure to investigate the hypothesized relationship between cognitive processes and emotional response, presented diagrammatically in Figure 1, will be described in the following experiment.

CHAPTER 5

EXPERIMENT 3: NONEVALUATIVE AND EVALUATIVE BELIEFS AS MEDIATORS OF EMOTION

Cognitive learning therapy is characterized by the mediational role assigned to cognitions in the generation of emotional and behavioural responses (Mahoney, 1974; Mahoney & Arnkoff, 1978). The empirical evidence available to support this assertion demonstrates an association between cognitively based activities and emotional responses (Cohen & Lazarus, 1973; Coyne & Lazarus, 1983; Hale & Strickland, 1976; Koriat et al, 1972; Lazarus, 1966; Lazarus & Alfert, 1964; Lazarus et al, 1962; Velten, 1968). These studies generally speaking do not monitor the specific cognitive processes identified by cognitive learning theorists and discussed in the previous chapter as being critical for the generation of emotions. Therefore, the available evidence does not empirically demonstrate the hypothesized mediational role of these specific cognitive processes for emotion.

It has been argued in the previous chapter that cognitive learning theory suggests that humans' nonevaluative and evaluative beliefs about a stimulus characterize their emotional response to that stimulus. An experimental paradigm has been proposed to test that assertion. The methodology outlined in the previous chapter suggested that false feedback on a computer game task could be used as a mood induction procedure. The current work will utilize this strategy to evaluate whether subjects' nonevaluative and evaluative beliefs mediate their emotional response to playing a computer game. The nonevaluative belief which was thought to be important for this task was subjects' belief of success or failure at the computer game and their evaluative beliefs which were thought to be important were their value and expectation of success at the game.

It was hypothesized that subjects' emotional reaction to the game would be characterized by their belief of success or failure at the task (nonevaluative belief) and by their value and expectation of success at computer games (evaluative belief).

5.1 Method

Subjects

The 60 subjects were volunteers from a pool of 200 first year psychology students at the Australian National University who had never played the computer game used in the experiment. There were 22 males and 38 females. Their age range was from 18 to 47 years with a mean age of 25.8 years. Subjects received course credit for participating in the experiment.

Design

The design was a two by three factorial design with two levels of evaluative belief (high and low value/expectation of success at computer games) and three levels of nonevaluative belief (positive feedback, negative feedback, and no feedback control).

Materials

Equipment. The computer game was played on a Commodore Vic 20 Colour Home Computer with a 14 inch Commodore video monitor (model 1701).

The computer game used was a commercially available game called "Blitz". The object of the game was to clear a runway for a plane to land on by dropping "bombs" on the obstacles that were on the runway. Points were scored for the number of obstacles cleared and the game

terminated with the plane crashing if the runway could not be cleared in time. The level of difficulty was such that first time players invariably failed to clear the runway and, therefore, crashed. The game was chosen because:

1. It was thought that since no one was expected to complete the task both the positive and negative feedback would be credible. That is, the subjects who received positive feedback would accept the game was a difficult one at which they had done well and the subjects who received negative feedback would consider the game was one at which other people were able to do better than they could.

2. The game only required subjects to press one key which controlled the release of bombs as the plane flew over the runway. The advantage of this was that the release of bombs was sensitive to the key press and there was less scope for subjects to attribute low scores to external factors like unresponsive equipment than if more sophisticated machine responses like left/right movement or joy stick control were required.

Mood assessment instruments. The three types of mood assessment used in Experiment 1 were used again here.[3] That is, the pre-induction mood test was the writing numbers test, the digit symbol subtest from the WAIS, the eight visual analogue scales (relaxed, anxious, irritated, calm, frustrated, despondent, excited, and happy), and the POMS. The post-induction mood test was a repeat of these tests only with the letter symbol subtest from the NHAIS replacing the digit symbol subtest.

[3] Although the less clinical scales used in Experiment 2 appeared to be superior for the self statement mood induction procedure there was no empirical reason to assume that this would apply to the new mood induction procedure being used here. Therefore the original scales used in Experiment 1 were used to provide an empirical test of their appropriateness for this new task.

Cognitive assessment. In order to measure evaluative beliefs a Task Evaluation Scale (TES) was developed to assess subjects' value and expectation of success at computer games. It consisted of eight items which subjects were asked to agree/disagree with using a seven point scale (see Appendix B-1).

To determine subjects' nonevaluative belief a posttest questionnaire was used to measure subjects' own assessment of their scores on the game. Subjects were asked to rate their scores on the Scores Rating Scale (see Appendix B-2). The Scores Rating Scale was a five point scale developed for this study on which subjects rated their scores from "much better than average" to "much worse than average". The scale was embedded in other questions about participating in the experiment.

Procedure

The subjects were randomly assigned to one of the three feedback conditions, positive (PosFbk), negative (NegFbk), and no feedback (NoFbk). The random assignment was restricted to ensure even numbers across feedback conditions. Again, a procedure of sampling without replacement (Keppel, 1982) was used.

Subjects were tested individually and had been given the following information about the experiment prior to attending.

> The experiment is part of a research project looking at the influence of mood on visuo motor skill acquisition. This involves filling in some mood scales and playing a video game.

On attending the experimental session subjects assigned to the positive and negative feedback conditions were given the following instructions. All instructions which were typed on a sheet of A4 paper were given to the subjects to read before being read aloud by the experimenter.

The purpose of the experiment is to check the impact of current mood on the visuo motor skill acquisition.

The skill being tested is the level of eye hand coordination required to play a video game called "Blitz".

The level of difficulty varies for each game and the computer automatically records your score. At the end of each game it provides a comparison between your score and the best score so far for that game.

The playing instructions will be provided on the screen before you begin playing the first game. However, before you commence playing I would like to check your current mood.

Subjects assigned to the no feedback control condition received the following instructions.

The purpose of the experiment is to check the impact of current mood on the visuo motor skill acquisition.

The skill being tested is the level of eye hand coordination required to play a video game called "Blitz".

The level of difficulty varies for each game and the computer automatically records your score. It then adjusts your score for the level of difficulty of that game to obtain an estimate of your rate of skill acquisition.

The playing instructions will be provided on the screen before you begin playing the first game. However, before you commence playing I would like to check your current mood.

After the reading of the instructions subjects completed the Task Evaluation Scale and their current mood was assessed (pre-induction mood test). Subjects then played 15 games of "Blitz". Subjects in the two experimental conditions received predetermined feedback about their scores at the end of each game. This was done by comparing their score for that game to the "Best Score" so far by any player on that game. The "Best Score" for the positive feedback group was actually the subject's score minus a random number between 0 and 20. This meant the subject always obtained a score higher than the "Best Score" so far. As the majority of players score between 70 and 120 points per game and in order to retain credibility there was a minimum "Best Score" of 53 points for the positive feedback group. The "Best Score" for the

negative feedback group was the subject's score plus a random number between 60 and 100. The no feedback control group were not given any indication of their scores or information about "Best Scores" at all.

Each game lasted for between 60 to 90 seconds making each playing session 15 to 20 minutes.

After completing the 15 games subjects' mood was reassessed (post-induction mood test) followed by the administration of the posttest questionnaire to assess subjects' nonevaluative beliefs about the game.

Subjects were then debriefed and care was taken that subjects were not experiencing any lingering negative mood effects after they had finished the experiment.

5.2 Results

The cognitive and mood assessment data were analyzed by separate two-way analyses of variance. The results of these analyses are outlined below.

Cognitive Assessment

The cognitive assessment was in two parts. The first part assessed subjects' evaluative beliefs about their value and expectation of success at computer games. This was measured by the Task Evaluation Scale and used to define the high and low value/expectation groups. The second part assessed subjects' nonevaluative beliefs about the scores feedback as measured by the Scores Rating Scale. The data from the Task Evaluation Scale and the Scores Rating Scale were analyzed separately and these data are presented below.

Evaluative belief: Value and expectation of success at computer games. Each feedback condition was divided into a high and low

value/expectation group by way of a median split of the Task Evaluation Scale scores. As expected a two-way analysis of variance of the Task Evaluation Scale with two levels of value/expectation (high, low) and three levels of feedback (positive, negative and no feedback control) showed a significant between groups effect for value/expectation, $F(1,54) = 92.27$, $p>.000$ (see Table 20). Again as expected there was no main effect of feedback conditions on the Task Evaluation Scale ratings. These data indicate that the median split was a successful method of establishing groups with different levels of value/expectation of success at computer games.

Table 20
Experiment 3 Mean Task Evaluation Scale Scores for the Six Experimental Groups.

Value/ Expectation	Feedback Condition			
	Positive	Control	Negative	Total
High	3.09	3.09	2.39	2.85
Low	4.59	4.74	4.57	4.63
Total	3.84	3.45	3.91	

Nonevaluative belief: Belief of feedback. A two-way analysis of variance of the Scores Rating Scale revealed a significant main effect for feedback conditions, $F(2,54) = 21.29$, $p<.000$. Subjects in the positive feedback condition rated their scores as being significantly higher than those in both the negative feedback and control conditions. Contrary to expectations there was no significant difference between the negative feedback and control groups (see Table 21). There was also a significant two-way interaction between feedback condition and

value/expectation, $F(2,54) = 3.79$, $p<.03$ for scores rating. This interaction suggests that subjects who had low value/expectation of success on computer games rated their scores as higher than high value/expectation subjects when they received positive feedback and alternatively rated their scores as lower than high value/expectation subjects when they received negative feedback (see Table 21). These data suggest that the scores feedback was effective at encouraging subjects to believe that they had done better or worse than average. Interestingly, in the absence of feedback the control subjects believed they had done worse than average.

Table 21
Experiment 3 Mean Scores Rating Scale Scores for the Six Experimental Groups.

Value/ Expectation	Feedback Condition			
	Positive	Control	Negative	Total
High	2.50	3.20	3.30	3.00
Low	2.00	3.80	3.90	3.23
Total	2.25	3.50	3.60	

Pre-Induction Mood Test

As with the previous experiments there were some minor pre-induction mood differences between the experimental groups. Given the number of individual mood scales reported (16) it is likely that some chance differences could occur. The procedure adopted here of using mood change scores as the main dependent variable should adequately account for these minor differences. The results of separate analyses for each of the mood measures are reported below.

Visual analogue scales. A two-way analysis of variance of the visual analogue scales showed no pre-induction mood test differences between the experimental groups (see Table 22).

Profile of Mood States (POMS). A two-way analysis of variance indicated that there was a significant difference between the feedback conditions for the fatigue scale, $F(2,54) = 3.61$, $p < .04$, and between the value/expectation conditions for the confusion scale, $F(1,54) = 7.90$, $p < .007$. Contrasts showed the negative feedback subjects to be more fatigued than the positive feedback and control subjects and the low value/expectation subjects to be more confused than the high value/expectation subjects. There were no pre-induction mood test differences on any of the other POMS scales (see Table 23).

Motor speed. There were no pre-induction mood test differences on the two motor speed tests (see Table 24).

Pre- to Post-Induction Mood Change

Mood change scores were calculated in the same way as in Experiment 1. Separate two-way analyses of variance were used to analyze the mood change data. Contrary to expectations significant mood change effects were restricted to the visual analogue summary scales VAPS and VANS. For these scales there was a significant effect of feedback on mood change. There were no significant effects on mood change of the value and expectation of success at computer games. The results for each of the mood measures are detailed below.

Table 22
Experiment 3 Pre-Induction Mean Visual Analogue Scale Scores for the Six Experimental Groups.

	Feedback Condition										
	Positive			Control			Negative				
	Value/Expectation Condition									Total	
Visual Analogue Scales	High	Low	Total	High	Low	Total	High	Low	Total	High	Low
Relaxed	53.2	55.6	54.40	63.0	40.7	51.85	52.4	64.8	58.60	56.20	53.70
Anxious	27.6	27.2	27.40	34.2	47.2	40.70	33.9	32.0	32.95	31.90	35.47
Irritated	24.9	30.8	27.85	10.5	30.5	20.55	35.2	27.8	31.50	23.53	29.73
Calm	55.7	66.2	60.95	61.7	50.4	56.05	53.4	73.1	63.25	56.93	63.23
Frustrated	23.6	21.7	22.65	13.0	27.6	20.30	17.9	30.0	23.95	18.17	26.43
Despondent	22.2	31.8	27.00	19.7	27.0	23.35	21.7	32.2	26.95	21.20	30.33
Excited	29.2	30.3	29.75	37.2	40.6	38.90	41.7	28.1	34.90	36.03	33.00
Happy	62.4	55.0	58.70	66.3	63.3	64.80	61.9	53.9	57.90	63.53	57.40
VAPS	50.1	51.8	50.95	57.1	48.8	52.90	52.4	55.0	53.66	53.17	51.83
VANS	24.6	27.9	26.22	19.4	33.1	26.22	27.2	30.5	28.84	23.70	30.49

Table 23
Experiment 3 Pre-Induction Mean POMS Scores for the Six Experimental Groups.

	Feedback Condition										
	Positive			Control			Negative				
	Value/Expectation Condition									Total	
Profile of Mood State (POMS)	High	Low	Total	High	Low	Total	High	Low	Total	High	Low
Tension/Anxiety	6.9	7.7	7.30	9.7	10.0	9.85	8.8	7.0	7.90	8.47	8.23
Depression	5.4	5.1	5.25	2.1	4.1	3.10	2.9	9.4	6.15	3.47	6.20
Anger/Hostility	3.1	2.2	2.65	2.0	3.5	2.75	3.4	4.9	4.15	2.83	3.53
Vigor	17.5	15.7	16.60	17.6	13.8	15.70	13.4	10.4	11.90	16.17	13.30
Fatigue	5.8	8.9	7.35	7.8	7.2	7.50	12.8	13.0	12.90	8.80	9.70
Confusion	4.9	7.1	6.00	5.3	8.3	6.8	6.9	10.3	8.6	5.70	8.57
TMS	8.6	15.3	11.95	9.3	19.3	14.30	21.4	34.2	27.80	13.10	22.93

Table 24
Experiment 3 Pre-Induction Mean Motor Speed Test Scores for the Six Experimental Groups.

	Feedback Condition										
	Positive			Control			Negative				
	Value/Expectation Condition									Total	
Motor Speed Tests	High	Low	Total	High	Low	Total	High	Low	Total	High	Low
Digit Symbol	57.0	60.2	58.60	55.9	56.7	56.30	57.9	56.5	57.20	56.93	57.80
Writing Numbers	72.5	67.1	69.80	64.5	65.7	65.10	64.7	64.7	64.7	67.23	65.83

Visual analogue scales. A two-way analysis of variance revealed a significant between groups effect for feedback conditions on the VAPS, $F(2,52) = 3.25$, $p<.05$, and VANS, $F(2,52) = 3.12$, $p<.05$, scales. Comparisons between the marginal means for VAPS showed the positive feedback group to have a significantly greater positive mood change than both the negative feedback, $F(2,54) = 6.01$, $p<.01$, and control, $F(2,54) = 3.36$, $p<.05$, groups. A similar analysis of the group means for the VANS scale revealed the control group to have a significantly greater negative mood change than the positive feedback, $F(2,54) = 5.72$, $p<.01$, and the negative feedback, $F(2,54) = 3.31$, $p<.05$, groups (see Table 25). The differences between the groups' mean mood change scores for the individual visual analogue scales did not reach significance (see Table 25).

Profile of mood states (POMS). There were no significant differences between the groups on any of the POMS scales (see Table 26).

Motor Speed. A two-way analysis of variance showed a significant two-way interaction for change scores on both the writing numbers test, $F(2,54) = 4.66$, $p< .02$, and the symbols tests, $F(2,54) = 3.40$, $p<.04$. For the writing numbers test the subjects who were low on value/expectation and received negative feedback showed an increased motor speed and for the symbols tests subjects who were low on value/expectation and received positive feedback showed an increase in motor speed (see Table 27).

Table 25
Experiment 3 Pre- to Post-Induction Visual Analogue Scale Mean Change Scores for the Six Experimental Groups.

	Feedback Condition										
	Positive			Control			Negative				
	Value/Expectation Condition									Total	
Visual Analogue Scales	High	Low	Total	High	Low	Total	High	Low	Total	High	Low
Relaxed	9.2	0.7	4.95	-20.5	-1.9	-11.2	-14.4	-6.6	-10.50	-8.57	-2.60
Anxious	11.1	6.0	8.55	-10.4	6.6	-1.90	0.7	0.2	0.45	0.47	4.27
Irritated	-2.8	2.8	0.00	-17.2	-9.1	-13.15	8.1	-6.4	0.85	-3.97	-4.23
Calm	12.0	-13.6	-0.80	-9.2	1.7	-3.75	-6.0	-14.3	-10.15	-1.07	-8.73
Frustrated	-3.5	-8.1	-5.80	-21.1	-24.4	-22.75	-20.0	2.5	-8.75	-14.87	-10.00
Despondent	0.2	12.8	6.50	-0.7	-4.0	-2.35	-2.4	12.1	4.85	-0.97	6.97
Excited	20.0	21.3	20.65	24.3	0.0	12.15	0.0	13.6	6.80	14.77	11.63
Happy	7.1	10.0	8.55	-0.3	-0.8	-0.55	-0.7	-3.1	-1.90	2.03	2.03
VAPS	12.1	4.6	8.34	-1.4	-0.3	-.84	-5.3	-2.6	-3.94	1.79	0.58
VANS	1.3	3.4	2.31	-12.4	-7.7	-10.04	-3.4	2.1	-0.65	-4.83	-0.75

Table 26
Experiment 3 Pre-to Post-Induction POMS Mean Change Scores for the Six Experimental Groups.

	Feedback Condition										
	Positive			Control			Negative				
	Value/Expectation Condition									Total	
Profile of Mood State (POMS)	High	Low	Total	High	Low	Total	High	Low	Total	High	Low
Tension/Anxiety	2.0	1.8	1.90	-0.3	1.4	0.55	-1.1	-1.3	-1.20	0.20	0.63
Depression	2.5	2.1	2.3	0.8	1.9	1.35	-0.3	3.2	1.45	1.00	2.40
Anger/Hostility	0.8	0.1	0.45	-0.8	0.3	-0.25	0.7	0.0	0.35	0.23	0.13
Vigor	-0.6	1.5	0.45	0.4	-0.2	0.10	-0.3	-1.6	-0.95	-0.17	-0.10
Fatigue	1.0	3.0	2.00	1.7	0.7	1.20	1.3	0.2	0.75	1.33	1.30
Confusion	1.1	1.2	1.15	0.4	2.5	1.45	0.1	0.4	0.25	0.53	1.37
TMS	1.1	1.6	1.37	0.4	1.1	0.73	0.1	0.2	0.11	0.52	0.96

Table 27
Experiment 3 Pre- to Post-Induction Mean Motor Speed Test Scores for the Six Experimental Groups.

	Feedback Condition										
	Positive			Control			Negative				
	Value/Expectation Condition									Total	
Motor Speed Tests	High	Low	Total	High	Low	Total	High	Low	Total	High	Low
Digit Symbol	-8.3	-1.2	-4.75	-2.3	-5.1	-3.70	-4.7	-4.6	-4.65	-5.1	-3.63
Writing Numbers	3.0	0.8	1.90	2.7	0.3	1.50	1.2	4.9	3.05	2.30	2.00

5.3 Discussion

The results of this experiment tentatively demonstrated that it was possible to discriminate between the groups of subjects in terms of their nonevaluative and evaluative beliefs about the experimental task and the resulting impact of that task on their mood. These findings along with their implications for cognitive learning theory, the current methodology and general issues relevant to mood induction research will be expanded below.

The use of false feedback was shown to be a potentially successfully method of manipulating subjects' nonevaluative beliefs about their scores on a computer game. The subjects' Scores Rating Scale results indicate that the false positive feedback was effective in convincing the positive feedback group that their scores were above average. The false negative feedback was also effective in convincing the negative feedback group that their scores were below average. The withholding of scores and feedback, however, did not have the desired effect for the control group. It is clear that when scores and feedback were withheld subjects used other criteria to judge their performance. Since the control group rated their scores as below average it seems most likely that not being able to complete the task convinced the control group (in the absence of any other criteria) that their scores must be below average. The fact that the level of difficulty of the game was intentionally set this way in order to ensure the negative feedback was credible was outlined in the previous section. In retrospect, while achieving that aim it would appear to have introduced an unforeseen confounding element by providing a source of uncontrolled negative feedback.

In debriefing subjects it became apparent that the method of

providing feedback also introduced a methodological problem. The system of providing a game by game best score comparison based on the subject's own score became transparent if the subject's scores fluctuated substantially from game to game. While the effect of this problem was not sufficient to prevent the feedback groups mean rating of scores from being significantly different it was another uncontrolled source of experimental error.

This study also appeared to be able to successfully control for subjects' evaluative beliefs about success at computer games. The analysis of subjects' TES scores (ratings of value and expectation of success at computer games) indicated that there was no difference on this variable across the three feedback conditions. The median split enabled the feedback groups to be divided into high and low value/expectation groups whose mean TES scores were significantly different. However, subjects' TES scores were skewed toward the high end such that the mean TES scores for the low value/expectation groups were between neutral and low rather than being genuinely low.

There was some evidence from this study that subjects' nonevaluative beliefs were related to reported mood change. Both of the combined visual analogue scales showed significant differences between the feedback groups. It was of some interest that these differences varied across the positive and negative scales. The positive feedback group showed the most change on the positive mood scales and the control group showed the most change on the negative mood scales. This is consistent with the view that the uncontrolled visual feedback from the game was negative and apparently more effective than the controlled false negative feedback. It also suggests that the positive moods responded to the positive nonevaluative beliefs and negative moods to the negative nonevaluative beliefs. These results are consistent with the findings

from Experiments 1 and 2 and support the notion that positive and negative moods are independent (Boyle, 1985). That is, an increase in positive mood is not automatically accompanied by a corresponding decrease in negative mood and vice versa. The results are also consistent with the proposition considered previously that positive and negative moods may involve separate cognitive processes. It would appear that positive nonevaluative beliefs were associated with changes in positive moods without having a great impact on negative moods and the reverse for negative nonevaluative beliefs.

There was no evidence from this study to show that the different levels of the evaluative beliefs most commonly cited by cognitive behaviour therapists were associated with differential mood change. There are four possible interpretations of this finding. The median split of the TES scores while producing groups that were statistically different may not have provided sufficient variation on this variable, particularly in view of the fact that the low groups' scores were not genuinely low. Alternatively, the TES scores may not accurately represent subjects' value/expectation of success at computer games. The scale has face validity but given the specificity of the scale there is no suitable existing scale that can provide a test of its concurrent validity. It is also possible that the evaluative beliefs measured here by the TES (value/expectation of computer games) may not have been the relevant ones to mediate emotional response to this experimental task. Finally, there is a fourth alternative that must be considered. Subjects in the high and low value and expectation of success at computer games groups did not show any differences in their emotional response to the experience of success or failure at computer games. If what subjects believe about success at computer games does not influence their emotional response to the experience of success or failure at computer

games then it is possible that these kinds of beliefs are not an important determinant of emotions. Therefore, it may be necessary to reject the cognitive behaviour therapists' position that evaluative beliefs are causally related to emotional responding.

On a more general level, as was found in Experiments 1 and 2 mood changes were reported for a range of moods rather than just one or two. The findings here continue to support the previous work cited earlier that suggests moods are most likely to occur in clusters (Boyle, 1985; Polivy, 1981). The significant mood changes were also confined to the visual analogue scales. These scales appear to be more suitable for monitoring nonclinical mood states than either the POMS or the tests of psychomotor functioning. It is suggested that the tests of psychomotor functioning are not appropriate for assessing mood changes in response to computer games. The results indicated that achieving low scores on a computer game was more likely to generate physiologically arousing negative moods like frustration, irritation and tension than a physiologically retarding mood such as depression. The failure of this measure to discriminate between the experimental groups was seen as a positive indication that these are the kinds of moods associated with this experimental paradigm.

In conclusion, the limited success of this experiment in generating the hypothesized mood changes was seen as being largely due to methodological difficulties. Firstly, the data suggests that the game chosen as the experimental task had the unforeseen disadvantage of providing uncontrolled negative feedback and thereby contaminating the feedback groups. Since there was no control or monitoring of this feedback there is no guarantee its effects were randomly distributed throughout the groups. Secondly, the method of providing feedback, by being less effective for some subjects than others, also introduced

additional experimental error. Thirdly, there was no way of checking that the measure of evaluative belief used in this study (TES) was appropriate or valid and, therefore, the failure of this variable to predict mood change cannot be interpreted with any confidence.

However, the results were sufficiently encouraging to justify an attempt to overcome these methodological difficulties in the expectation that the experimental paradigm could provide a useful test of the theoretical concepts under consideration. This was undertaken in the next experiment which is outlined in the next chapter.

CHAPTER 6

EXPERIMENT 4: NONEVALUATIVE AND EVALUATIVE BELIEFS AS MEDIATORS OF EMOTION

The first problem that had to be addressed by the current work was to find a suitable experimental paradigm to assess the relationship between nonevaluative and evaluative beliefs and emotion. It has been argued in the previous chapter that the methodology used for Experiment 3 was promising but required refinement. The areas identified as possible sources of experimental error were the nature of the computer game task, the method of providing feedback, and the validity of the Task Evaluation Scale as a measure of subjects' value and expectation of success at computer games.

The current study was designed to overcome these difficulties. The computer game, the method of providing feedback and the measurement instrument for assessing subjects' value and expectation of success at computer games were revised. Also, additional scales were added to assess how the subjects qualitatively evaluated their computer game scores. It is suggested that subjects' level of satisfaction with their scores, in the light of experiences of success and failure, would reflect their value and expectation of success at computer games. Therefore, these scales were used as a validity check of the Task Evaluation Scale as a measure of subjects' value and expectation of success at computer games.

Again it was hypothesized that subjects' emotional response to the computer game task would be characterized by their belief of success or failure at the task (nonevaluative belief) and the level of their value and expectation of success at computer games (evaluative belief).

6.1 Method

Subjects

The 60 subjects were volunteers from a pool of 180 first year psychology students at the Australian National University who had not had any prior contact with the experimental materials. The subjects age ranged from 17 to 45 years with a mean age of 21.9 years. There were 19 males and 41 females. The subjects received course credit for participating in the experiment.

Design

The design was the same as that used in Experiment 3.

Materials

Equipment. The computer hardware was the same as that used in Experiment 3. The computer game was changed to eliminate the possibility of the game providing visual feedback about subjects' performance. A game called "Shooting Gallery" was devised which had no logical end point that subjects were able to assume as a goal. The object of the game was to fire at an endless supply of moving targets, points were scored for "hits" and a time limit of 60 seconds was available to accumulate points. The only objective criterion available by which to judge performance was that provided and controlled by the experimenter.

Mood measurement instruments. Mood was assessed by the revised visual analogue scales used in Experiment 2 and the POMS. The results from Experiment 3 suggest the revised visual analogue scales which provide greater coverage of the nonclinical mood states may be more appropriate to the nature of the experimental task. It was thought that the motor speed tests used in previous experiments were not an

appropriate index of the kind of moods associated with success and failure experience on a computer game and so these were not included.

Cognitive assessment. The Task Evaluation Scale (TES) from Experiment 3 was revised and expanded to incorporate separate seven item scales for TES (Value) and TES (Expectation) of success on computer games (see Appendix C-1).

The post test questionnaire was also revised and expanded to include a seven point, seven item scale to assess subjects' opinion of the quality of their scores on the game (Evaluative Beliefs Scale) (see Appendix C-2). The Scores Rating Scale, used as a measure of how well subjects thought they had done in relation to other people, was upgraded to a seven point scale. Also, two additional seven point scales were added. The first to assess how satisfied subjects were with their scores (Satisfaction with Scores Scale) and the second to measure how subjects' scores compared to their expectations (Scores Expectation Scale). Subjects were also asked to give the main reasons for their ratings of their level of satisfaction with their scores (see Appendix C-3).

Pre-Induction Mood Test

The pre-induction mood test was a modified form of that used in Experiment 2. The two motor speed tests were deleted. Since the mood changes expected were not simply along the elation-depression continuum it was thought that these tests were no longer appropriate as mood measures. The ten visual analogue scales and the Profile of Mood States (POMS) were retained.

Post-Induction Mood Test

The post-induction mood test consisted of repeating the ten visual analogue scales and the POMS.

Procedure

The procedure was the same as Experiment 3 except for the following changes.

The experimental instructions were adapted to suit the new computer game. Subjects in the positive and negative feedback conditions were given the following experimental instructions.

> The purpose of the experiment is to check the impact of current mood on the visuo motor skill acquisition.
>
> The skill being tested is the level of eye hand coordination required to play a video game called "Shooting Gallery".
>
> The computer automatically records your score and at the end of each game it provides a comparison between your score and the usual range of scores obtained by first time players.
>
> The playing instructions will be provided on the screen before you begin playing the first game. However, before you commence playing I would like to check your current mood.

Subjects in the no feedback control condition were given the following experimental instructions.

> The purpose of the experiment is to check the impact of current mood on the visuo motor skill acquisition.
>
> The skill being tested is the level of eye hand coordination required to play a video game called "Shooting Gallery".
>
> The computer automatically records your score and calculates your rate of skill acquisition.
>
> The playing instructions will be provided on the screen before you begin playing the first game. However, before you commence playing I would like to check your current mood.

The number of games was reduced from 15 to 10 because some subjects in Experiment 3 found it difficult to maintain concentration for 15 games and became bored. The method of providing controlled feedback was also changed. It was found in Experiment 3 that subjects' scores fluctuated considerably from game to game and the "Best Score" method at times seemed inconsistent to subjects. Therefore, at the end of each game subjects were given their score for that game and a rating for their score on a range from "very good" to "very poor" (see Appendix C-

4). The range of scores associated with each rating was preset within feedback conditions so that subjects in the positive feedback condition always rated "above average", "good" or "very good" and those in the negative feedback condition always rated "below average", "poor" or "very poor". Subjects in the no feedback condition received their score without any rating or comparison information. Each game was for 60 seconds making each playing session 10 to 15 minutes. Finally, even though subjects were randomly assigned to experimental groups their actual game scores were recorded to test if there was a difference in playing standards across the experimental groups.

Subjects were again debriefed and care was taken to ensure subjects did not leave the experiment while still experiencing any lingering negative mood effects.

6.2 Results

The Task Evaluation Scale was again used to split the feedback conditions into high and low value/expectation groups. Separate two-way analyses of variance were then used to analyze the subjects actual scores on the computer game, each of the cognitive variables, and the mood data. The results of these analyses are presented below.

Computer Game Scores

A two-way analysis of variance of subjects' average score on the computer game revealed that there was no significant between group difference on subjects' actual scores (see Table 28). These data indicate that there was no difference between subjects' average scores on the computer game regardless of their feedback or value/expectation condition.

Table 28
Experiment 4 Mean Computer Game Scores for the Six Experimental Groups.

Value/ Expectation	Feedback Condition			
	Positive	Control	Negative	Total
High	63.3	71.8	72.3	69.1
Low	67.7	63.6	71.2	66.0
Total	65.5	67.7	71.8	

Cognitive Assessment

Evaluative beliefs: Value and expectation of success at computer games. A correlational analysis indicated TES (Value) and TES (Expectation) scales to be significantly positively correlated $r = .810$, $p<.001$. The TES (Value) scores were used to divide each feedback condition into a high and low value/expectation group by way of a median split. However, since it was not possible to distinguish between the TES (Value) and TES (expectation) variables the evaluative belief condition will still be referred to as value/expectation. A two-way analysis of variance of the TES scales showed a significant between groups effect of value/expectation for TES (Value), $F(2,54) = 118.79$, $p>.001$ and for TES (Expectation), $F(2,54) = 48.63$, $p< .001$ (see Tables 29 and 30). As expected the high value/expectation groups had a significantly greater value and expectation of success at computer games than the low value/expectation groups. These data indicate that the median split was a successful way of establishing the high and low value/expectation groups.

Unfortunately, there was also a significant main effect across feedback conditions for both the TES (Value), $F(2,54) = 3.37$, $p<.04$ and

Table 29
Experiment 4 Mean TES (Value) Scores for the Six Experimental Groups.

Value/ Expectation	Feedback Condition			
	Positive	Control	Negative	Total
High	3.26	2.89	2.84	3.00
Low	5.46	4.67	5.09	5.07
Total	4.36	3.76	3.99	

Table 30
Experiment 4 Mean TES (Expectation) Scores for the Six Experimental Groups.

Value/ Expectation	Feedback Condition			
	Positive	Control	Negative	Total
High	3.49	2.41	2.84	2.91
Low	4.86	4.21	4.33	4.47
Total	4.17	3.53	3.37	

TES (Expectation), $F(2,54) = 4.83$, $p<.01$, scores (see Table 29 and 30). Comparisons between the marginal means indicated the positive feedback group had lower value/expectation of success than the negative feedback and control groups.

Nonevaluative belief: Belief of feedback. A two-way analysis of variance of the Scores Rating Scale revealed a significant main effect for feedback conditions, $F(2,54) = 16.60$, $p<.001$ (see Table 31). Each of the feedback conditions was significantly different to the other two. That is, subjects in the positive feedback condition rated their scores

as being significantly higher than those in the negative feedback and control conditions. The control group ratings were between those of the positive and negative feedback groups and were significantly higher than the negative feedback group.

Table 31
Experiment 4 Mean Scores Rating Scale Scores for the Six Experimental Groups.

Value/ Expectation	Feedback Condition			
	Positive	Control	Negative	Total
High	3.3	4.0	5.3	4.2
Low	3.7	4.5	5.9	4.7
Total	3.5	4.3	5.6	

Qualitative rating of scores. A two-way analysis of variance showed a significant main effect for feedback conditions on the Evaluative Belief Scale, $F(2,54) = 9.88$, $p<.001$. The positive feedback and control groups rated their scores as qualitatively better than the negative feedback group, $t\ (59) = 4.33$, $p<.001$ and $t\ (59) = 3.0$, $p<.01$ respectively and the positive feedback group tended to rate their scores as qualitatively better than the control group, $t\ (59) = 1.33$, $p<.1$. There was a significant main effect for value/expectation on the Evaluative Belief Scale, $F(2,54) = 5.17$, $p<.03$. The low value/expectation subjects rated their scores as better than the high value/expectation subjects (see Table 32). These data tend to confirm that the experimental groupings based on TES (Value) scores identified subjects who have a higher and lower value and expectation of success at computer games.

Table 32
Experiment 4 Mean Evaluative Belief Scale Scores for the Six Experimental Groups.

Value/ Expectation	Feedback Condition			
	Positive	Control	Negative	Total
High	3.19	3.79	4.94	3.97
Low	3.94	3.19	3.99	3.37
Total	3.06	3.49	4.46	

There was a significant main effect of feedback conditions on the Satisfaction with Scores Scale, $F(2,54) = 4.38$, $p<.02$. The positive feedback subjects were more satisfied than the controls and negative feedback subjects and the controls were more satisfied than the negative feedback subjects. The positive feedback and control groups were significantly more satisfied than the negative feedback group, t (59) = 2.79, $p<.005$ and t (59) = 2.25, $p<.02$ respectively (see Table 33).

Table 33
Experiment 4 Mean Satisfaction with Scores Scale Scores for the Six Experimental Groups.

Value/ Expectation	Feedback Condition			
	Positive	Control	Negative	Total
High	2.9	3.2	4.9	3.67
Low	3.0	3.2	3.6	3.27
Total	2.95	3.20	4.25	

There was a significant main effect for both feedback conditions and value/expectation conditions for the Scores Expectation Scale, $F(2,54) = 8.51$, $p<.001$ and $F(2,54) = 4.38$, $p<.04$ respectively. The positive feedback subjects rated their scores as being better than they expected, the control subjects rated their scores as neither better nor worse than expected and the negative feedback subjects rated their scores as being worse than they expected. The positive feedback and control groups were significantly different to the negative feedback group , t (59) = 4.1, $p<.001$ and t (59) = 2.44, $p<.01$ respectively. The high value/expectation subjects rated their scores as worse than expected and the low value/expectation subjects as better than expected (see Table 34).

Table 34
Experiment 4 Mean Scores Expectation Scale Scores for the Six Experimental Groups.

Value/ Expectation	Feedback Condition			
	Positive	Control	Negative	Total
High	3.2	4.2	5.3	4.23
Low	3.1	3.4	4.2	3.57
Total	3.15	3.80	4.75	

Pre-Induction Mood Test

Once again there were some random pre-induction between group mood differences. These are detailed below.

Visual analogue scales. A two-way analysis of variance of the visual analogue scales showed a significant main effect for value/expectation on the pleased, $F(1,54) = 5.29$, $p< .03$ and happy,

$F(1,54) = 9.68$, $p<.003$, scales. An inspection of means indicated for both scales the high value/expectation subjects mood was significantly more positive than the low value/expectation subjects (see Table 35).

Table 35
Experiment 4 Pre-Induction Mean Visual Analogue Scale Scores for the Six Experimental Groups.

	Feedback Condition										
	Positive			Control			Negative				
	Value/Expectation Condition									Total	
Visual Analogue Scales	High	Low	Total	High	Low	Total	High	Low	Total	High	Low
Relaxed	58.4	43.0	50.70	68.8	49.8	59.30	62.8	60.7	61.75	63.33	51.17
Anxious	57.9	59.9	58.90	62.8	42.4	52.60	65.3	69.6	67.45	62.00	57.30
Irritated	36.3	44.8	40.55	43.6	52.3	47.95	43.1	28.8	35.95	41.00	41.97
Calm	20.4	22.7	21.55	16.8	19.5	18.15	24.1	21.5	22.80	20.43	21.23
Frustrated	62.4	41.3	51.85	52.6	31.9	42.25	51.3	62.6	56.95	55.43	45.27
Despondent	26.4	32.3	29.35	17.3	34.4	25.85	30.3	22.8	26.55	24.67	29.83
Excited	24.9	33.3	29.10	12.4	31.8	22.10	27.6	23.9	25.75	21.63	29.67
Happy	34.5	35.6	35.05	46.7	22.3	34.50	45.0	37.2	41.10	42.07	31.70
VAPS	65.4	50.6	58.00	69.0	45.4	57.20	70.7	66.0	68.35	68.37	54.00
VANS	28.6	38.7	33.65	19.6	35.7	27.65	17.6	19.8	18.70	21.93	31.40

Profile of mood states (POMS). A two-way analysis of variance indicated that there was a significant difference between the value/expectation conditions for the depression, $F(1,54) = 3.92$, $p< .05$, and confusion, $F(1,54) = 9.14$, $p< .004$, scales. The low value/expectation group was significantly more depressed and confused

than the high value/expectation group. There was also a trend toward a significant main effect for value/expectation on the TMS, $F(1,54) = 3.63$, $p<.06$. The low value/expectation subjects tended to have a more negative mood than the high value/expectation subjects. There was also a significant two-way interaction for the TMS scale, $F(2,54) = 5.19$, $p<.009$. The interaction doesn't appear to have any meaningful interpretation and is probably a random effect (see Table 36).

Table 36
Experiment 4 Pre-Induction Mean POMS Scores for the Six Experimental Groups.

	Feedback Condition										
	Positive			Control			Negative				
	Value/Expectation Condition									Total	
Profile of Mood State (POMS)	High	Low	Total	High	Low	Total	High	Low	Total	High	Low
Tension/Anxiety	6.7	5.5	6.10	5.5	8.9	7.20	9.1	5.1	7.10	7.10	6.50
Depression	3.4	8.3	5.85	2.4	12.2	7.30	6.2	3.0	4.60	4.00	7.83
Anger/Hostility	1.3	6.3	3.80	0.9	5.1	3.00	5.0	2.6	3.80	2.40	4.67
Vigor	9.7	9.3	9.50	16.2	8.7	12.45	11.9	13.5	12.70	12.60	10.50
Fatigue	8.3	11.5	9.90	7.4	11.1	9.25	14.2	9.6	11.90	9.97	10.73
Confusion	7.8	11.5	9.65	8.1	12.5	10.30	8.5	10.0	9.25	8.13	11.33
TMS	17.8	33.8	25.80	8.1	41.1	23.95	31.1	16.8	24.60	19.00	30.57

Pre- to Post-Induction Mood Change

Mood change scores were calculated in the same way as in Experiment 1. While there were some significant mood change differences on both the visual analogue scales and the POMS across both of the experimental

conditions, the less clinical visual analogue scales again proved to be the more sensitive index of mood change for the computer game task. The most revealing feature of the mood change data was demonstrated by comparing the groups' mean mood change score for each of the mood measures to zero to determine which of the groups were consistently experiencing a significant amount of mood change. This method of analyzing the data showed that the high value/expectation groups were more sensitive to negative feedback and that the low value/expectation groups were more sensitive to positive feedback. The mood change data for each of the mood measures is detailed below.

Visual analogue scales. A two-way analysis of variance of the visual analogue scales revealed a significant main effect for feedback conditions on the pleased, $F(2,54) = 11.37$, $p < .001$, discouraged, $F(2,54) = 6.04$, $p < .004$, VAPS, $F(2,54) = 6.14$, $p < .004$, and VANS scales, $F(2,54) = 3.40$, $p < .04$. There was also a trend towards a significant main effect for feedback conditions on the excited scale, $F(2,54) = 2.78$, $p < .07$.

Comparisons between the marginal means indicated for the pleased scale that the positive feedback group was significantly different to the negative feedback group, t (59) = 4.71, $p < .001$, and both the positive and negative feedback groups were significantly different from the control group, t (59) = 1.70, 3.01 and $p < .05$, .001 respectively. For the discouraged, VAPS, and VANS scales the positive feedback group was significantly different from the negative feedback group, t (59) = 2.7, 3.1, and 2.09, and $p < .005$, .001, and .03 respectively and the negative feedback group was significantly different to the control group t (59) = 3.24, 2.96, and 2.4, and $p < .001$, .005, and .01 respectively. For the excited scale there was a trend for the positive feedback group to be significantly different to the negative feedback group, t (59) = 1.6,

$p<.06$ and the negative feedback group was significantly different to the control group, t (59) = 2.3, $p<.02$.

There was a significant main effect of the value/expectation condition on the relaxed, $F(1,54) = 4.46$, $p<.04$ and VAPS, $F(1,54) = 6.17$, $p<.02$, scales. There was also a trend toward a significant main effect for the value/expectation conditions on the happy, $F(1,54) = 3.38$, $p<.07$, discouraged, $F(1,54) = 3.52$, $p<.07$, and VANS, $F(1,54) = 3.16$, $p<.08$, scales.

Since the major dependent variable was a mood change score the experimental group means were compared with zero to determine which groups tended to exhibit the most change. The negative feedback high value/expectation, the positive feedback low value/expectation and the no feedback control low value/expectation groups were the only groups to consistently demonstrate mood changes significantly greater than zero, across a range of the visual analogue scales.

The mean mood change for the negative feedback high value/expectation group was negative and significantly greater than zero for all 6 negative and 3 of the positive visual analogue scales. These were pleased, relaxed, tense, irritated, frustrated, disappointed, discouraged, VAPS and VANS, t (59) = 4.18, 3.36, 2.41, 3.01, 3.08, 3.21, 3.9, 2.82 and 4.71, and $p<.001$, .001, .01, .001, .001, .001, .001, .005, and .001 respectively.

The mean mood change for the positive feedback low value/expectation group was positive and significantly greater than zero for 4 of the positive and one of the negative visual analogue scales. These were pleased, irritated, lighthearted, excited, happy and VAPS, t (59) = 1.82, 1.97, 1.82, 2.17, 1.68 and 2.06, and $p<.05$, .03, .05, .02, .05, and .02 respectively.

The mean mood change for the no feedback control low

value/expectation group was positive and significantly greater than zero for 3 of the positive and one of the negative visual analogue scales. These were irritated, lighthearted, excited, and VAPS, t (59) = 1.65, 1.72, 3.87, and 2.48, and $p<.05$, .05, .001, and .01 respectively (see Table 37).

Table 37
Experiment 4 Pre- to Post-Induction Visual Analogue Scale Mean Change Scores for the Six Experimental Groups.

	Feedback Condition										
	Positive			Control			Negative				
	Value/Expectation Condition									Total	
Visual Analogue Scales	High	Low	Total	High	Low	Total	High	Low	Total	High	Low
Pleased	7.5	13.5	10.50	-6.6	2.3	-2.15	-31.1	-17.9	-24.50	-10.07	-0.70
Relaxed	3.0	-8.9	-2.95	-15.0	4.9	-5.05	-26.8	6.5	-10.15	-12.93	0.83
Tense	-4.4	-10.0	-7.20	5.1	5.5	5.30	-15.9	-0.1	-8.00	-5.07	-1.53
Irritated	-12.6	-17.1	-14.85	-7.8	-14.3	-11.05	-26.1	-7.0	-16.55	-15.50	-12.80
Lighthearted	-5.9	15.4	4.75	8.5	14.5	11.50	-3.3	-6.2	-4.75	-0.23	7.90
Frustrated	-6.3	-2.0	-4.15	-19.7	-10.8	-15.25	-30.2	-14.2	-22.20	-18.73	-9.00
Disappointed	-9.2	-0.9	-5.05	-14.0	2.4	-5.80	-27.5	-15.4	-21.45	-16.90	-4.63
Excited	14.1	17.8	15.95	11.5	31.7	21.60	4.4	1.2	2.80	10.00	16.90
Happy	-3.3	10.1	3.40	0.3	4.4	2.35	-8.8	0.8	-4.00	-3.93	5.10
Discouraged	2.6	3.9	3.25	3.1	11.4	7.25	-28.7	-4.5	-16.60	-7.67	3.60
VAPS	15.4	47.9	31.65	-1.3	57.8	28.25	-65.6	-15.6	-40.6	-17.17	30.03
VANS	-29.9	-26.1	-28.00	-33.3	-5.8	-19.55	-128.4	-41.2	-84.8	-63.87	-24.37

Profile of mood states (POMS). A two-way analysis of variance

revealed a significant main effect for value/expectation on the confusion scale, $F(1,54) = 8.0$, $p < .007$. An inspection of means showed the low value/expectation subjects were less confused than the high value/expectation subjects (see Table 38).

Table 38
Experiment 4 Pre- to Post-Induction Mean POMS Scores for the Six Experimental Groups.

	Feedback Condition										
	Positive			Control			Negative				
	Value/Expectation Condition									Total	
Profile of Mood State (POMS)	High	Low	Total	High	Low	Total	High	Low	Total	High	Low
Tension/Anxiety	-0.1	-3.2	-1.65	-1.5	-0.2	-0.85	-1.4	0.4	-0.50	1.00	1.00
Depression	1.8	1.9	1.85	0.1	3.1	1.6	-1.3	-1.0	-1.15	0.20	1.33
Anger/Hostility	-0.7	-0.7	-0.70	-0.9	0.2	-0.35	-1.6	-1.1	-1.35	-1.07	-0.53
Vigor	-0.1	2.2	1.05	1.1	0.9	1.00	-0.9	-1.5	-1.20	0.03	0.53
Fatigue	0.8	-0.2	0.30	1.6	2.7	2.15	-0.2	2.6	1.20	0.73	1.70
Confusion	1.0	3.0	2.00	0.9	2.7	1.80	-0.5	2.2	0.85	0.47	2.63
TMS	2.7	3.0	2.85	1.3	9.4	5.35	-5.9	-1.6	-2.15	-0.63	4.67

6.3 Discussion

The results from this experiment support the experimental hypothesis that subjects' emotional response to the computer game is characterized by their nonevaluative and evaluative beliefs about the game. The assessment of nonevaluative and evaluative beliefs clearly demonstrated that the experimental groups were differentiated on these

variables. The mood change data show clear differences between the experimental groups which demonstrate that both these cognitive variables are associated with emotional responding. Also, the results from this study again supported the proposition that positive and negative moods are independent (Boyle, 1985; Diener & Emmons, 1985) and that moods tend to occur in clusters rather than as discrete responses (Boyle, 1985; Polivy, 1981). Here the discussion will focus first on the evidence supporting the assertion that the experimental groups were differentiated on the cognitive variables, second on the evidence which demonstrates their association with emotional responding and finally, on the implications of these findings for cognitive learning theory and therapy.

Subjects' nonevaluative beliefs were represented by their estimation of the relative level (above or below average) of their computer games scores. There was no difference between the feedback conditions in terms of the subjects' actual scores (see Table 28). However, in spite of there being no actual difference in subjects' scores, the positive feedback group believed their scores were above average and the negative feedback group believed their scores were below average. The no feedback control group believed their scores to be neither above nor below average. It would appear that changing the computer game and the method of providing feedback removed the uncontrolled visual feedback from the previous experiment that provided the control group with negative feedback. It must be acknowledged, however, that the control groups' scores on the Scores Rating Scale were not significantly different to the positive feedback group. Therefore, it must be expected that their emotional responses will be similar to the positive feedback group. It can also be seen from Table 31 that the negative feedback groups' scores were more extreme than the positive feedback group, suggesting their emotional

responses may also be more extreme. It was concluded that the provision of false feedback was a successful method of controlling subjects' nonevaluative beliefs about their scores on the computer game.

Subjects' evaluative beliefs were represented by an estimation of how important it was for them to score highly and how successful they expected to be at computer games. The median split of the feedback groups into high and low TES (Value) groups again clearly demonstrated a differentiation between groups in terms of this evaluative belief about success at computer games. The highly significant positive correlation between TES (Value) and TES (Expectation) made it impossible to distinguish between these two concepts. Therefore, as was done in Experiment 3, the two variables were referred to jointly as value/expectation.

A series of post-induction qualitative ratings of subjects' scores were also included in this study as a validity check of the TES scales. The significant main effects for feedback conditions on the Evaluative Beliefs Scale, Satisfaction with Scores Scale, and Scores Expectation Scale indicated the positive feedback group believed their scores were qualitatively better than the negative feedback group and tended to believe their scores were qualitatively better than the control group. There was also evidence from these scales that the low value/expectation subjects rated their scores as qualitatively better than the high value/expectation subjects. These data indicate that the subjects qualitatively rated their computer game scores in the predicted manner. Therefore, these results tend to validate the subject groupings provided by the TES (Value) scale median split procedure.

The evidence presented so far confirmed that the current methodology successfully established experimental groups that were differentiated by their nonevaluative and evaluative beliefs about the

experimental task. This made it possible to evaluate the major experimental hypothesis that groups with these characteristics would also be differentiated by their emotional response to the experimental task.

There was clear evidence from this study that both nonevaluative and evaluative beliefs are associated with mood change. Both the positive and negative visual analogue summary scales (VAPS and VANS) differentiated between the positive and negative feedback groups. The control group was significantly different to the negative but not the positive feedback group. This is entirely consistent with the nonevaluative and evaluative belief measures outlined above.

The VAPS also differentiated the high and low value/expectation groups and there was a trend for the VANS to do so as well. The differences between the experimental groups for the individual visual analogue scales and the POMS mostly reflected these distinctions with some but not all reaching significance. Given the nature of the experimental task, the more clinical orientation of the POMS scales may explain the modest mood changes reflected by this measure.

The most revealing data from the present study, however, came from assessing which of the experimental groups experienced the greatest mood changes. Those subjects who believed their scores were better than average and who had low value/expectation of success at computer games (positive feedback low value/expectation group) showed the greatest positive emotional response, mainly on the positive visual analogue scales and those subjects who believed their scores were worse than average and had high value/expectations of success at computer games (negative feedback high value/expectation group) showed the greatest negative emotional response, mainly on the negative visual analogue scales. This group also tended to show a stronger emotional response

than all the other groups on the visual analogue scales, which is consistent with the finding that it was more extreme in terms of the nonevaluative and evaluative belief measures. The low value/expectation control group tended to be similar but not as extreme as the low value/expectation positive feedback group in terms of mood change scores and this is again consistent with the nonevaluative and evaluative belief data.

Therefore, the groups which showed the most positive mood change were those that had low value/expectations and who believed their scores were high. Alternatively, the most negative mood change was shown by the group that had high value/expectations and who believed their scores were low. When it is remembered that there was no actual difference in the mean scores across the groups, it strongly suggests that these distinctive mood responses are associated with the subjects' non evaluative and evaluative beliefs about their scores.

It has been shown in this experiment that subjects' beliefs and expectations characterized their emotional responses to the experimental task. Therefore, the results of this study supported the proposition that the cognitive processes identified by the cognitive theorists and therapists are associated with generating mood (Bandura, 1977; Ellis, 1962; Lazarus, 1982, 1984; Mahoney, 1974).

The dependence of emotional response on nonevaluative beliefs, established in this experiment by the experimental manipulation of subjects' nonevaluative belief about their scores clearly demonstrated that subjects' perception of reality was causally linked to emotional response. However, while it has been shown that evaluative beliefs are associated with emotional response, because they were measured and controlled for but not experimentally manipulated, it would be premature to claim a causal role for evaluative beliefs in mediating emotion.

Furthermore, it was not possible to independently evaluate the relationship between value or expectation with emotional response because the measures of these variables correlated so highly in this study.

The case for arguing a causal role for evaluative beliefs would be considerably strengthened by empirical evidence which demonstrated that a change in evaluative beliefs was accompanied by a corresponding change in emotional response. The distinctive contributions of value and expectation could be appraised by an experimental manipulation that differentially affected these variables. These issues were addressed by further research.

CHAPTER 7

EXPERIMENT 5: NONEVALUATIVE AND EVALUATIVE BELIEFS AS MEDIATORS OF EMOTION

The previous study provided evidence of a causal relationship between nonevaluative beliefs and emotional response and demonstrated an association between evaluative beliefs and emotional response. These findings are consistent with the basic assumptions that underlie cognitive behaviour therapy (see Chapter 1). However, the previous study fell short of providing evidence of a causal relationship between the evaluative beliefs and emotional response. In order to establish such a causal relationship it is necessary to demonstrate that experimentally induced change in evaluative beliefs produces corresponding changes in emotional response.

There has been no previous research that has established a methodology for generating change in values and expectations of success at computer games. However, there is a considerable literature on attitude and value change (see Cialdine, Petty, & Cacioppo, 1981; Fishbein & Ajzen, 1975; Rokeach, 1968). There are two approaches to the problem that are particularly pertinent here. From a theoretical point of view, the predominant position amongst cognitive behaviour therapists was articulated by Bandura (1978) who argued that cognitive events are induced or altered far more readily by "experiences of mastery arising from successful performance" than by verbal persuasion (Bandura, 1977, p. 78). It can be assumed that Bandura would also consider that experiences of failure arising from unsuccessful performance may have similar but negative effects.

This experiential approach to changing cognitions is given empirical support from research that manipulated expectations of external control in order to study the learned helplessness model of

depression (Cole & Coyne, 1977; Roth & Kubal, 1975). These workers used preexperimental training exercises to experimentally manipulate expectancies. They administered contingent and noncontingent reinforcement for performance on problem solving tasks in order to generate expectancies of either internal or external control over the test situation. They found that providing prior experience of success or failure successfully manipulated subjects' expectancies.

The current study adopted a similar strategy in an effort to manipulate expectancies of success and failure at computer games. Subjects were given the training task of playing a computer game. False feedback was used to generate a belief of either above or below average scores on the training game in order to influence expectations of high or low scores on the subsequent test game. There was no direct attempt made to change the subjects' value of success at computer games.

It was hypothesized that the positive and negative feedback on the training game would raise and lower subjects' expectations about the quantitative value of their scores on the test game without affecting the value they placed on succeeding at computer games. It was further hypothesized that the positive and negative feedback on the test game would produce positive and negative mood changes. It also appeared from the previous study that subjects' moods change most when their experience does not match their expectations and values. Therefore, it was also hypothesized that the two groups whose feedback on the training game was reversed for the test game would experience the largest mood changes.

7.1 Method

Subjects

The 40 subjects were volunteers from a pool of 120 first year behavioural science students at the Canberra College of Advanced Education who had not had any prior contact with the experimental material. Their ages ranged from 17 years to 48 years with a mean age of 26.25 years. There were 13 males and 27 females. The subjects received course credit for taking part in the experiment.

Design

The design was a two by two factorial design with two levels of training (positive and negative) and two levels of feedback (positive and negative). Subjects were randomly assigned to experimental conditions.

Materials

Equipment. The computer hardware and software were the same as for Experiment 4. An additional game called "Sharp Shooter" was used for training which was a modified version of "Shooting Gallery". The direction of firing, the shape of the targets, the background and the scoring system was changed to give it a different appearance. The scoring system was actually the same as "Shooting Gallery" with a constant added to all scores in order to disguise their similarity. Each game of "Sharp Shooter" lasted for 70 rather than 60 seconds so subjects absolute number of hits would also be higher in case those subjects that subsequently received negative feedback made this mental comparison.

Mood assessment instruments. The mood assessment scales were the same as those used in Experiment 4. These were the five positive and five negative visual analogue scales, VAPS, VANS, and the POMS.

Cognitive assessment. The cognitive assessment scales were the same as those used in Experiment 4. These were the TES (Value) and TES (Expectation) scales, the Scores Rating Scale, Evaluative Beliefs Scale, Satisfaction with Scores Scale, and the Scores Expectation Scale.

Pre- and Post-Induction Mood Tests

The pre- and post-induction mood tests were the same as those used in Experiment 4.

Procedure

The procedure was divided into three phases. These were the pre-induction, induction, and post-induction phase.

Pre-induction phase. Subjects were given the same experimental instructions to read as in Experiment 4. These were also read aloud by the experimenter. The subjects were given the following additional instructions verbally by the experimenter:

> However, before we get started I have a practice game for you to play. This is to give you some idea of what the game will involve and to let you get used to using the equipment.

Subjects were then given five games of "Sharp Shooter" to play and received positive or negative feedback at the end of each game in the same manner as with 'Shooting Gallery' in Experiment 4.

On completing the practice games subjects were given the TES and the Irrational Beliefs Test (IBT) (Jones, 1969). The IBT takes approximately 15 minutes to complete. It served as a distractor task to allow any mood effects from playing the training game to dissipate before the pre-induction mood test.

After subjects finished completing the TES and IBT scales their mood was assessed (Pre-Induction Mood Test).

Treatment phase. Subjects then played 10 games of "Shooting

Gallery". Positive or negative feedback was provided at the end of each game in the same way as was done in Experiment 4.

Post treatment phase. At the completion of the 10 games subjects' mood was reassessed (Post-Induction Mood Test) and the Post Test Questionnaire was completed.

Subjects were then debriefed with the experimenter again taking care to ensure subjects did not leave the experiment while experiencing any negative mood effects.

7.2 Results

Again the actual scores, cognitive variables, and mood data were analyzed by separate two-way analyses of variance.

Computer Game Scores

Unlike the previous experiment, there was a significant main effect of both training and feedback on subjects' actual average score on the computer game, $F(1,36) = 9.84$, 7.56 and $p<.003$, .009, respectively. An inspection of the group means showed that the negative feedback and the positive training groups achieved significantly higher scores than the positive feedback and negative training groups (see Table 39). While these results were unexpected, since the highest scores were obtained by the group expected to show the most negative mood change and the lowest score by the group that was expected to show the most positive mood change any differential effect subjects' actual scores are likely to have on mood should work against the experimental hypothesis.

Table 39
Experiment 5 Mean Computer Game Scores for the Four Experimental Groups.

	Feedback Condition		
Training	Positive	Negative	Total
Positive	74.47	90.13	82.30
Negative	63.72	72.73	68.22
Total	69.09	81.43	

Cognitive Assessment

Evaluative beliefs: Value and expectation of success at computer games. Training was successful in altering subjects' expectation of success at computer games. Unfortunately, contrary to prediction it also altered subjects' value of success at computer games. A two-way analysis of variance of TES (Value) and TES (Expectation) scores revealed a significant between groups effect for both scales, $F(1,36) = 32.3$, 20.0 and $p<.001$, .001 respectively. The positive training group had a higher value and expectation of success than the negative training group. As would be expected, there was no effect of training on TES (Value) and TES (Expectation) across the feedback conditions (see Table 40 and 41).

Nonevaluative belief: Belief of feedback. The Scores Rating Scale was used as a measure of subjects' level of acceptance of the feedback. A two-way analysis of variance on the Scores Rating Scale revealed a significant main effect for feedback, $F(1,36) = 20.84$, $p<.001$. The positive feedback subjects rated their scores as above average and the negative feedback subjects rated their scores as below average. There

was no between groups effect for training which suggests that the training game did not affect subjects' perception of their scores on the test game (see Table 42).

Table 40
Experiment 5 Mean TES (Value) Scores for the Four Experimental Groups.

	Feedback Condition		
Training	Positive	Negative	Total
Positive	3.67	3.39	3.53
Negative	5.26	4.99	5.12
Total	4.46	4.19	

Table 41
Experiment 5 Mean TES (Expectation) Scores for the Four Experimental Groups.

	Feedback Condition		
Training	Positive	Negative	Total
Positive	3.77	3.03	3.40
Negative	4.59	4.93	4.76
Total	4.18	3.98	

Qualitative rating of scores. As a check on subjects' cognitive reaction to their scores, three post test scales were administered to

Table 42
Experiment 5 Mean Scores Rating Scale Scores for the Four Experimental Groups.

	Feedback Condition		
Training	Positive	Negative	Total
Positive	3.60	4.70	4.15
Negative	3.00	5.40	4.20
Total	3.30	5.05	

assess what subjects thought generally about the quality of their scores, how satisfied they were with them and how their scores compared to their expectations.

As predicted there was a clear distinction between the feedback conditions for the Evaluative Beliefs Scale, $F(1,36) = 23.16$, $p<.001$, the Satisfaction with Scores Scale, $F(1,36) = 19.81$, $p<.001$, and the Scores Expectation Scale, $F(1,36) = 25.4$, $p<.001$. Contrary to predictions there was no significant difference on these three scales for the training conditions. However, there was a trend for the Evaluative Beliefs Scale to be significantly different for the training conditions (see Tables 43, 44, and 45).

Pre-Induction Mood Test

As has been found previously there was a minor pre-induction mood difference between the experimental groups.

Visual analogue scales. A two-way analysis of variance of the visual analogue scales detected a significant between groups effect for the relaxed scale for both the feedback, $F(1,36) = 4.82$, $p<.035$ and the training, $F(1,36) = 5.48$, $p<.025$, conditions. An inspection of group

Table 43
Experiment 5 Mean Evaluative Beliefs Scale Scores for the Four Experimental Groups.

	Feedback Condition		
Training	Positive	Negative	Total
Positive	3.54	4.81	4.18
Negative	3.24	4.23	3.74
Total	3.39	4.52	

Table 44
Experiment 5 Mean Satisfaction with Scores Scale Scores for the Four Experimental Groups.

	Feedback Condition		
Training	Positive	Negative	Total
Positive	2.70	4.50	3.60
Negative	2.50	4.50	3.50
Total	2.60	4.50	

Table 45
Experiment 5 Mean Scores Expectation Scale Scores for the Four Experimental Groups.

	Feedback Condition		
Training	Positive	Negative	Total
Positive	3.10	5.00	4.05
Negative	2.30	4.80	3.55
Total	2.70	4.90	

means indicated the positive training and negative feedback groups were significantly different to the negative training and positive feedback groups respectively. This was the only scale out of the 10 individual and two summery visual analogue scales to show a between groups difference. Since there was only a difference on this one scale and that difference was in a direction that would work against the experimental hypothesis it is suggested that the visual analogue scales indicate there were effectively no pre-induction mood differences between the experimental groups (see Table 46).

Profile of mood states (POMS). There were no pre-induction mood differences for any of the POMS scales (see Table 47).

Pre- to Post-Induction Mood Change

The change scores were again calculated in the same manner as was done in Experiment 1. Both the visual analogue and POMS scales showed significant between group mood differences across the feedback conditions. While there were no main effects for training on either mood measure the groups which showed mood changes significantly greater than zero reflected the influence of training. The results for each of the mood measures are presented below.

Visual analogue scales. Subjects' mood change scores showed a modest effect for feedback conditions. Again contrary to predictions, but consistent with the failure to find significant differences on the post-induction qualitative rating of scores for the training conditions, there were no significant mood change effects for training.

The two-way analysis of variance showed a significant main effect for feedback conditions on three of the 10 individual visual analogue scales and on one of the summary scales. These were the pleased, $F(1,36) = 15.9$, $p<.001$, irritated, $F(1,36) = 4.2$, $p<.05$, disappointed, $F(1,36) = 17.59$, $p<.001$, and VANS, $F(1,36) = 6.15$, $p<.02$, scales. The relaxed

Table 46
Experiment 5 Mean Pre-Induction Visual Analogue Scale Scores for the Four Experimental Groups.

	Feedback Condition							
	Positive			Negative				
	Training Condition						Total	
Visual Analogue Scales	Positive	Negative	Total	Positive	Negative	Total	Pos	Neg
Pleased	56.6	64.8	60.70	62.9	66.4	64.65	59.75	65.60
Relaxed	70.6	75.1	72.85	41.0	71.7	56.35	55.80	73.40
Tense	33.5	24.7	29.10	56.6	35.4	46.00	45.05	30.05
Irritated	29.8	17.6	23.70	16.5	22.0	19.25	23.15	19.80
Lighthearted	39.1	57.3	48.20	43.9	53.9	48.90	41.50	55.60
Frustrated	26.2	20.4	23.30	34.9	24.1	29.50	30.55	22.25
Disappointed	30.7	16.5	23.60	26.3	19.0	22.65	28.50	17.75
Excited	37.7	44.6	41.15	40.6	30.3	35.45	39.15	37.45
Happy	56.9	71.5	64.20	59.5	68.3	63.90	58.20	69.90
Discouraged	31.3	25.8	28.55	24.7	30.3	27.50	28.00	28.05
VAPS	52.2	62.7	57.42	49.6	58.3	53.85	50.88	60.39
VANS	69.7	79.0	74.35	68.2	73.8	71.02	68.95	76.42

Table 47
Experiment 5 Mean Pre-Induction POMS Scale Scores for the Four Experimental Groups.

	Feedback Condition							
	Positive			Negative				
	Training Condition						Total	
POMS Scales	Positive	Negative	Total	Positive	Negative	Total	Pos	Neg
Tension/Anxiety	4.1	6.4	5.25	13.1	4.2	8.65	8.60	5.30
Depression	4.2	4.8	4.50	8.8	4.2	6.50	6.50	4.50
Anger/Hostility	2.2	1.8	2.00	5.5	1.5	3.50	3.85	1.65
Vigor	8.8	15.3	12.05	11.5	14.2	12.85	10.15	14.75
Fatigue	13.6	9.2	11.40	12.5	9.8	11.15	13.05	9.50
Confusion	8.7	9.0	8.85	9.7	6.4	8.05	9.20	7.70
TMS	24.0	15.9	19.95	38.1	11.9	25.00	31.05	13.90

scale showed a trend towards being significantly different across feedback conditions, $F(1,36) = 3.75$, $p<.06$. The positive feedback subjects' mood change was more positive and/or less negative than the negative feedback subjects.

In order to determine which of the experimental groups experienced a significant amount of mood change, the groups' mean mood change scores were compared to zero. In spite of there being no significant main effects for the training conditions the negative training/positive feedback group was the only group whose mood change was consistently greater than zero on the positive mood scales. This group's mood change was positive and significantly greater than zero on the excited scale and showed a trend in this direction on three other scales, pleased,

relaxed and VAPS , $\underline{t}$ (39) = 3.19, 1.55, 1.4, 1.56 and $p<.001$, .08, .09, .08 respectively. The positive training/negative feedback group was the only group to consistently show a mood change greater than zero on the negative mood scales. This group's mood change was negative and significantly greater than zero on four scales. These were the tense, irritated, frustrated and VANS scales, $\underline{t}$ (39) = 2.79, 2.63, 4.37, 3.1 and $p<.005$, .006, .000, .001 respectively (see Table 48).

Table 48
Experiment 4 Mean Pre-to Post-Induction Visual Analogue Scale Change Scores for the Four Experimental Groups.

	Feedback Condition							
	Positive			Negative				
	Training Condition						Total	
Visual Analogue Scales	Positive	Negative	Total	Positive	Negative	Total	Pos	Neg
Pleased	6.3	12.1	9.20	-29.9	-13.9	-21.90	-11.80	-0.90
Relaxed	-21.9	-8.7	-15.30	0.5	-7.0	-3.25	-10.70	-7.85
Tense	3.2	-9.9	-3.35	-2.1	-8.4	-5.25	0.55	-9.15
Irritated	0.3	0.8	0.55	-30.4	-13.00	-21.70	-15.05	-6.10
Lighthearted	9.6	10.9	10.25	16.7	-0.8	7.95	13.15	5.05
Frustrated	-7.6	1.4	-3.10	-25.3	-4.9	-15.10	-16.45	-1.75
Disappointed	9.4	5.8	7.60	-31.7	-14.0	-22.85	-11.15	-4.10
Excited	9.9	25.5	17.70	9.4	6.8	8.10	9.65	16.15
Happy	-0.4	3.3	1.45	-6.9	-11.9	-9.40	-3.65	-4.30
Discouraged	3.5	10.0	6.75	-10.5	-3.8	-7.15	-3.50	3.10
VAPS	3.5	43.1	23.30	-10.2	-26.8	-18.50	-3.35	8.15
VANS	8.8	8.1	8.45	-100.0	-44.1	-72.05	-45.60	-18.00

Profile of mood states (POMS). There was a substantial between groups effect for subjects' mood change scores as measured by the POMS. Again, contrary to predictions there was no effect for the training conditions.

A two-way analysis of variance indicated that five of the six individual scales and the total scale showed significant differences between the feedback groups. These were the depression, $F(1,36) = 6.35$, $p<.02$, vigor, $F(1,36) = 4.65$, $p<.04$, fatigue, $F(1,36) = 5.35$, $p<.03$, confusion, $F(1,36) = p<.002$ and TMS, $F(1,36) = 8.68$, $p<.006$, scales. There was also a trend towards a significant difference on the anger scale, $F(1,36) = 3.83$, $p<.06$. Contrasts consistently showed that the positive feedback groups' mean mood change was positive and the negative feedback groups' mean mood change was negative.

Again in spite of there being no significant between group mood change effects for the training conditions, an analysis of the groups' mean mood changes to determine which groups achieved a mood change significantly greater than zero revealed that the negative training/positive feedback group was the only group to consistently show significant levels of mood change. This groups level of mood change was significantly greater than zero for three of the six individual scales and the total POMS scale. There was also a trend for one other scale to show a significant difference. These were the depression, vigor, confusion and TMS scales with the fatigue scale showing the trend, $t(39) = 2.36, 1.61, 2.93, 2.2, 1.42$, and $p<.01, .05, .001, .02, .08$ respectively.

Table 49
Experiment 4 Mean Pre- to Post-Induction POMS Scale Scores for the Four Experimental Groups.

	Feedback Condition							
	Positive			Negative				
	Training Condition						Total	
POMS Scales	Positive	Negative	Total	Positive	Negative	Total	Pos	Neg
Tension/Anxiety	-0.8	-0.1	-0.45	1.6	0.2	0.90	0.40	0.05
Depression	1.3	3.0	2.15	-0.7	-1.4	-1.05	0.30	0.80
Anger/Hostility	1.0	0.3	0.65	-2.8	-0.4	-1.60	-0.9	-0.05
Vigor	0.6	2.8	1.70	-2.0	-2.1	-2.05	-0.7	0.35
Fatigue	2.3	1.9	2.10	-0.3	-1.7	-1.00	1.00	0.10
Confusion	0.9	2.3	1.60	-1.0	-1.1	-1.05	-0.05	0.60
TMS	5.3	10.2	7.75	-5.2	-6.5	-5.85	0.05	1.85

7.3 Discussion

The results from this study largely support all the major experimental hypotheses. The training game did raise and lower subjects' expectations of success at computer games. Unfortunately, it also raised and lowered subjects' value of success at computer games as well, again making it impossible to independently assess the relative contributions of these cognitive variables to mood change. The positive and negative feedback was again associated with positive and negative mood change and the two groups whose expectations were not matched by feedback showed the greatest amounts of mood change. Therefore, the present study, as in the two previous studies, demonstrated a causal relationship between

nonevaluative beliefs and emotional response. The results from this study also provide tentative support for the hypothesis that evaluative beliefs also have a causal relationship with emotional response. These results, therefore, provide empirical support for the basic theoretical assumptions of the cognitive learning therapies (see Chapter 1). The following discussion will consider the evidence generated in this study of a causal relationship between nonevaluative and evaluative beliefs, and emotional response. It will also consider the implications of these findings for the theoretical assumptions of the cognitive learning therapies.

As was shown in the two previous studies, there was a significant difference between the feedback conditions on the Scores Rating Scale indicating that the feedback conditions generated differential beliefs about the size of the subjects' scores. As expected the positive feedback group believed their scores were higher than the negative feedback group even though the difference between their actual scores was in the opposite direction. Again there was a consistent significant difference between the feedback conditions for their mood change scores (see Table 41).

Unlike the two previous experiments in the current study an attempt was made to manipulate subjects' expectations of success at computer games by providing prior experience of either success or failure at computer games. The resulting value/expectation of success was again assessed by the TES (Value) and TES (Expectation) scales. Contrary to predictions, the training influenced value as well as expectation of success at computer games. Therefore, once again it was not possible to differentiate the independent effects of these variables. There was a significant difference between the positive and negative training groups for both TES (Value) and TES (Expectation). There was no difference on

these scales for the experimental feedback conditions. Since subjects were randomly assigned to the training groups there is no reason to assume that there was a systematic value/expectation difference for these groups prior to training. It is reasonable to assume that subjects' experience on the training game generated a shift in both their value and expectation of success at computer games.

Again, the impact of the experimental treatments on subjects' cognitive state was assessed by the post-induction qualitative rating of scores scales. There was a strong difference between the feedback conditions but there was no difference for the training conditions on the Evaluative Beliefs Scale, the Satisfaction with Scores Scale or the Scores Expectation Scale. These results tend to suggest that while training produced a difference in value/expectation of success these differences were not large enough to influence the post-induction qualitative rating of scores.

Having successfully manipulated subjects' value/expectation of success at computer games with the training game made it possible to assess the nature of the association shown in the previous study between value/expectation and emotional response. The mood change data for the training groups is consistent with a causal relationship between value/expectation of success at computer games and emotional response.

There was no significant between groups effect for the training conditions on the mood change scores. However, by investigating the magnitude of the mood changes across the experimental groups, that is comparing the groups' mean mood changes to zero, it was found that the mood changes in this experiment tended to support the experimental hypothesis. As in the previous study the negative training/positive feedback and the positive training/negative feedback groups were the only groups to consistently produce mood changes significantly greater

than zero. In other words subjects who had had their value/expectation of success lowered and then were told they had achieved above average scores consistently achieved a positive mood change consistently greater than zero. Subjects who had had their value/expectations of success raised and who were then told they had scored below average consistently achieved a negative mood change significantly greater than zero. The other groups, those that had their value/expectation lowered followed by being told that they had achieved below average scores and those that had their value/expectation raised and who were then told that they had achieved above average scores did not consistently experience mood change significantly greater than zero.

In summary, subjects whose feedback matched their training experience were less affected emotionally by the test game than subjects whose feedback did not match their training experience. Subjects were given a distractor task between the training and test phases which allowed any mood changes that occurred during the training to dissipate. This ensured there was no post-training pre-induction mood difference between the experimental groups. Therefore, the mood changes outlined above can not be attributed in anyway to the direct influence of the training feedback on subjects' pre-induction mood states. Since in this experiment subjects' expectations and value of success at computer games were experimentally manipulated and their emotional responses reflected those changes a causal relationship has been demonstrated between these variables. This finding demonstrates empirically that values and expectations are causally related to emotional responses. Therefore, the kinds of cognitions which are frequently the focus of clinical interventions by cognitive learning therapists have been demonstrated to be causally related to emotional responding.

CHAPTER 8

THE MERE EXPOSURE RESEARCH

The preceeding chapters have dealt with the first question identified in Chapter 4 concerning cognitions being a sufficient condition for emotional response. The results from the previous experiments provided evidence of a causal relationship between the specific cognitive processes identified by the cognitive learning therapists and emotions. This work extends to these specific processes the widely accepted view that cognitions are a sufficient condition for generating emotional response. The current chapter will consider the second question from Chapter 4, of whether cognitive processes are also a necessary condition for emotional responding.

While there is agreement that cognitions are a sufficient cause of emotions there is some considerable disagreement as to whether they are a necessary precursor of emotions (Kagan et al, 1985). As has been outlined above the cognitive learning therapist's cognitive mediational approach to emotion is consistent with the view that cognitions are a necessary precursor of emotion. The strongest challenge to the generality of the cognitive mediational position adopted by cognitive learning therapists has come recently from a social psychologist. In an intentionally provocative paper Zajonc (1980) has asserted that the cognitive theorists of emotion (including the cognitive learning therapists) have overlooked some of the evidence which suggests affect is not always post-cognitive. Before discussing the propositions contained in Zajonc's paper it is perhaps worthwhile to recognize the spirit in which they were written:

> The language of my paper has been stronger than can be justified by the logic of my argument or the weight of the evidence, I hasten to affirm that one of my purposes was to convince you that affect should not be treated as unalterably last and invariably post cognitive. (Zajonc, 1980, p. 172)

Zajonc's language is indeed strong as he states that his interpretation of the evidence suggests: "affective judgments may be fairly independent of, and precede in time the sorts of perceptual and cognitive operations commonly assumed to be the basis of these affective judgments .... [emotions are] the first reaction of the organism .... [they] can occur without extensive perceptual and cognitive encoding .... [they] are made with greater confidence than cognitive judgments and can be made sooner .... [Zajonc concludes] affect and cognition are under the control of separate and partially independent systems that can influence each other in a variety of ways and that both constituted independent sources of effects in information processing" (Zajonc, 1980, p. 151). In addition to those qualities of affective responses described by Zajonc in his summary, he has also defined emotions as having all of the following qualities. They are dominant, basic, primary, automatic, instantaneous, effortless, inescapable, irrevocable, holistic, more difficult to verbalize, yet easy to communicate and understand, pre-cognitive, and partially independent of cognition (p. 151).

It is the purpose of this review to seriously consider some of the issues raised by Zajonc and their implications for the cognitive learning therapies, review some of the constructive comments his paper has attracted and consider how some of the notions generated by the debate can be empirically evaluated. The first task will be to consider the implications of Zajonc's position for the cognitive learning therapies.

8.1 The Implications of Affective Primacy for the Cognitive Learning Therapies

The proposition that cognitions and emotions are controlled by partially independent systems is pertinent to the assessment of abnormal

psychological experience. If this were found to be the case then it would follow that abnormality in one system would not automatically mean abnormality in the other, change in one system would not necessarily mean accompanying change in the other or substantial time lags may at least be expected and it would probably prove ineffective to attempt to elicit change in either system by working through the other system. Therefore, it would become imperative for cognitive learning therapists to be able to differentially identify system breakdown and devise interventions to directly access each system independently (Rachman, 1981).

The position outlined above could have particular relevance in view of the limited success of the semantic or rational psychotherapies. These approaches which are prominent examples of the cognitive learning therapies, depend on two assumptions refuted by Zajonc. The first that affect is post-cognitive rather than pre-cognitive and the second that cognition and affect either operate within the same system or that there is ready interchange between the systems. Therefore, if Zajonc's interpretation of the evidence proved to be correct, the semantic therapist's model would be difficult to sustain. Acceptance of Zajonc's interpretation, therefore, would discourage further attempts by cognitive learning therapists to discover more precise cognitive explanations for affective reactions (Rachman, 1981). Since the ramifications, for the cognitive learning therapies, of accepting Zajonc's approach are so drastic, the evidence on which they are based warrants consideration.

8.2 The Empirical Evidence For Affective Primacy

It is appropriate at this point to consider the evidence Zajonc has marshalled to support his position and evaluate it in the light of some

of the comment it has attracted in the literature. Central to Zajonc's position on cognition and affect is his approach to unconscious mental events. He argues that there are at least two different forms of unconscious process. One emerges "where behaviour, such as that occurring in discrimination among stimuli, is entirely under the influence of affective factors" (Zajonc, 1980, p. 171). Here he includes such phenomena as perceptual defense, subliminal perception and state dependent recall. The other "is implicated in highly overlearned, and thus automated, sequences of information processing; this form includes cognitive acts but has collapsed them into larger molar chunks that may conceal their original component links" (p. 171). The empirical evidence that Zajonc cites to support the proposition that affect can be pre-cognitive depends on accepting the first category of unconscious processes outlined above. The critical piece of evidence for Zajonc's position is the finding that the mere exposure effect for preferences (Hamid, 1972; Harrison, 1977; Zajonc, 1968) occurs even when recognition of the visual stimuli is kept at chance levels (Kunst-Wilson & Zajonc, 1980; Zajonc, 1980). Mere exposure refers to a body of research which has identified and investigated the finding that the repeated exposure of an individual to a stimulus is a sufficient condition for the enhancement of his attitude toward that stimulus. Zajonc (1980, 1984) argues that the finding that frequent exposure of stimuli enhances preference even in the absence of subsequent stimulus recognition, is evidence of emotional response in the absence of cognition. In general terms, Zajonc is arguing for the separation of affect and cognition and the dominance and primacy of affective reactions because stimuli whose ordinary perceptual recognition has been kept at chance level, may generate an emotional response.

Critical reaction to Zajonc's position has suggested his arguments

depend on definitions of cognition and cognitive processing that (a) are narrow, (b) assume cognitive processes are synonymous with rationality, and (c) assume stimulus recognition or awareness is essential for cognitive processing to occur (Lazarus, 1982, 1984; O'Malley, 1981; Rachman, 1981). Each of these views will be examined in more detail below.

First Zajonc's critics suggest the contention that affect and cognition are partially independent systems and that affect is primary depends in part on a particularly narrow view of cognitive processing that stems from the conception of mind as an analogue to a computer. In this formulation, human cognition, like the operations of a computer proceeds by serially receiving, registering, reading, storing for the short or long run and retrieving meaningless bits, followed by transformation to meaning that is called information processing (Lazarus, 1982). It is reasonable to argue that such a lengthy process does not account for the very rapid emotional responses humans experience. However, there is an alternative to concluding that affect must, therefore, be primary and independent of cognition. It has been argued (Folkman, Schaefer & Lazarus, 1979; Lazarus, 1982, 1984; Wrubel, Benner & Lazarus, 1981) that humans are sensitive to meaning and evaluate events in terms of their impact for the individual and react emotionally to some of these evaluations. Lazarus (1982) explains:

> We do not always have to await revelation from information processing to unravel the environmental code. As was argued in the new look movement in perception, personal factors such as beliefs, expectations, and motives or commitments influence attention and appraisal at the very outset of any encounter. Concern with individual differences leads eventually to concern with personal meanings and to the factors that shape such meanings. We actively select and shape experience and in some degree mould it to our own requirements. Information processing as an exclusive model of cognition is insufficiently concerned with the person as a source of meaning. (p. 1020)

Lazarus later argues "we can react to incomplete information, which

in fact we do in most transactions. The meaning derived from incomplete information can, of cause, be vague; we need to allow for this type of meaning as well as for clearly articulated and thoroughly processed meaning" (Lazarus, 1982, p. 1021). Lazarus's position is based on the work he and his colleagues have done on the role of cognitive mediation in emotional experience and coping processes (Cohen & Lazarus, 1973; Coyne & Lazarus, 1983; Koriat et al, 1972; Lazarus, 1966; Lazarus & Alfert, 1964; Lazarus et al, 1962; Speisman et al, 1962). These authors argue the results of their studies support the notion that cognitive processes have a causal influence on emotion. Their position does not preclude emotion having a causal influence on cognition, in fact, they see the relations between cognition and emotion as "complex two way streets" (Lazarus, Kanner, & Folkman, 1980, p. 191). They believe an adequate model would have to focus on the *on*going interplay of emotions and cognitions. Not withstanding this, they claim it is "cognitive processes which shape the quality and intensity of a given emotional response and not the other way around" (Lazarus et al, 1980, p. 191). To clarify their position it would seem that Lazarus and his colleagues are saying; cognitions are a necessary and sufficient condition of emotion, the quality and intensity of emotional responses can only be determined by cognitive processes and it is possible, indeed likely, that there is a feedback loop whereby emotional responses influence cognitive processes and thereby (through cognitions) influence subsequent emotional experiences. This presents a much broader view to Zajonc's of the nature of cognition and the cognitive processes which generate emotion.

The second issue which has attracted criticism is Zajonc's argument that the independence of the two systems is further illustrated by the clinical experience that irrational fears are resistant to modification

by rational logical argument as exemplified by the semantic therapies. However, this interpretation of the evidence has been questioned on two separate grounds. Firstly, what the Zajonc model does not account for is whether or not rational, logical argument does in fact have an impact on the cognitive basis of irrational fears. This distinction between the role of cognitive processes in mediating emotions and the capacity of verbal therapies to influence these cognitive processes has long been recognized (Bandura, 1977). Bandura (1977) argues that cognitive events are induced and altered far more readily by "experiences of mastery arising from successful performance" (p. 78) than by means of verbal persuasion. Zajonc does not address this issue but merely assumes that the ineffectiveness of verbal therapies is evidence for the primacy of affect and the independence of the cognitive and affective systems. However, if Bandura's alternative explanation of the lack of success of verbal therapies is accepted then it would be worthwhile pursuing rational approaches and considering the adoption of more active intervention techniques. Secondly, other workers dispute what they see as an assumption by Zajonc that cognitions are synonymous with rationality. They point out that the cognitive processes that shape our emotional reactions can distort reality as well as reflect it realistically (Lazarus, 1982). This view is consistent with that expressed by Dember (1974) in relation to the influence of ideation on motivation. During the forties, events considered motivational in nature were tied directly to conditions of physiological imbalance (Hull, 1943). Over the next three decades it was realized that the motivational state of both human beings and animals is also influenced by the informational properties of stimuli (Dember, 1965). Dember argued in a later paper (Dember, 1974) that even the most cognitive of theories to date didn't adequately account for "the motivational potency of

ideation" (p. 165). His paper presents an array of evidence to support this assertion and his final comments are addressed to the issue of the kinds of assumptions commonly associated with rationality:

> More generally, I would call into question the easy assumption that the dominance of behaviour by rational "cognitive" processes will necessarily assume personally and socially desirable outcomes. On the contrary, there may be as much to fear from unbridled ideation (especially in its extreme form ideology) as there is from unconscious fantasies and impulses or unrestrained emotion. (Dember, 1974, p. 167)

Both Lazarus and Dember have recognized that events dependent on cognitive processes are not necessarily linked to rational outcomes.

Finally, Zajonc's critics assert that the concept of cognition and cognitive processes influencing emotional responses does not imply awareness is necessary of the cognitive factors which determine emotional reactions (Lazarus, 1966, 1982, 1984). It is this issue of awareness which Rachman (1981) also identifies as critical to Zajonc's position:

> Probably the most challenging aspect of this part of Zajonc's argument is the claim, based on some interesting but sparse evidence that affective changes occur after repeated stimulus exposure, even in the absence of [stimulus] recognition. It is this last clause that is potentially the most fascinating and one that would bear investigation. (p. 283)

The critics of Zajonc's position collectively represent an alternative view of the relationship between cognition and emotion that may be summarized as follows. Emotional reactions occur in response to what we believe the situation to be, our belief does not have to be accurate or rational, it can be based on a variety of processes including thoughts, beliefs, expectations and past experiences, it can and does occur before detailed information processing is completed, and we do not need to be aware of the cognitive processes involved. These critics doubt that Zajonc's contention that emotion is independent of cognition, will be sustained when a broader view of cognition, such as that used above, is adopted.

8.3 The Current Research Problem

Although Zajonc has been criticized for the narrowness of his definition of cognition and the assumption that cognition does not occur without stimulus recognition, it has yet to be demonstrated that cognitive processes, however broadly defined, can influence emotional responses to stimuli in the absence of recognition. Should it be possible to demonstrate that cognitions can influence emotional responses to nonrecognizable stimuli it would be more difficult to refute the necessity of cognitive mediation for emotional response. The following studies were undertaken to investigate this issue.

CHAPTER 9

THE MERE EXPOSURE RESEARCH: LITERATURE REVIEW AND EXPERIMENTS 6, 7, AND 8

The mere exposure effect was used by Zajonc (1980) to illustrate notions about the relationship between affect and cognition. The nature of his theorizing and the reactions of other authors have been reviewed above and some ideas which warrant closer scrutiny have been identified. Like Zajonc it is proposed to utilize the mere exposure phenomena in order to do this. Therefore, before proceeding to outline that work, the experimental findings which characterize the mere exposure effect are reviewed below.

9.1 The Mere Exposure Effect

The mere exposure effect as presented by Zajonc (1968) has the following features.

1. The repeated exposure of an individual to a stimulus is a sufficient condition for the enhancement of his attitude toward that stimulus.

2. The mathematical representation which best fits the relationship between positive affect and stimulus repetition is a positive decelerating curve, with enhanced affect a function of the logarithm of the exposure frequency.

3. Exposure is not seen as the only basis for liking and it is possible enhanced affect from stimulus repetition can be at least partially offset by other factors.

4. There is no such thing as "over exposure" and each successive exposure leads to successively smaller increments in positive affect. It is argued that studies which show that stimuli eventually lose their appeal

after high levels of stimulus repetition reflect variables other than exposure itself.

Other researchers have suggested that the relationship between familiarity and liking is more complex than that proposed by the mere exposure model. The most common alternative suggested is an inverted-U relationship between exposure and liking where stimuli of intermediate familiarity are the best liked (Berlyne, 1967, 1971, 1973, 1974).

It is not the purpose of this study to enter into a debate concerning the ultimate parameters of the effect. There is a wealth of research which enables us to predict the occurrence of the mere exposure effect under specified conditions. This evidence will be summarized below.

The range of empirical evidence which has accumulated in support of the phenomenon is substantial. Increased positive affect as a function of frequency of exposure has been found with chinese characters (Suedfeld, Epstein, Buchanan, & Landon, 1971; Zajonc, 1968), turkish words (Zajonc, 1968; Zajonc & Rajecki, 1969), nonsense syllables (Becknell, Wilson, & Baird, 1963; Johnson, Thompson, & Frincke, 1960), music (Lieberman & Walters, 1968), photographs of mens' faces (Zajonc, 1968) phobic objects (Litvak, 1969), and random geometric shapes (Hamid, 1972; Kunst-Wilson & Zajonc, 1980). The research into the conditions under which these effects have occurred will be considered next.

1. Stimulus variables

(i). Initial familiarity

The mere exposure hypothesis suggests the relationship between affect and exposure frequency is a positive decelerating curve and, therefore, accommodates the finding that repetition of an already familiar stimulus has little effect on attitude (Harrison, 1977).

(ii). Initial meaning

The mere exposure effect has been found for stimuli with a variety of initial affective ratings (Harrison, 1977). It has been shown, however, that novel stimuli of low association value show greater increases in positive affect than similar stimuli of high association value (Hamid, 1972).

(iii). Complexity

Reduced stimulus complexity lowers the likelihood of an exposure effect. Complex stimuli have consistently shown more powerful exposure effects than simple stimuli (Berlyne, 1970; Fryrear & Cottrell, 1976, cited in Harrison, 1977; Saegert & Jellison, 1970; Skaife, 1966, cited in Berlyne, 1971; Smith & Dorfman, 1975). A study which investigated a range of stimulus complexity (Hamid, 1972) found optimal increases in liking with medium level complexity geometrical shapes.

(iv). Recognizability

There is a growing body of evidence which suggests stimulus recognition is not necessary for the exposure affect to occur (Kunst-Wilson & Zajonc, 1980; Moreland, 1975; Moreland & Zajonc, 1977; Seamon, Brody, & Kauff, 1983a, 1983b; Wilson, 1975; Zajonc, 1980). This evidence will be reviewed in more detail in a later section.

2. Presentation variables

(i). Context

It has been suggested that the affective reactions elicited by the situation or context in which the exposure occurs will become increasingly associated with the exposure stimuli as exposure progresses (Burgess & Sales, 1971; Perlman & Oakamp, 1971; Saegert, Swap, & Zajonc, 1973). Two different kinds of context variables have been investigated and their impact on the exposure effect can be differentiated.

Initially, it was thought that the background or surround of the stimuli may transfer it's affective valance to the stimuli via incidental learning (Burgess & Sale, 1971). The weight of evidence does not support this proposition (Johnson, 1973; Saegert et al, 1973). Subsequently, the proposition that the exposure effect would be influenced by the emotional properties of another stimulus which became associated with the exposure stimulus by means of paired associate learning or other direct procedures, has accumulated more empirical support (Burgess & Sales, 1971; Perlman & Oskamp, 1971; Swap, 1976, cited in Harrison, 1977). The evidence suggests that these two effects, exposure and associative learning, are independent and additive (Zajonc, Markus, & Wilson, 1974b). Therefore, exposure in a negative context may act to reduce liking but the exposure effect will serve to increase liking and the resultant emotional response will be the balance between the two effects (Harrison, 1977).

(ii). Presentation sequence

An exposure effect is more likely to occur when stimuli are presented as a heterogeneous sequence, that is, interspersed among other stimuli, than when presented in a homogeneous or interrupted sequence (Berlyne, 1970). The frequency of presentation, rather than the exposure duration, is the critical variable for the mere exposure effect. When duration of exposure was compared to exposure frequency an inverted-U shaped function was found for the relationship between duration and affect (Hamid, 1972).

3. Measurement variables

(i). Scales

The most common affective rating scales which have been used in mere exposure research are Good-Bad and Like-Dislike scales. These

scales are easily contaminated by variables not representative of positive affect, for example, curiosity, and require careful interpretation (Zajonc, Crandall, Kail, & Swap, 1974a).

(ii). Immediate and delayed ratings

The general trend in the literature is that mere exposure effects are more likely to occur if the exposure and rating phases are separated in time (Harrison, 1977). One group of studies suggests delayed ratings in terms of minutes produces greater increases in liking than immediate ratings (Harrison & Crandall, 1972; Stang, 1974) and another group shows rating delay in terms of days also produces improved ratings (Crandall, Harrison, & Zajonc, 1976, cited in Harrison, 1977; Johnson & Watkins, 1971; Stang, 1976, cited in Harrison, 1977; Stang & O'Connell, 1974; Wilson & Miller, 1968).

9.2 Experiment 6

The interesting but sparse evidence referred to by Rachman (1981) (see Chapter 8) consists of four studies carried out by Zajonc and his colleagues. Two of these (Moreland, 1975; Moreland & Zajonc, 1977) used multiple regression analysis to determine the relative merits of exposure frequency and recognition as predictors of liking. They found that exposure frequency was, and that recognition variables were not significant predictors of affect. However, there is some doubt about the appropriateness of multiple regression and partial correlation analysis for testing the null hypothesis that stimulus recognition mediates the exposure effect on liking (Birnbaum & Mellers, 1979; Moreland & Zajonc, 1979).

Far more compelling evidence has been reported in two subsequent studies which attempted to assess this issue using direct

experimentation. One study has shown that the attractiveness of auditory stimuli was enhanced by repeated exposure when recognition was impaired by a dichotic listening task (Wilson, 1979). The other used very rapid presentation of visual stimuli such that post exposure stimulus recognition was kept at chance level. The results suggest that affect was enhanced by exposure (the mere exposure effect) in the absence of stimulus recognition (Kunst-Wilson & Zajonc, 1980). These results, together with the assumption that stimulus recognition is necessary for cognitive mediation to occur, form the basis of Zajonc's contention that cognition is not a necessary precursor of emotion.

Attempts to replicate these findings have met with mixed success. Zajonc (1984) reported that Mandler had been unable to replicate the Kunst-Wilson and Zajonc (1980) study. Another series of studies that investigated the effects of shadowing, masking, cerebral laterality, and test latency on the mere exposure effect in the absence of stimulus recognition were only able to consistently replicate Kunst-Wilson and Zajonc (1980) with the help of shadowing or by presenting the stimuli to the right visual field (Seamon, Brody, & Kauff, 1983a). These studies are difficult to interpret since recognition was also frequently above chance in some of the experimental conditions investigated. In spite of this, these findings tend to suggest affective judgments are superior for identifying target slides when training is restricted to the left hemisphere but not when training is restricted to the right hemisphere and when training was shadowed by a verbal task. That is, affective judgments were superior for subjects who listened to and repeated a list of words while they were being shown the training slides. These findings raise complex questions concerning the lateralization of cognitive functions within the brain. They would seem to support the contention (O'Malley, 1981) that recognition judgments more so than preference

judgments are in some part influenced by verbal labeling or language (a left hemisphere function). Seamon et al (1983a) concluded that their findings were best interpreted as evidence of how different retrieval processes are activated by requests for either recognition or preference judgments and how these different retrieval processes can access different levels of stimulus representation from memory. They suggest that recognition decisions can be made on the basis of familiarity or on the basis of a search for the relevant item representation in memory. They contend that frequent exposure can generate stimulus familiarity even when there has been insufficient time for a full representation of the stimulus to be encoded. Therefore, they argue that target selection by affect judgement may be recognition based on a retrieval process that accesses the familiarity produced by repeated exposure. Furthermore, they contend that in the case of affective judgments, subjects need not be aware that this stored information has been accessed. They summarize their position by stating "strictly speaking, a repeated stimulus may be liked, not because it is familiar, but because the subject may be familiar with processing it." (p. 554)

Since the concept of cognition adopted here is broader than that which would limit the involvement of cognitive processes to the level of conscious awareness and verbal labeling, it was decided to take a different approach to evaluating the import of Zajonc's argument.

It has been shown in the previous experiments here, and in the laboratory and real life studies that investigated the role of cognitions in mediating emotional reactions (Cohen & Lazarus, 1973; Coyne & Lazarus, 1983; Koriat et al, 1972; Lazarus & Alfert, 1974; Lazerus et al, 1962; Speisman et al, 1964), that emotional responses can be generated by experimentally manipulating cognitive processes which have been classified in Chapter 4 as evaluative and nonevaluative

beliefs.

It is possible that the preferences generated by the mere exposure effect can be manipulated in the same way. In his 1968 formulation of the mere exposure hypothesis Zajonc acknowledged that enhanced affect from stimulus repetition could be at least partially offset by other factors (see previous section for review). One factor which has been empirically investigated is when stimuli are presented in such a way that the perceiver is encouraged to make attributions about them. The findings suggest that the subjects emotional response to the stimuli may be influenced by stimulus attributions (Burgess & Sales, 1971; Perlman & Oskamp, 1971; Swap, 1976, cited in Harrison, 1977).

It has been shown in another context that first year psychology students value intelligence and creativity as socially desirable attributes and instructions which link these qualities to an experimental task can significantly influence responses on that task (Ashton & White, 1975). It is hypothesized that subjects who value intelligence and creativity (evaluative belief) and who believe experimental instructions linking intelligence and creativity to a preference for either familiar or unfamiliar stimuli (nonevaluative belief) would respectively increase and decrease their affective rating of the trained (familiar) stimuli.

9.2.1 Method

Subjects

The 48 subjects were volunteers from a group of 200 first year psychology students at the Australian National University who had not had any prior contact with any of the experimental materials. Their age ranged from 18 years to 47 years with a mean of 23.85 years. There were

15 males and 33 females. Subjects were given course credit for participating.

Design

The experimental design was a two by two by two by three factorial design (see Table 50). The factors were stimulus sets (A,B), order of judgments (recognition/preference, preference/recognition), stimulus recognition (recognition, nonrecognition), and instructions (increase, decrease, control). The dependent variables were belief of instructions, attitude to intelligence and creativity, recognition judgments, and preference judgments.

Table 50
Experiment 6 Experimental Design

	Stimulus Set			
	A		B	
	Order of Judgement			
Group	R/P	P/R	R/P	P/R
Recognition				
Increase				
Decrease				
Neutral				
Nonrecognition				
Increase				
Decrease				
Neutral				

Materials

Stimuli. The stimuli were two sets (A,B) of 20 stimulus slides[4] of randomly generated 10 point shapes (solid black on white), standardized for association value, preference rating and recognizability (see Appendix D-1, D-2).

Equipment. The slides were projected on to a 17 by 23 centimeter rear projection screen mounted at the end of a 1 meter viewing tunnel, by a Kodak Carousal S-RA projector using a 150 watt bulb. The slide exposure time was controlled by a Uniblitz mechanical shutter model number 225LOAOT5-24928 manufactured by A.W.Vincent Assoc., Inc. New York. The projection distance for all slide presentations was 400mm. The training stimuli were shown through a No. 70 red and a No. 59 green Kodak Wratten gelatin filter catalogue numbers 149 5936 and 149 5878 respectively. They appeared black on a reddish background. During training diffuse room lighting was provided by a 240 volts, 50hz, 15 watt fluorescent desk lamp placed under the table supporting the viewing tunnel. In the training position the uninterrupted projector light intensity at the center of the screen was 2500 foot candles. The test stimuli were projected at an angle of 15 degrees. During testing normal room lighting was used. In the test position the uninterrupted projector light intensity at the center of each projection area was 1250 foot candles.

Recognition and preference judgments. Subjects' recognition and preference judgments were made on a data sheet by placing a circle around either "left" or "right" to indicate which of the slides they

[4] Kunst-Wilson and Zajonc (1980) used two sets of 10 stimulus slides. A pilot study to compare 6, 10, and 20 slide stimulus sets found no significant difference between the 10 and 20 slide sets for the percentage of target slides selected by either recognition or preference judgments (see Appendix D-3).

recognized or preferred respectively. Subjects also indicated on a five point scale how sure they were about each judgement (see Appendix D-4).

Cognitive assessment. The importance for subjects of intelligence and creativity as a personal attribute was assessed using the Attitude to Intelligence and Creativity Questionnaire (see Appendix D-5). A post test questionnaire was designed to assess whether subjects remembered the information from the experimental instructions and whether they found it credible (believable). To assess if they understood and remembered the instructions subjects were asked to indicate whether intelligent and creative people preferred familiar or unfamiliar material. How credible these experimental instructions were was measured by a five point scale on which subjects rated how likely they thought it was that intelligent and creative people would prefer familiar/unfamiliar material. To ensure that the significance of these measures were not over emphasized they were embedded in some general questions about taking part in the experiment (see Appendix D-6).

Procedure

Subjects who volunteered for the study were randomly assigned to one of the six experimental conditions: recognition - increase, decrease, and control; nonrecognition - increase, decrease, and control. The random assignment was restricted to ensure even numbers across experimental conditions. This was done by a procedure of sampling without replacement (Keppel, 1982), that is, as a subject was assigned to a condition that condition was not available for assignment until all the other conditions had also been assigned a subject. Subjects were then given the following instructions. All instructions were handed to subjects typed on an A4 sheet of paper and read aloud by the experimenter.

I am investigating the rationale behind techniques used in advertising. Initially, I need some people to help me evaluate the stimuli I am going to use in my research. This will involve looking at some slides and filling in some rating scales. Because of the nature of my research I need to know how people with different opinions on several issues will rate the slides. Therefore, before you rate these slides I would like to check your opinion on these issues.

Subjects then completed the Attitude to Intelligence and Creativity Questionnaire. On completing this scale subjects were given the appropriate experimental instructions.

Increase Group. The rationale I'm investigating relates to some recently published research that purported to show that intelligent, creative people form stronger preferences for familiar material than for unfamiliar material and conversely that dull, uncreative people form stronger preferences for unfamiliar material than for familiar material. In order to check these findings I need to establish standard ratings for my stimuli. To do this I am going to briefly show you some slides and then ask you to rate both these familiar slides and some you haven't seen before. You won't be able to remember all the slides but your degree of preference for the familiar slides should correlate with your intelligence and creativity.

Decrease Group. The rationale I'm investigating relates to some recently published research that purported to show that intelligent, creative people form stronger preferences for unfamiliar material than for familiar material and conversely that dull, uncreative people form stronger preferences for familiar material than for unfamiliar material. In order to check these findings I need to establish standard ratings for my stimuli. To do this I am going to briefly show you some slides and then ask you to rate both these familiar slides and some you haven't seen before. You won't be able to remember all the slides but your degree of preference for the unfamiliar slides should correlate with your intelligence and creativity.

Subjects in the two control groups did not receive any experimental instructions. All subjects were then given the following pretraining instructions.

Pretraining Instructions. I'm going to show you some slides now. Your task is to merely attend to these slides for the moment. Later you will be asked to make some judgments about them. Each slide will be presented on the screen for only a brief time. Therefore, I want you to fix your gaze on the center of the screen and even if you only see a flash of light concentrate on whatever comes up on the screen. I will give you the signal "ready" just before each slide is shown so that you will know when it is coming. You cannot ask questions during the series so do you have any questions now.

If a subject had any questions the instructions were read again but no explanations were provided.

The experiment then consisted of two phases, training and test. During the training phase, subjects were shown one set of stimulus slides a total of five times. The subjects within each experimental condition were divided into two subgroups, with subjects randomly assigned to subgroups. The stimulus sets used for training were counterbalanced across these subgroups. That is, half of the subjects in each experimental condition were shown set A and half set B. During training a separate random order was used for each of the five presentations of the stimulus set. The exposure time for the recognition conditions was 1 second and for the nonrecognition conditions was 1 millisecond.

During the test phase each of the training slides were presented in a paired comparison with slides from the nontraining set and forced choice judgments of recognition, preference, and rating confidence were recorded. Since the experimental instructions confound recognition and preference judgments these ratings could not be made about the same stimuli. Therefore, each stimulus set was divided into two subsets (A1,A2 & B1,B2). Subjects then made recognition judgments about subsets A1 or B1 and preference judgments about subsets A2 or B2 (depending on their experimental condition subgroup). Subsets A1 and A2, and subsets B1 and B2 had been previously standardized for recognizability. That is, when A1 is at chance recognition level so is A2, and when B1 is at chance recognition level so is B2 (see appendix C-2).

All subjects were given the following pretest instructions.

Pretest Instructions

1. Recognition test

I'm now going to show you two slides at a time, you will have adequate time to see them and I would like you to make the following judgments about each of the pairs of slides.

(a) Which slide have you seen before

(b) How sure you are of your judgment

PLEASE MAKE SURE YOU MAKE BOTH JUDGMENTS

(a) AND (b) ABOUT EACH PAIR OF SLIDES

2. Preference test

I'm now going to show you two slides at a time, you will have adequate time to see them and I would like you to make the following judgments about each of the pairs of slides.

(a) Which slide do you prefer

(b) How sure you are of your judgment

PLEASE MAKE SURE YOU MAKE BOTH JUDGMENTS

(a) AND (b) ABOUT EACH PAIR OF SLIDES

The order in which subjects made the recognition and preference judgments was counterbalanced within experimental condition subgroups. Subjects were not told they would be required to make a second set of judgments until after they had completed the first sequence of comparisons.

Finally, subjects completed the post test questionnaire.

9.2.2 Results

A complete four-way analysis of variance was performed on the data.

The results of that analysis are outlined below.

Slide Sets

There was no significant differences between slide sets A and B for either recognition or preference ratings. The percentage of trained slides selected for set A and B by recognition judgments was 57.5 and 64.2 per cent respectively and by preference judgments 50.8 and 57.1 per cent respectively. These data indicate that the slide sets A and B were equivalent stimuli and that the data from these sets can be pooled when analyzing the other factors.

Order of Judgments

The were no significant main effects or interactions for the order of making the recognition and preference judgments. The percentage of trained stimuli selected by subjects who made recognition judgments first was 59.2 per cent for recognition and 55.0 per cent for preference judgments. For subjects who made preference judgments first the results were 62.5 per cent for recognition and 52.9 per cent for preference judgments. Again these results indicate that the order of making judgments can be ignored when considering the other factors.

Effect of Training

As would be expected, there was a significant main effect of training on recognition judgments, F (2,35) = 22.75, $p<.0001$. The 1 second training group recognized significantly more target slides, 71.7 per cent, than the 1 millisecond training group, 50.0 per cent. The 1 second group's level of recognition was significantly above chance, t (19) = 3.89, $p<.0001$, whereas the 1 millisecond training group's was not significantly different to chance. There was no main effect of

training on preference judgments. These were 53.8 per cent and 54.2 per cent for the 1 second and the 1 millisecond training groups respectively (see Table 51). There was also a significant main effect for value of intelligence and creativity, F (1,41) = 5.31, $p<.05$. An inspection of means showed that the mean value of intelligence and creativity of 2.96 for the 1 millisecond training group was significantly higher than the mean value of 3.06 for the 1 second training group. Since this measure was taken prior to the group assignment this must be a chance finding.

Table 51
Percentage of Trained Stimuli Selected by Recognition and Preference Judgments for the Two Levels of Training and the Three Levels of Instruction.

	Judgment			
	Preference		Recognition	
Instructions	Non Recognition	Recognition	Non Recognition	Recognition
Increase	53.8	53.8	55.0	75.0
Decrease	53.8	45.0	56.2	66.2
Control	53.8	63.7	38.8	73.7

Effect of Instructions

Contrary to predictions, there was no significant main effect or interaction of experimental instructions for either recognition or preference judgments. However, there was a main effect for belief of instructions across the three instruction conditions, F (1,31) = 7.42, $p<.05$. It can be seen from the mean rating of 2.06 that the decrease

instructions were believed whereas the rating of 3.06 for the increase instructions indicates they were somewhat disbelieved. The neutral subjects did not receive experimental instructions. Therefore, the ratings indicated subjects in the experimental conditions accepted that intelligent, creative people preferred unfamiliar material but found it more difficult to believe that intelligent, creative people would prefer familiar material. This meant that only the decrease instructions had been effective. Therefore, it was decided to use t tests to individually compare the instruction conditions to chance and with their control groups.

For recognition judgments there was no significant difference between the instruction conditions, nor was there any significant difference to chance at the 1 millisecond training level. At the 1 second training level, subjects from all three instruction conditions, increase, decrease and control, achieved above chance levels of stimulus recognition, t (19) = 3.16, 2.03, 3.04 and $p<.001$, .02, .005 respectively. There were no significant differences between the groups themselves (see Table 50).

For preference judgments at the 1 millisecond training level the instruction groups were not significantly different to chance or each other. At the 1 second training level the control group's preference ratings were significantly greater than chance level for the trained slides, t (19) = 1.75, $p<.05$. The increase and decrease groups were not significantly different to chance. The decrease group's preference for the trained slides was significantly less than the control group, t (19) = 2.38, $p<.02$. The increase group was not significantly different to either the decrease or control groups. These results indicate that when subjects could recognize the training slides and the instructions were believed, subjects' preference for the trained slides was influenced by

the instructions (see Table 51).

Effect of Evaluative and Non Evaluative Beliefs on Recognition and Preference Judgments

Because of the relatively small number of subjects used in this exploratory study the median split method of investigating the impact of evaluative beliefs used in the previous studies was not appropriate here.

Therefore, in order to identify those subjects who both believed the instructions and valued intelligence and creativity a new variable "meaning" was computed by adding subjects' Belief of Instructions and Attitude to Intelligence and Creativity scores.

A correlational analysis was used to investigate the relationship between meaning, and recognition and preference judgments. There was no significant correlation between meaning and preference for any of the individual experimental groups. There was a significant positive correlation between meaning and preference judgments for both the increase and decrease conditions, $r = .5$, $p < .03$ and $r = .46$, $p < .05$ respectively. There was no correlation between these variables for the control groups. While these results for the increase groups are contrary to initial predictions they are consistent with the failure of the increase groups to accept the instruction that intelligent and creative people prefer familiar material. Therefore, the correlation between meaning and preference was also calculated for the increase and decrease groups combined. There was a significant positive correlation between meaning and preference at both the 1 millisecond and 1 second training levels, $r = .58$, $p < .01$ and $r = .76$, $p < .001$ respectively. Since the direction of the relationship between meaning and preference was predicted the levels of significance quoted above are for one-tailed tests.

The above finding was further investigated by a multiple regression analysis which detected a linear relationship between meaning and

preference judgments. The contribution of meaning to this linear dependence was significantly greater than any of the other experimental variables, t (31) = 2.28, $p<.05$. There is no difference in the relationship across training or instruction conditions. The relationship indicates that subjects who valued intelligence and creativity, and believed the instructions linking intelligence and creativity to preference, were less likely to prefer the target slides.

9.2.3 Discussion

The findings from this study are revealing in two ways. First they raise the possibility that subjects' preference judgments of stimuli whose ordinary perceptual recognition has been kept at chance level may be influenced by nonevaluative and evaluative beliefs, and second they form the basis for constructing a methodology to thoroughly assess that possibility.

The major finding from this study was the significant positive correlation between meaning and preference ratings for the decrease instruction conditions. The fact that there was a positive rather than the expected negative correlation for the increase condition is perhaps due to the fact that the decrease instructions were believed but the increase instructions were not. It is, therefore, possible that these groups had similar beliefs about intelligent and creative peoples' preferences for familiar verses novel material. As meaning is a combination of nonevaluative and evaluative belief this finding tends to support the experimental hypothesis that these processes can influence subjects' preference judgments of trained stimuli. There were two further findings that were of interest. First the significant positive correlation found for the 1 millisecond training condition and second

the regression analysis which confirmed there was a similar linear relationship between meaning and preference across both the increase and decrease groups at both training levels. Taken together these results suggest meaning may influence the mere exposure effect even when ordinary perceptual recognition of the trained stimuli has been kept at chance level. Furthermore, when the current results are considered in conjunction with the interpretation put forward by Seamon et al (1983a), that preferences for nonrecognized stimuli are based on a familiarity with the stimuli that the subject may not be aware of, they suggest that cognitions can interact with processes that are not available to awareness.

It was somewhat surprising to fail to replicate Kunst-Wilson and Zajonc's (1980) finding of a mere exposure effect in the nonrecognition control group. Since there was a mere exposure effect for the recognition control group it would seem that the failure to replicate can only be attributed to the shorter training exposure. It must be acknowledged that this was an exploratory study and that the number of subjects was not overly large. However, a cell size of eight should be adequate to test a robust effect.

From a methodological perspective the current study was only a limited success. The exposure times chosen produced the desired recognition rates for the nonrecognition and recognition training levels, 50 per cent and 71.7 per cent respectively. However, it is clear that the subjects only accepted the experimental instructions linking intelligence and creativity to novel or unfamiliar material. This meant that the methodology was only effective in generating the hypothesized nonevaluative belief for the decrease groups. It is possible that since the increase groups did not believe that intelligence and creativity was associated with a preference for familiar material, they may have had

similar nonevaluative beliefs as the decrease groups. While the increase groups results are consistent with this interpretation it is not possible to determine if this was actually the case. Therefore, it was only possible to draw tenative conclusions on the basis of the decrease and control group's results.

It also became apparent from the subjects' postexperimental debriefing that the training set of 20 slides was to large. Subjects reported that they became bored with the 100 training exposures and that their concentration and attention wandered. In fact one subject asked if the experiment was an endurance test to see how long it would take subjects to ask to stop.

If these tenative results withstand thorough investigation then Zajonc's interpretation of the evidence will have been shown to be inaccurate. That is, showing cognitions can influence preference judgments in the absence of stimulus recognition would cast serious doubt on the assumption that these judgments are made without cognitive involvement. Indeed, if the position of Seamon et al (1983a, 1983b) is further supported then the finding Zajonc's position depends on (Kunst-Wilson & Zajonc, 1980) may be shown to be due to a memory function which is generally accepted as a cognitive process. Such findings would strongly support the alternate position outlined above which sees cognition as a necessary as well as a sufficient condition for generating emotion.

The results from this preliminary investigation are encouraging enough to warrant further investigation to determine (a) if preferences for stimuli trained below the threshold for ordinary perceptual recognition reflect an increased liking or a response bias due to the kind of memory retrieval process activated, and (b) if nonevaluative and evaluative beliefs can account for the preference ratings of stimuli

whose repeated exposure was such that ordinary perceptual recognition was kept at chance level. The following two studies were undertaken to investigate these two issues.

9.3 Experiment 7

The first issue identified in the previous study for further investigation was whether the mere exposure effect for stimuli trained below perceptual threshold is an expression of increased liking for the trained stimuli (Zajonc, 1980) or an artifact of memory retrieval processes (Seamon et al, 1983a).

The theoretical explanation provided by Seamon et al (1983a) for their position was outlined above. To reiterate, these authors argued that repeated presentation of stimuli at a level below perceptual threshold generates a familiarity in memory referred to elsewhere as perceptual fluency (Jacoby & Dallas, 1981). They also contended that this occurs even when there is not sufficient information for a full item representation to be encoded in memory. They suggested that judgments based on affective criteria activate a memory retrieval process that accesses the stimulus familiarity information whereas judgments based on recognition criteria activate a memory retrieval process that searches for and fails to find a full item representation. Therefore, affective judgments are superior for identifying trained stimuli not because subjects' liking for the trained stimuli has increased but because they are more familiar.

If this position is accurate it would follow that the trained stimuli should be nominated regardless of the valence of the affect judgment subjects are asked to make. That is, if there is a response bias towards choosing the trained stimuli because it is familiar and not

because there has been an increased liking for it over the comparison (nontrained) stimuli, then the trained stimuli should be chosen whether the subject is asked to choose the stimuli they like or the stimuli they dislike. However, if the repeated exposure generates an increased liking for the stimuli then the trained stimuli should be chosen when subjects are asked to choose the stimuli they like and the comparison stimuli when they are asked to choose the slide they dislike.

The difficulty with this approach is that to ask for a response or the opposite to that response is essentially asking the same question in both cases. That is, there is a strong possibility that when subjects are asked to choose which stimuli they dislike, they would first choose which stimuli they like and then nominate the other stimuli as the one they dislike. In order to reduce the risk of subjects basing their responses on the same judgment for both questions, response categories were chosen that were as discrete as possible. Therefore, the response categories used in this study were "which slide do you feel more positive about" and "which slide do you feel more negative about".

The empirical investigations of the mere exposure effect where training has been done under conditions adequate for subsequent stimulus recognition suggest that trained stimuli actually acquire an increased liking (see above review). Therefore, it was hypothesized that when subjects could recognize the trained stimuli they would discriminate affectively between the trained and comparison stimuli and that when subjects could not recognize the trained stimuli they would not discriminate affectively between the trained and comparison stimuli. That is, when training was conducted under adequate viewing conditions subjects would tend to choose the trained stimuli as the ones they feel positive about and the comparison stimuli as the ones they feel negative about and when training was conducted at below perceptual threshold

subjects would tend to choose the trained stimuli in both cases.

9.3.1 Method

Subjects

The subjects were 80 volunteers from pool of 400 first year behavioural science students at the Canberra College of Advanced Education who had not had any prior contact with the experimental materials. Their age ranged from 17 to 48 years with a mean age of 22.8 years. There were 33 males and 47 females. Students who volunteered for the study received course credit for participating.

Design

The experimental design was a two by two factorial design. The factors were type of affective judgment (positive, negative) and training (recognition, nonrecognition). The dependent variables were recognition judgments, and preference judgments.

Materials

Stimuli. The stimuli were two sets (A,B) of 10 randomly generated 10 point shapes. The sets A and B were the same slides as the sets A1 and B1 used in Experiment 6.

Equipment. The projection and viewing equipment was the same as that used in Experiment 6.

Recognition and preference judgments. These judgments were made on the same type of answering sheet as was used in Experiment 6.

Procedure

Subjects were randomly assigned to one of the four experimental conditions as in the previous experiments. Subjects were then given the

following instructions. As in previous experiments all instructions were handed to subjects typed on A4 paper and read aloud by the experimenter.

> I am investigating the rationale behind techniques used in advertising. Initially, I need some people to help me evaluate the stimuli I am going to use in my research. This will involve looking at some slides and filling in some rating scales. I'm going to show you some slides now. Your task is to merely attend to these slides for the moment. Later you will be asked to make some judgments about them. Each slide will be presented on the screen for only a brief time. Therefore, I want you to fix your gaze on the center of the screen and even if you only see a flash of light concentrate on whatever comes up on the screen. I will give you the signal "ready" just before each slide is shown so that you will know when it is coming. You cannot ask questions during the series so do you have any questions now.

If a subject had any questions the instructions were read again but no explanations were provided.

As in Experiment 6, the experiment then consisted of a training phase and a test phase. The procedure had the following alterations.

In the training phase the exposure time was 1 millisecond for all the training conditions. In the nonrecognition condition the No. 70 red and No. 59 green gelatin filters were used to ensure that the training exposures were below perceptual threshold. The light filters were not used for the recognition condition.

In the test phase, because in this study subjects were not given experimental instructions confounding the recognition and preference judgments these judgments were made about the same slides. Therefore, the training set was reduced from 20 to 10 slides. The order of making recognition and preference judgments was counterbalanced within the experimental conditions.

Since cognitive variables were not being monitored in this study subjects did not complete the post test questionnaire.

9.3.2 Results

A complete two-way analysis of variance was performed on the data and the results of this analysis are outlined below.

Effect of Training

As expected there was a significant main effect of training on recognition judgments, F (1,76) = 7.85, $p<.007$. Subjects in the recognition training condition recognized significantly more trained slides than subjects in the nonrecognition training condition, 68 per cent and 57.3 per cent respectively (see Table 52). There was also a trend for there to be a significant main effect of training on preference judgments, F (1,76) = 3.15, $p<.08$. Inspection of the marginal means showed the nonrecognition groups tended to nominate more trained slides than the recognition groups, 57 per cent and 51 percent respectively (see Table 52). This mainly reflects a tendency by subjects in the negative judgment recognition group to nomimate the comparison slide as the one they felt negative about.

Effect of Type of Judgment

As would be expected there was no effect of type of affective judgment on recognition judgments. There was a significant main effect for type of affective judgment on preference judgments, F (1,76) = 11.59, $p<.001$. An inspection of marginal means indicated that the positive judgment groups nominated significantly more trained slides than the negative judgment groups, 59.8 per cent and 48.3 per cent respectively (see Table 52). However, while the positive judgment condition was significantly different to chance, t (38) = 2.88, $p<.005$, the negative judgment condition was not. This indicates that overall the

Table 52
Percentage of Trained Stimuli Selected by Recognition and Preference Judgments for the Two Levels of Training and the Two Levels of Type of Affective Judgment

	Judgment					
	Preference			Recognition		
Affective Judgment	Non Recognition	Recognition	Total	Non Recognition	Recognition	Total
Positive	60.0	59.5	59.8	58.0	69.0	63.5
Negative	54.0	42.5	48.3	56.5	67.0	61.8
Total	57.0	51.0		57.3	68.0	

negative judgment was not as successful at identifying the comparison slide as the positive judgment was for identifying the trained slide.

Interactions

There was no significant interaction for recognition judgments. Inspection of individual group means showed that for the recognition condition both the positive and negative affective judgment groups level of stimulus recognition was above chance, t (19) = 3.5 and 3.13, $p<.001$ and .001 respectively. For the nonrecognition condition both the positive and negative judgment groups level of recognition were higher than expected but neither were greater than chance.

For preference judgments, there was a trend for there to be a significant interaction for training and type of affective judgments, F (1,76) = 2.65, $p<.1$. Contrasts between the individual group means revealed a significant difference for the negative affective judgments between the recognition and nonrecognition groups, t (38) = 2.4, $p<.01$.

There was no significant difference for the positive affective judgments between these two groups. This tends to indicate that when subjects could recognize the stimuli they discriminated affectively and when they could not recognize the stimuli they could not discriminate affectively and tended to nominate the trained stimuli for both affective judgments.

9.3.3 Discussion

The findings from this study tend to support the experimental hypothesis. They provide substantial evidence that subjects do not affectively discriminate between trained and comparison stimuli when training is carried out at below the perceptual threshold. This evidence will be outlined below.

When subjects could recognize the trained stimuli they nominated the trained stimuli significantly more often than chance as the stimuli they felt more positive about and the comparison stimuli significantly more often than chance as the stimuli they felt more negative about. However, when subjects could not recognize the trained stimuli at above chance level, they still nominated the trained stimuli significantly more often than chance as the stimuli they felt more positive about but they did not nominate the comparison stimuli significantly more often than chance as the stimuli they felt more negative about. Furthermore, the frequency with which they selected the trained stimuli as the ones they felt more negative about was significantly greater when they could not recognize the stimuli than when they could recognize the stimuli. These results suggest that when stimulus training was above the perceptual threshold subjects actual liking for the trained stimuli increased above that which they had for the comparison stimuli and when training was carried out at below the perceptual threshold the trained

stimuli did not acquire an increased liking over the comparison stimuli. However, in spite of this there was still a tendency for subjects to choose the below threshold trained stimuli significantly more often than chance as the stimuli they felt more positive about. The failure of subjects to also nominate the below threshold trained stimuli significantly more often than chance as the one they felt more negative about may well be attributed to this being the more difficult category to discretely identify. That is, a proportion of subjects in this category may have first chosen the stimuli they felt more positive about (liked) and then nominated the other as the one they felt more negative about (disliked). The critical finding here was that subjects did nominate the below threshold trained stimuli as the one they felt more negative about significantly more often than they did when the stimuli were recognizable.

These findings strongly support the proposition of Seamon et al (1983a) that the mere exposure effect reported by Kunst-Wilson and Zajonc (1980) is due to different memory retrieval processes activated by requests for recognition and preference judgments. The failure of subjects in this study to select the comparison stimuli as the ones they felt more negative about when training was conducted at a level below the perceptual threshold, as they had done for stimuli trained at above the perceptual threshold, casts serious doubt on Zajonc's (1980) view that the preference judgments reported by Kunst-Wilson and Zajonc (1980) constitute an affective response. The results obtained by Kunst-Wilson and Zajonc (1980) may well be due to cognitive (memory) processes. It, therefore, follows that those findings are questionable as evidence for affective responses in the absence of cognition. This interpretation must, however, also be treated with caution. Although the recognition levels for the nonrecognition conditions were in the chance range they

were in the upper portion of that range and there were no significant differences between the recognition and preference judgments as predictors of the trained slides. It is possible that the preference judgments in the nonrecognition condition were chance responses and that there is no impact of training on preferences when training is conducted below the perceptual threshold.

In spite of the doubt cast by this study on Zajonc's (1980) interpretation of the evidence it remains of interest to establish if the effect described by Kunst-Wilson and Zajonc (1980) can be manipulated by the kinds of cognitive processes (nonevaluative and evaluative beliefs) investigated in the earlier part of this work. This issue was investigated in the following study.

9.4 Experiment 8

The second issue identified in Expperiment 6 for further investigation was whether nonevaluative and evaluative beliefs could influence the preference ratings of stimuli whose repeated exposure during training was such that ordinary perceptual recognition remained at chance level.

One of the critical assumptions of Zajonc's (1980) argument for affective primacy is that the influence of repeated exposure on affective responses must be devoid of cognitive involvement if subsequent stimulus recognition is at chance level. The purpose of the current study is to test if this assumption holds for the cognitive processes shown here to be important determinants of emotional responses.

The methodology used is a refinement of that used in Experiments 6 and 7. In earlier studies experimental instructions had been shown to be

an effective methodology for generating particular nonevaluative beliefs (see Chapter 4). In Experiment 6 it was found that instructions linking intelligence and creativity to preference for unfamiliar material were effective but that those linking these attributes to familiar material were not effective. Therefore, in this study only the effective instructions linking preference for unfamiliar material to intelligence and creativity were used. The use of a single instruction was combined with the positive and negative affective judgments used in Experiment 7 in an attempt to bias subjects' preference responses in favour of the trained or comparison stimuli. That is, since the instructions suggest intelligent and creative people should prefer the comparison stimuli, subjects who are asked which stimuli they feel more positive about should tend to nominate the comparison stimuli and those who are asked which stimuli they feel more negative about should tend to nominate the trained stimuli.

It was also shown in Chapter 4 that the effectiveness of instructions is determined by subjects' evaluative beliefs about the attribute in question. Therefore, subjects' evaluative beliefs were assessed and used to differentiate experimental groups on the basis of their value of intelligence and creativity as an attribute.

A no instruction control group was also included to test that recognition was at chance level, if instructions influenced recognition judgments, and as a replication of the nonrecognition condition from the previous study where it was not clear if there was a tendency for subjects in both affective judgment groups to nominate the trained stimuli or whether their responses were random.

The following three experimental hypothesizes were tested. First, that the instructions, high value of intelligence and creativity, and positive affective judgment group would select significantly less

trained stimuli than the other groups. Second, that in the control condition there would be no significant difference between the number of trained stimuli selected by the positive and negative judgment affective groups when making their preference judgments. Third, that in the control condition the number of trained stimuli selected by both the positive and negative judgment groups would be significantly greater than chance.

9.4.1 Method

Subjects

The subjects were 80 volunteers from pool of 400 first year behavioural science students at the Canberra College of Advanced Education. Their age ranged from 17 to 51 years with a mean age of 23.6 years. There were 34 males and 46 females. None of the subjects who took part had participated in any of the previous mere exposure experiments. Students who volunteered for the study received course credit for participating.

Design

The experimental design was a two by two by two factorial design. The factors were experimental instructions (instructions, no instruction control), value of intelligence and creativity (high, low), and type of affective judgment (positive, negative). The dependent variables were belief of instructions, recognition judgments, and preference judgments.

Materials

Stimuli. The stimuli were the same two sets (A,B) used in Experiment 7.

Equipment. The projection and viewing equipment was the same as that used in Experiments 6 and 7. However, because in Experiment 7 the recognition levels for the nonrecognition condition were higher than expected, in the current experiment a .4 neutral density gelatin filter was added during the training phase to ensure recognition was at chance level.

Recognition and preference judgments. These judgments were made on the same type of answering sheet as was used in Experiments 6 and 7.

Cognitive assessment. The Attitude to Intelligence and Creativity and Post Test Questionnaires from Experiment 6 were used to assess value of intelligence and creativity and belief of instructions respectively.

Procedure

Subjects were randomly assigned to one of the six experimental conditions as in the previous experiments. Subjects were then given the following instructions. As in previous experiments all instructions were handed to subjects typed on A4 paper and read aloud by the experimenter.

> I am investigating the rationale behind techniques used in advertising. Initially, I need some people to help me evaluate the stimuli I am going to use in my research. This will involve looking at some slides and filling in some rating scales. Because of the nature of my research I need to know how people with different opinions on several issues will rate the slides. Therefore, before you rate these slides I would like to check your opinion on these issues.

The subjects then completed the Attitude to Intelligence and Creativity Questionnaire. On completing this scale the subjects in the experimental instruction condition were then given the following instructions.

> I am investigating the rationale behind tectniques used in advertising. I am particularly interested in the established phenomenon that intelligent, creative people tend to form stronger preferences for unfamiliar material and conversely that dull, uncreative people tend to form stronger preferences for familiar material.
>
> The purpose of this research is to see if there is also a

relationship between intelligence and creativity and the capacity to recognise perceptually difficult material.

The experimental task involves briefly showing you some slides and then later gettting you to make some judgments about them. The details of the task will be explained as you go.

The first stage is to show you some slides. Your task is to merely attend to these slides for the moment. Each slide will be presented on the screen for only a brief time. Therefore, I want you to fix your gaze on the center of the screen and even if you only see a flash of light concentrate on whatever comes up on the screen. I will give you the signal "ready" just before each slide is shown so that you will know when it is coming. You cannot ask questions during the series so do you have any questions now.

Subjects in the no instruction control condition were given the following instructions.

I'm going to show you some slides now. Your task is to merely attend to these slides for the moment. Later you will be asked to make some judgments about them. Each slide will be presented on the screen for only a brief time. Therefore, I want you to fix your gaze on the center of the screen and even if you only see a flash of light concentrate on whatever comes up on the screen. I will give you the signal 'ready' just before each slide is shown so that you will know when it is coming. You cannot ask questions during the series so do you have any questions now.

If a subject had any questions the instructions were read again but no explanations were provided.

As in Experiment 6 and 7, the experiment then consisted of a training phase and a test phase. The procedure had the following alterations.

In the training phase the exposure time was 1 millisecond for all the training conditions. For all subjects a .4 neutral density gelatin filter was used with the No. 70 red and No. 59 green gelatin filters to ensure that the training exposures were below perceptual threshold.

Prior to training, half the subjects were given experimental instructions confounding the recognition and preference judgments. Since these judgments were made about the same stimuli, the order of making recognition and preference judgments for those subjects who received

experimental instructions was not counterbalanced. As the dependent variable of major interest was subjects preference judgments these were made before recognition judgments by all subjects in the experimental instruction condition.

Since cognitive variables were being monitored in this study subjects also completed the post test questionnaire (see Appendix D-6).

9.4.2 Results

A complete three-way analysis of variance was performed on the data and the results of this analysis are outlined below.

Effect of Instructions

Contrary to predictions there was no significant main effect or interaction for instructions on either recognition or preference judgments (see Table 53).

Effect of Value of Intelligence and Creativity

Again contrary to predictions there was no significant main effect or interaction of value for intelligence and creativity on either recognition or preference judgments (see Table 53).

Effect of Type of Affective Judgment

As predicted there was no significant main effect or interaction for type of affective judgment on either recognition or preference judgments (see Table 53).

Comparison of Individual Experimental Group's Mean Recognition and Preference Judgments with Chance

There was no significant difference between individual experimental

groups mean recognition and preference judgments and chance (see Table 53).

Table 53
Percentage of Trained Stimuli Selected by Recognition and Preference Judgments for the Two Levels of Instructions, Type of Affective Judgment, and Value of Intelligence and Creativity.

	Judgment							
	Preference				Recognition			
	Instructions							
	Instruction		Control		Instruction		Control	
	Value of Intelligence and Creativity							
Affective Judgment	High	Low	High	Low	High	Low	High	Low
Positive	51.0	50.0	52.0	57.0	55.0	61.0	56.0	55.0
Negative	45.0	47.0	44.0	45.0	53.0	57.0	49.0	54.0
Total	48.0	48.5	48.0	51.0	54.0	59.0	52.5	55.0

9.4.3 Discussion

The results from this study only provided support for one of the three experimental hypothesizes it was designed to investigate. The implications of the results for each of the experimental hypothesizes will be considered in turn.

It had been hypothesized that the instructions, high value of intelligence and creativity, and positive affective judgment group when making a preference judgment would choose significantly less trained

stimuli than the other groups. This hypothesis was based on the assumption that the instructions, if believed and valued, would bias the subjects toward reporting a preference for the comparison stimuli. Therefore, if choosing the stimuli they felt more positive about subjects would tend to choose the comparison rather than the trained stimuli. Conversely, it was assumed that if they were choosing the stimuli they felt more negative about subjects would tend to choose the trained rather than the comparison stimuli. Furthermore, it was felt that if subjects did not believe the instructions or did not value being seen as intelligent and creative they would tend to choose the more familiar trained stimuli for both judgments. The results from this study fail to provide any evidence to support these assumptions. Therefore, this study failed to demonstrate that nonevaluative and evaluative beliefs could influence preference judgments for stimuli whose repeated exposure was below the perceptual threshold.

The results did support the second hypothesis that when making preference judgments, there would be no significant difference between the number of trained stimuli selected in the control condition by the positive and negative affective judgment groups. There was no significant difference between these groups. This finding is consistent with the evidence from Experiment 7 which indicated that subjects could not discriminate affectively between stimuli when repeated exposure had been conducted below the perceptual threshold. These findings will be considered further in conjunction with the evidence for the third hypothesis.

The third hypothesis, that for the control condition both the positive and negative affective judgment groups would choose the trained stimuli significantly more often than chance as the stimuli they felt more positive and more negative about respectively, was not supported by

the data. The trained stimuli was not chosen significantly more often than chance by either group. The failure of either group to select the trained stimuli in preference to the comparison stimuli and the fact that there was no significant difference between the groups for the number of trained stimuli selected, suggest that subjects forced choice preference judgments about stimuli that have been repeatedly exposed prior to testing at a level below the perceptual threshold, are random responses. There is no substantial evidence of a mere exposure effect for stimuli that can not be recognised.

Again these data fail to replicate Kunst-Wilson and Zajonc (1980). In fact the only reports of similar findings are the Seamon et al (1983a, 1983b) studies which incorporated other features and frequently failed to achieve the clear seperation of recognition and preference judgments reported by Kunst-Wilson and Zajonc (1980). In the previous study here (Experiment 7) when the positive affective judgment group showed an above chance preference for the trained slides there was not a clear seperation of recognition and preference judgments even though stimulus recognition was at chance level. It would appear to be difficult to demonstrate that affective judgments are superior for identifying stimuli whose prior repeated exposure was clearly below the perceptual threshold. The reasons for this difficulty must be speculative. In their report Kunst-Wilson and Zajonc (1980) gave minimal information about their procedures. For example, the precise wording of their instructions were not included. It is possible that some feature of their procedure acted as a demand characteristic in favour of their hypothesis.

In summary, the current work tends to suggest that the kinds of cognitive processes that are of interest to cognitive learning therapists can not access visual stimuli that have been presented below

the perceptual threshold. Therefore, the current study failed to demonstrate that cognitive processes have a capacity to influence mental processes that are not available to awareness. The findings also pose considerable difficulty for those researchers who interpreted previous findings (Kunst-Wilson & Zajonc, 1980) as evidence of affective responses in the abscence of cognition. There was no clear evidence that the mere exposure effect for preferences occurred when the repeated stimulus exposure was conducted below the perceptual threshold. Furthermore, there was evidence that the affective responses made to stimuli previously exposed in this manner did not represent a discrete emotional response.

CHAPTER 10

CONCLUSIONS AND DIRECTIONS FOR FUTURE WORK

The studies reported in this thesis had three aims. The first was to clarify the existing evidence providing empirical support for the cognitive learning therapy approach to emotion. The second was to extend that evidence to include an assessment of the specific cognitive processes thought by cognitive learning therapists to mediate emotion. The third was to investigate the issue of whether cognitive processes are merely sufficient or both sufficient and necessary conditions for emotional response. The specific question addressed was to determine if stimuli needed to be available to conscious awareness for cognitive processes to mediate emotions.

The empirical work conducted by the author and reported in this thesis has achieved two of these three aims. The two initial experiments successfully demonstrated that cognitions were related to emotional responding. This finding established that there was a basis for the cognitive mediational model of emotion. Therefore, further research to define the nature of this relationship and the kinds of cognitive processes involved was warranted.

The subsequent investigations established the computer game mood induction paradigm as a successful methodology for work in this area. The empirical demonstration of nonevaluative and evaluative beliefs as mediators of emotion is seen as the most significant contribution of the current work. These studies showed that the specific kinds of cognitive processes cognitive learning therapists suggested were pertinent for emotions were indeed mediators of emotional responses.

Although the third area of research did not achieve its aim of establishing if cognitive processes could possibly be both a necessary and sufficient condition for emotional response, it has raised important

questions about the validity of the mere exposure paradigm's capacity to make a useful contribution to the on going debate about affective primacy.

The results of the investigations conducted in each if these three areas will be summarized below.

10.1 Self Statement Mood Induction Studies

The self statement mood induction research had recently been criticized as being prone to influence from experimental demand characteristics (Buchwald et al, 1981; Polivy & Doyle, 1980); for being unreliable as a mood inducer (Sutherland et al, 1982), and as being an inappropriate paradigm for evaluating the role of cognitions as mediators of emotion (Lazarus et al, 1982). The first two studies reported here were conducted to clarify these criticisms.

In the first study, two sets of elation and two sets of depression mood induction statements that had been previously assessed as either believable or unbelievable were used as mood induction stimuli in a laboratory self statement mood induction experiment. Based on the cognitive mediational model of emotion it was expected that the believable mood statements would be the more effective mood inducers. Since experimental demand characteristics applied equally to the believable and unbelievable statement induction groups it was suggested that experimental demand characteristics could not adequately account for any differences that may occur between these two groups. It was found that both the believable and unbelievable elation statements generated a significantly more positive mood than both the believable and unbelievable depression statements. However, the believable elation statements were no more effective as mood inducers than the unbelievable

elation statements nor were the believable depression statements more effective mood inducers than the unbelievable depression statements. Since the rationale for the self statement mood induction procedure suggests it is the content of the statements that is responsible for generating mood, the failure of this study to show the believability of the statements influenced their effectiveness as mood inducers tends to lend support to the view that the mood changes reported may reflect the influence of experimental demand characteristics. An alternative explanation was that the believability of the statements was idiosyncratic to subjects and, therefore, the prior statement ratings did not reflect the statements believability for the subjects in this study. This possibility was assessed in the second experiment.

The second experiment confirmed that the statement believability ratings were idiosyncratic to individual subjects. That is, what was a believable statement to one subject may be less convincing for another subject. When subjects were assigned to believable and unbelievable groups on the basis of their own ratings of the statements the believability of the statements tended to characterize their effectiveness as mood inducers.

Collectively, these two studies suggested that believability was a factor in determining the effectiveness of mood induction statements. However, because of the potential for subjects to find the statements unbelievable, self statements could tend to prove unreliable as a mood induction procedure. These results were taken to indicate that experimental demand characteristics were not wholly responsible for the mood changes reported in these studies. Therefore, it was concluded that these experiments provide general support for those theories that suggested cognitive processes are mediators of emotional response. A second series of studies were carried out to investigate the nature of

these cognitive processes and the results of that work are summarized in the next section.

10.2 Computer Game Mood Induction Studies

The mediational role for emotion of the specific cognitive processes identified by cognitive learning therapists had not been directly assessed. The lack of direct evidence for this basic tenet of cognitive learning therapy was seen as being an important omission from the empirical support for this therapeutic approach. It was the objective of the current work to empirically evaluate the validity of this theoretical assumption. The cognitive processes seen as being pertinent to the mediation of emotion were classified as being either nonevaluative or evaluative beliefs. In Experiments 3, 4, and 5 the capacity of nonevaluative and evaluative beliefs as mediators of emotion was assessed.

The self statement mood induction methodology from the previous experiments was not a suitable paradigm for carrying out these investigations. Its weaknesses have been summarized in the previous section. A new methodology was needed to replace it. The strategy adopted utilized a computer game as a mood induction task. False positive and false negative feedback about subjects' scores on the game was used to induce positive and negative moods respectively. There were three advantages to adopting this new experimental approach. First it was a single event which made it practical for subjects' cognitive responses to be manipulated or monitored. Second it was a real rather than an "as if" experience which increased the probability that it would be seen as a believable task and, thereby, prove to be a more reliable mood induction procedure. Third there was less likelihood of subjects being aware of the experimenters intentions which reduced the risk of

subjects' responses being a function of experimental demand characteristics.

In Experiment 3 subjects' belief of success or failure on the computer game was successfully controlled by the false feedback. This nonevaluative belief proved to be a limited success as a predictor of mood change. On the other hand, subjects' value and expectation of success at computer games as an evaluative belief about the experimental task failed to predict mood change. There were several methodological problems identified with this study which made it difficult to interpret these findings. The data from the control group suggested that there was an uncontrolled source of negative feedback associated with the game. Also, the actual method of providing feedback was thought to be inconsistent and the validity of the Task Evaluation Scale as a measure of subjects' value and expectation of success at computer games could not be guaranteed. Therefore, comments on the theoretical implications of the limited predictive capacity of nonevaluative beliefs, and the failure of evaluative beliefs to predict mood change were withheld until these possible methodological difficulties with the computer game mood induction procedure were clarified in the next experiment.

In Experiment 4 the methodology was revised to account for the problems outlined above. The computer game was changed to eliminate the uncontrolled negative feedback; the method of providing feedback was altered to improve its consistency; the Task Evaluation Scale was revised to monitor values and expectations separately, and additional scales were added to provide a validity check of the revised Task Evaluation Scales.

With these methodological refinements in place the computer game mood induction paradigm proved to be a highly successful method of assessing the mediational role of nonevaluative and evaluative beliefs.

The data from the Scores Rating Scale indicated that subjects' nonevaluative beliefs had been controlled by the experimental feedback. That is, in spite of there being no difference between the subjects' actual scores those subjects who received positive feedback believed that their scores were above average and those subjects who received negative feedback believed that their scores were below average. The data from the Evaluative Beliefs Scale, the Satisfaction with Scores Scale, and the Scores Expectation Scale tended to validate the Task Evaluation Scale as a measure of subjects' value and expectation of success at computer games. That is, subjects in the low value/expectation groups tended to rate their scores as qualitatively better than subjects in the high value expectation groups. These results were taken to indicate that the current methodology had been a successful method of differentiating experimental groups on the basis of their nonevaluative and evaluative beliefs.

These cognitive variables then proved to be good predictors of mood. That is, what subjects believed about their scores and what they believed about doing well at computer games influenced their emotional response to playing the game. This experimental demonstration of cognitive variables influencing mood provided strong evidence in support of the cognitive mediational approach to emotion. The direct evidence of a mediational role was at this stage restricted to nonevaluative beliefs. Since evaluative beliefs had been measured but not experimentally manipulated the current methodology only allowed for an association between evaluative beliefs and emotional response to be established. An additional experiment was needed to determine if this association involved a causal relationship or only reflected a common involvement with a "third" factor. This issue was pursued in the next experiment.

In Experiment 5 both nonevaluative and evaluative beliefs were experimentally manipulated. False feedback of success or failure on a computer game was again employed to control nonevaluative beliefs. Evaluative beliefs were manipulated by also using false feedback to provide subjects with prior experiences of success or failure on a training game. The Task Evaluation Scale, Scores Rating Scale, Evaluative Belief Scale, Satisfaction with Scores Scale, and Scores Expectation Scale were again used to monitor nonevaluative and evaluative beliefs. The data from these measures confirmed that the experimental groups were differentiated in terms of their nonevaluative and evaluative beliefs. These variables again proved to be significant predictors of subjects' emotional responses to the experimental task. These results provided a replication of the finding from the previous experiment that nonevaluative beliefs directly influenced mood. They also provided for the first time an empirical demonstration of evaluative beliefs having a direct influence on emotional response. These data constitute an experimental demonstration of the cognitive processes central to the cognitive learning therapist's cognitive mediational model of emotion as mediators of emotion.

Having established nonevaluative and evaluative beliefs can mediate emotional response the question of whether these processes are merely a sufficient or both a sufficient and necessary condition for emotion remained. This question was pursued in the final series of studies.

10.3 The Mere Exposure Studies

There has been recent debate in the literature as to whether cognitions or emotions are the primary system (Lazarus, 1982, 1984; Zajonc, 1980, 1984). It has been argued in this thesis that it is an issue that has some theoretical relevance for the basic tenets of

cognitive learning therapy. Arguments for the independence of affect and cognition or for a primary affective system are inconsistent with the assumptions of those therapies which attempt to modify emotional dysfunction by manipulating cognitive processes (Rachman, 1981).

It has been suggested that studies which claim to demonstrate that subjects' can respond emotionally to stimuli that can not be recognized constitute evidence of emotional responses occurring in the absence of cognition (Zajonc, 1980, 1984). This interpretation of the evidence assumes that cognitive processes can not access stimuli that are not recognized. A series of studies were conducted to test this assumption.

In Experiment 6 the mere exposure paradigm was used in conjunction with experimental instructions in an attempt to manipulate subjects' preferences for stimuli that were not recognized. The impact of instructions (nonevaluative belief) and the importance for the subject of the attribute being linked by the instructions to emotional responding (evaluative belief) were monitored. Surprisingly, the data failed to replicate the finding reported by Kunst-Wilson and Zajonc (1980) of a mere exposure effect for nonrecognized stimuli. However, the results indicated that when the hypothesized cognitive parameters were established it appeared that instructions could influence subjects' emotional response to stimuli that were not recognized. This was a tentative conclusion because the experimental instructions used in Experiment 6 were only partially effective in generating the necessary cognitive parameters. Therefore, the results obtained here were used as the basis for refining the experimental instructions and the question of cognitions influencing emotional response to nonrecognized stimuli was carried forward to Experiment 8.

Before pursuing the question of the effectiveness of nonevaluative and evaluative beliefs as mediators of emotional response to stimuli

that can not be recognized an attempt was made to clarify the nature of the effect reported by Kunst-Wilson and Zajonc (1980). A recent report had suggested that the mere exposure effect which had been reported for stimuli that could not be recognized may be an artifact of memory retrieval processes (Seamon et al, 1983a). These authors suggested that recognition and preference judgments activated different retrieval processes. They further claimed that the retrieval process associated with preference judgments could access stimuli that had not been fully encoded, whereas the retrieval processes associated with recognition judgments could only access stimuli that had been more fully encoded. They concluded that the mere exposure effect for stimuli that could not be recognized was based on familiarity and was not a genuine affective judgment.

In Experiment 7 rather than nominating the stimuli they preferred subjects were asked to identify either the stimuli that they felt more positive about or the stimuli that they felt more negative about. The rationale was that if the mere exposure effect for stimuli that could not be recognized was not actually an expression of a preference but was merely a response bias based on familiarity, subjects should not discriminate between the valence of the affective judgments and nominate the familiar slide in both cases. The results from this study supported the proposition that the finding reported by Kunst-Wilson and Zajonc (1980) could be based on a memory retrieval process and reflect stimulus familiarity. Once again the results failed to replicate the finding of a mere exposure effect reported by Kunst-Wilson and Zajonc (1980). While the current series of studies had failed to demonstrate a mere exposure effect for stimuli that could not be recognized there remained the possibility that emotional responses to such stimuli could be influenced by cognitive processes. This possibility was addressed in the next

study.

In Experiment 8 the methodologies from Experiment 6 and 7 were combined to test the cognitive mediational capacity of nonevaluative and evaluative beliefs for stimuli that could not be recognized. The results from this study failed to confirm the tentative findings from Experiment 6 of nonevaluative and evaluative beliefs influencing emotional response to nonrecognized stimuli. Once again there was no evidence of a mere exposure effect as reported by Kunst-Wilson and Zajonc (1980). The only experimenters to successfully replicate this effect (Seamon et al, 1983a, 1983b) were only able to do so when the stimulus training was restricted to the right visual field or when stimulus shadowing was used.

These results were taken to indicate that the mere exposure effect for nonrecognized stimuli is a complex perceptual task which is insufficiently understood for it to be a useful basis for generalizations about the relationship between cognitions and emotions. The failure of the current work to clearly show a relationship between nonevaluative and evaluative beliefs and emotional response to stimuli that are not recognized must also be viewed within the context of the uncertainty about the mere exposure paradigm. Until this phenomenon is better understood its appropriateness as a means of assessing the possibility of cognitive processes influencing emotional response to nonrecognized stimuli will remain unclear.

The results from the mere exposure experiments conducted here must be seen as failing to provide evidence for either Zajonc's (1980, 1984) argument of affect in the absence of cognition or of cognitions mediating emotional response to stimuli that are not recognized. Therefore, these data do not contribute to an enhanced understanding of the question of affective versus cognitive primacy.

10.4 Contribution of the Current Work

During the last 20 years behaviour therapists have shown an increasing interest in cognitive processes. Those workers who recognized cognitions as a necessary element for understanding behaviour have contributed to the new field of cognitive behaviour therapy. Within cognitive behaviour therapy the different approaches have been classified by the different theoretical status afforded cognitions (Mahoney & Arnkoff, 1978). One of the more promising approaches which postulates that cognitive processes play a mediational role in determining emotional and behavioural responses was identified by Mahoney (1974) as "cognitive learning therapy".

Cognitive learning therapy has its origins in the clinical work of such therapists as Beck, Ellis, Goldfried, Meichenbaum, and Mahoney. As a consequence of this the major thrust of the empirical work in this area has been on developing more effective therapeutic procedures with a consequent emphasis on clinical outcome research (Mahoney, 1977b). At the same time as cognitive learning therapy was being developed independent work was being carried out in the laboratory on the nature of the relationship between cognitions and emotions. This was in two parts. The first approach was an attempt to induce mood by manipulating cognitive variables (Alderman, 1972; Coleman, 1975; Hale & Strickland, 1976; Velten, 1968). The second approach used cognitive methods to manipulate emotional response to stressful stimuli (Koriat et al, 1972; Lazarus, 1966; Lazarus & Alfert, 1964; Lazarus et al, 1962; Speisman et al, 1964). These studies appeared to provide evidence that was generally supportive of the basic assumption of cognitive learning therapy that cognitions mediate emotion.

While there were the studies mentioned above that provided general support for the principle of cognitions as mediators of emotion,

investigations to date had not focused on the specific cognitive processes identified by cognitive learning therapists as pertinent for emotion. Furthermore, recent evidence had begun to question the validity of the findings from the laboratory mood induction studies. In addition to this criticism of existing research new evidence was reported that questioned the generality of the cognitive mediational model (Kunst-Wilson & Zajonc, 1980). The experiment by Kunst-Wilson and Zajonc (1980) provided evidence of subjects responding emotionally to stimuli that were not available to conscious awareness. This was cited as evidence of emotional responses occurring in the absence of cognitive mediation (Zajonc, 1980, 1984).

The studies reported in this thesis addressed these theoretical issues. Collectively, they provide substantial support for the theoretical basis of cognitive learning therapy. As has been detailed above the first group of studies investigated the self statement mood induction research. The results from these studies showed that the recent criticism of the evidence from this kind of research did not provide an adequate alternative explanation for these findings. The second group of studies investigated the specific cognitive processes identified by cognitive learning therapists as pertinent for emotion and provided empirical evidence that these processes can mediate emotion. The final group of studies fell short of providing evidence for the necessity of cognitive processes as mediators of emotion. However, these studies raised sufficient concern about the evidence cited in support of the argument for affective primacy that these claims must be viewed with caution. Therefore, it would seem that the current work has provided empirical support for the approach to emotional distress adopted by cognitive learning therapists which is based on a cognitive mediational model of emotion.

10.5 Directions for Future Work

The limitations of the self statement mood induction procedure and the uncertainty associated with the validity of the mere exposure effect for nonrecognized stimuli have been outlined above. Therefore, of the three experimental paradigms employed in this research the computer game mood approach has the most potential for stimulating further work. It would appear that worthwhile additional work could be carried out in three directions.

First computer games or other experimental tasks at which success or failure was under experimental control could be used in the laboratory to expand the theoretical base for cognitions as mediators of emotion. Such procedures could usefully examine the mediational potential of other cognitive processes, tease out the individual contributions of particular cognitive processes, and further explore the possibility of positive and negative emotions responding to different cognitive events.

The second possibility would be to move out of the laboratory and assess the principles developed there with real life issues. Tapping real life issues would provide the opportunity to work with more strongly held evaluative beliefs than are likely to be available for laboratory tasks. Under these conditions a separation of processes like value and expectation may be more viable.

The final possibility would be to apply the theoretical principles developed here to clinical populations. A combination of process and outcome research techniques could be used to assess whether cognitive learning therapy procedures actually influence the cognitive processes thought to be responsible for generating clinical outcomes with clients experiencing emotional distress. Research of this nature would provide the ultimate test of the theoretical assumptions of cognitive learning

therapy.

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APPENDIX A-1

The Believability Rating of 60 Elation and 60 Depression Self-Referent Statements (Velten, 1968).

Method

Subjects

The subjects were 62 second year administration students at the Canberra College of Advanced Education. Their age ranged from 18 years to 48 years with a mean age of 26.8 years. There were 32 males and 30 females. All subjects were volunteers and course credit was not available for participation.

Materials

Subjects were given a booklet containing the experimental instructions, a Profile of Mood States (POMS), the 119 mood induction statements (there is one statement common to both sets) and the statement rating scales.

Procedure

Subjects were provided with a test booklet and asked to record their age and sex and to then complete the POMS. Subjects were then asked to read the following experimental instructions which were then read aloud by the experimenter:

> This questionnaire is part of a research project which is evaluating techniques used to investigate emotions.
>
> Various combinations of the following statements are used by researchers to artificially induce different mood states.
>
> The statements are presented to subjects one at a time and the subject is asked to attempt to experience the feeling suggested by the statement.
>
> Your task is to read each statement and to rate to what extent you believe it is a statement subjects could respond to

emotionally by experiencing the feeling suggested in it. That is, how believable it would be as a mood induction statement.

To rate the believability of each mood statement place a circle around the number above the word which most closely describes what you think about the statement.

For example, if you thought the statement

"This is the greatest day of my life"

was extremely believable (i.e. you believe the statement is one subjects could respond to emotionally by experiencing the feeling expressed in it) then you would rate it as follows:

(1)	2	3	4	5	6	7
extremely believable	believable	somewhat believable	neither	somewhat unbelievable	unbelievable	extremely unbelievable

However, if you thought it was an extremely unbelievable mood statement (i.e. you don't believe the statement is one subjects could respond to emotionally by experiencing the feeling expressed in it) then you would rate it:

1	2	3	4	5	6	(7)
extremely believable	believable	somewhat believable	neither	somewhat unbelievable	unbelievable	extremely unbelievable

If you really cannot decide how believable/unbelievable it was as a mood statement then you would rate it:

1	2	3	(4)	5	6	7
extremely believable	believable	somewhat believable	neither	somewhat unbelievable	unbelievable	extremely unbelievable

If there isn't a word that exactly represents how you would rate the statement circle the number above the word that is closest to your evaluation.

There are no right or wrong responses to these statements, but it is important you answer as truthfully and as accurately as you can.

Make sure you respond to all the statements and only circle one number for each statement.

Remember, your task is to rate how believable the statements were for you as mood induction statements not how well the statement describes your current feeling.

After the instructions had been read and questions answered subjects were asked to rate the statements.

After the statements had been rated subjects were debriefed and thanked for their participation in the experiment.

Results

The average ratings of the elation statements ranged from 2.5 to 5.0 and for the depression statements from 2.4 to 4.8.

The 20 lowest rated (most believable) elation statements had a mean rating of 2.9 and the 20 lowest rated depression statements a mean rating of 3.05.

The 20 highest rated (least believable) elation statements had a mean rating of 3.86 and the 20 lowest rating depression statements a mean rating of 4.21.

The mean believability rating of the individual statements from the four experimental sets may be seen in Table 54.

A oneway analysis of variance revealed a significant effect for believability rating between statement sets, $F(3,76) = 103.7$, $p<.0000$. Contrasts between the sets found the believable elation and depression statements to be significantly more believable than the unbelievable elation and depression statements, $t(76) = 10.7$, $p<.000$ and $t(76) = 13.4$, $p<.000$ respectively. There was no difference between the believable elation and depression statements. The difference between the unbelievable elation and depression statements was significant, $t(76) = 4.3$, $p<.000$. The unbelievable depression statements were less believable than the unbelievable elation statements.

Table 54

Statement believability ratings for the believable elation and depression and the unbelievable elation and depression statement sets.

	Mood induction Statement Valance			
	Believable Elation	Unbelievable Elation	Believable Depression	Unbelievable Depression
Statement Number	M	M	M	M
1.	3.03	3.63	3.03	4.34
2.	2.52	3.56	2.68	4.23
3.	3.02	3.82	2.71	3.98
4.	2.60	3.77	2.52	3.98
5.	3.05	4.95	2.74	4.10
6.	2.89	4.05	3.02	4.10
7.	2.74	3.77	2.40	4.11
8.	2.95	3.43	2.87	4.07
9.	3.03	3.45	3.39	4.12
10.	2.92	3.97	3.08	4.23
11.	2.94	3.69	3.10	4.11
12.	3.05	3.66	3.15	4.16
13.	2.69	3.41	3.26	4.27
14.	2.94	4.27	3.44	4.11
15.	3.00	4.27	3.39	4.30
16.	2.98	4.16	3.00	4.03
17.	3.03	3.66	3.44	4.11
18.	2.77	3.66	2.95	4.79
19.	2.90	3.77	3.39	4.69
20.	3.00	3.77	3.35	4.36
Mean	2.90	3.83	3.05	4.21

Discussion

The statement ratings clearly show that the statements have a differential cognitive impact on subjects. The believable statement sets are more acceptable to subjects than the unbelievable statements. However, the statement ratings are skewed toward the believable end of the 7 point scale such that while the believable statement sets are clearly in that range the unbelievable statement sets are more towards being neither believable nor unbelievable than actually unbelievable.

Therefore, it is likely that all the statements will act as mood inducers but the believable statements should be more powerful than the unbelievable ones.

APPENDIX A-2

Believable Elation Mood Induction Statements.

Card A.

THE NEXT CARD WILL BEGIN THE SERIES OF STATEMENTS. I WILL READ THE STATEMENTS TO MYSELF, THEN I WILL TRY TO EXPERIENCE THE MOOD AS WELL AS I CAN UNTIL THE EXPERIMENTER INDICATES TO MOVE ON TO THE NEXT CARD. I WILL TRY TO BUILD MY MOOD AS I GO THROUGH THE CARDS.

Card 1.

TODAY IS NEITHER BETTER NOR WORSE THAN ANY OTHER DAY.

Card 2.

I DO FEEL PRETTY GOOD TODAY, THOUGH.

Card 3.

IF YOUR ATTITUDE IS GOOD, THEN THINGS ARE GOOD, AND MY ATTITUDE IS GOOD.

Card 4.

I FEEL CHEERFUL AND LIVELY.

Card 5.

MY JUDGEMENT ABOUT MOST THINGS IS SOUND.

Card 6.

IF I SET MY MIND TO IT, I CAN MAKE THINGS TURN OUT FINE.

Card 7.

I FEEL ENTHUSIASTIC AND CONFIDENT NOW.

Card 8.

MY FAVOURITE SONG KEEPS GOING THROUGH MY HEAD.

Card 9.

SOME OF MY FRIENDS ARE SO LIVELY AND OPTIMISTIC.

Card 10.

I'M ABLE TO DO THINGS ACCURATELY AND EFFICIENTLY.

Card 11.

I KNOW GOOD AND WELL THAT I CAN ACHIEVE THE GOALS I SET.

Card 12.

I'M OPTIMISTIC THAT I CAN GET ALONG VERY WELL WITH MOST OF THE PEOPLE I MEET.

Card 13.

I'M FEELING AMAZINGLY GOOD TODAY.

Card 14.

THINGS LOOK GOOD--THINGS LOOK GREAT!

Card 15.

I FEEL THAT MANY OF MY FRIENDSHIPS WILL STICK WITH ME IN THE FUTURE.

Card 16.

LIFE IS SO MUCH FUN IT SEEMS TO OFFER SO MANY SOURCES OF FULFILLMENT.

Card 17.

I WISH SOMEONE WOULD PLAY SOME GOOD LOUD MUSIC.

Card 18.

I'M FULL OF ENERGY.

Card 19.

GOD, I FEEL GREAT!

Card 20.

MY PARENTS ARE PRETTY PROUD OF ME MOST OF THE TIME.

APPENDIX A-3

Unbelievable Elation Mood Induction Statements.

Card A.

THE NEXT CARD WILL BEGIN THE SERIES OF STATEMENTS. I WILL READ THE STATEMENTS TO MYSELF, THEN I WILL TRY TO EXPERIENCE THE MOOD AS WELL AS I CAN UNTIL THE EXPERIMENTER INDICATES TO MOVE ON TO THE NEXT CARD. I WILL TRY TO BUILD MY MOOD AS I GO THROUGH THE CARDS.

Card 1.

I FEEL LIGHT HEARTED.

Card 2.

THIS MIGHT TURN OUT TO BE ONE OF MY GOOD DAYS.

Card 3.

ON THE WHOLE I HAVE VERY LITTLE DIFFICULTY THINKING CLEARLY.

Card 4.

I'M GLAD I'M IN COLLEGE--IT'S THE KEY TO SUCCESS NOWDAYS.

Card 5.

IT'S ENCOURAGING THAT AS I GET FURTHER INTO MY MAJOR, IT'S GOING TO TAKE LESS STUDY TO GET GOOD GRADES.

Card 6.

I'M FULL OF ENERGY AND AMBITION--I FEEL LIKE I COULD GO A LONG TIME WITHOUT SLEEP.

Card 7.

THIS IS ONE OF THOSE DAYS WHEN I CAN GRIND OUT CLASSWORK WITH PRACTICALLY NO EFFORT AT ALL.

Card 8.

MY JUDGEMENT IS KEEN AND PRECISE TODAY--JUST LET SOMEONE TRY TO PUT SOMETHING OVER ON ME.

Card 9.

NOW THAT IT OCCURS TO ME, MOST OF THE THINGS THAT HAVE DEPRESSED ME WOULDN'T HAVE IF I'D JUST HAD THE RIGHT ATTITUDE.

Card 10.

I KNOW THAT IN THE FUTURE I WON'T OVER-EMPHASIZE SO-CALLED "PROBLEMS".

Card 11.

I'M TO ABSORBED IN THINGS TO HAVE TIME FOR WORRY.

Card 12.

I AM PARTICULARLY INVENTIVE AND RESOURCEFUL IN THIS MOOD.

Card 13.

I FEEL SUPERB! I THINK IO CAN WORK TO THE BEST OF MY ABILITY.

Card 14.

I FEEL SO GAY AND PLAYFUL TODAY. I FEEL LIKE SURPRISING SOMEONE BY TELLING A SILLY JOKE.

Card 15.

I FEEL AN EXHILARATING ANIMATION IN ALL I DO.

Card 16.

MY MEMORY IS IN RARE FORM TODAY.

Card 17.

I CAN CONCENTRATE HARD ON ANYTHING I DO.

Card 18.

THINGS WILL BE BETTER AND BETTER TODAY.

Card 19.

I CAN MAKE DECISIONS RAPIDLY AND CORRECTLY; AND I CAN DEFEND THEM AGAINST CRITICISM EASILY.

Card 20.

I FEEL LIKE BURSTING WITH LAUGHTER--I WISH SOMEBODY WOULD TELL A JOKE AND GIVE ME AN EXCUSE!

APPENDIX A-4

Believable Depression Mood Statements.

Card A.

THE NEXT CARD WILL BEGIN THE SERIES OF STATEMENTS. I WILL READ THE STATEMENTS TO MYSELF, THEN I WILL TRY TO EXPERIENCE THE MOOD AS WELL AS I CAN UNTIL THE EXPERIMENTER INDICATES TO MOVE ON TO THE NEXT CARD. I WILL TRY TO BUILD MY MOOD AS I GO THROUGH THE CARDS.

Card 1.

TODAY IS NEITHER BETTER NOR WORSE THAN ANY OTHER DAY.

Card 2.

HOWEVER, I FEEL A LITTLE LOW TODAY.

Card 3.

I FEEL RATHER SLUGGISH NOW.

Card 4.

SOME TIMES I WONDER WHETHER COLLEGE IS ALL THAT WORTHWHILE.

Card 5.

EVERY NOW AND THEN I FEEL SO TIRED AND GLOOMY THAT I'D RATHER JUST SIT THAN DO ANYTHING.

Card 6.

I CAN REMEMBER TIMES WHEN EVERYONE BUT ME SEEMED FULL OF ENERGY.

Card 7.

TOO OFTEN I HAVE FOUND MYSELF STARING LISTLESSLY INTO THE DISTANCE, MY MIND A BLANK, WHEN I DEFINITELY SHOULD HAVE BEEN STUDYING.

Card 8.

I'VE HAD SOME IMPORTANT DECISIONS TO MAKE IN THE PAST, AND I'VE SOMETIMES MADE THE WRONG ONES.

Card 9.

PERHAPS COLLEGE TAKES MORE TIME, EFFORT, AND MONEY THAN IT'S WORTH.

Card 10.

I'M AFRAID THE RISK OF NUCLEAR WAR MAY GET A LOT WORSE.

Card 11.

THERE HAVE BEEN DAYS WHEN I HAVE FELT WEAK AND CONFUSED, AND EVERYTHING WENT MISERABLY WRONG.

Card 12.

I FEEL TERRIBLY TIRED AND INDIFFERENT TO THINGS TODAY.

Card 13.

I'M BEGINNING TO FEEL SLEEPY, MY THOUGHTS ARE DRIFTING.

Card 14.

MY LIFE IS SO TIRESOME---THE SAME OLD THING DAY AFTER DAY DEPRESSES ME.

Card 15.

I WANT TO GO TO SLEEP---I FEEL LIKE JUST CLOSING MY EYES AND GOING TO SLEEP RIGHT HERE.

Card 16.

I FEEL TIRED AND DEPRESSED; I DON'T FEEL LIKE WORKING ON THE THINGS I KNOW I MUST GET DONE.

Card 17.

I'VE FELT SO ALONE BEFORE, THAT I COULD HAVE CRIED.

Card 18.

I'M SO TIRED.

Card 19.

I DON'T WANT TO DO ANYTHING.

Card 20.

I'M UNCERTAIN ABOUT MY FUTURE.

APPENDIX A-5

Unbelievable Depression Mood Statements.

Card A.

THE NEXT CARD WILL BEGIN THE SERIES OF STATEMENTS. I WILL READ THE STATEMENTS TO MYSELF, THEN I WILL TRY TO EXPERIENCE THE MOOD AS WELL AS I CAN UNTIL THE EXPERIMENTER INDICATES TO MOVE ON TO THE NEXT CARD. I WILL TRY TO BUILD MY MOOD AS I GO THROUGH THE CARDS.

Card 1.

IT HAS OCCURRED TO ME MORE THAN ONCE THAT STUDY IS BASICALLY USELESS, BECAUSE YOU FORGET ALMOST EVERYTHING YOU LEARN ANYWAY.

Card 2.

I'M ASHAMED THAT I'VE CAUSED MY PARENTS NEEDLESS WORRY.

Card 3.

JUST TO STAND UP WOULD TAKE A BIG EFFORT.

Card 4.

I JUST CAN'T MAKE UP MY MIND; IT'S SO HARD TO MAKE SIMPLE DECISIONS.

Card 5.

I'VE LAIN AWAKE AT NIGHT WORRYING SO LONG THAT I HATED MYSELF.

Card 6.

THE WAY I FEEL NOW, THE FUTURE LOOKS BORING AND HOPELESS.

Card 7.

SOME VERY IMPORTANT DECISIONS ARE ALMOST IMPOSSIBLE FOR ME TO MAKE.

Card 8.

I HAVE THE FEELING THAT I JUST CAN'T REACH PEOPLE.

Card 9.

THINGS ARE EASIER AND BETTER FOR OTHER PEOPLE THAN FOR ME - I FEEL LIKE THERE IS NO USE IN TRYING AGAIN.

Card 10.

IT TAKES TO MUCH EFFORT TO CONVINCE PEOPLE OF ANYTHING.

Card 11.

MY THOUGHTS ARE SO SLOW AND DOWNCAST I DON'T WANT TO THINK OR TALK.

Card 12.

I JUST DON'T CARE ABOUT ANYTHING - LIFE JUST ISN'T ANY FUN.

Card 13.

LIFE SEEMS TOO MUCH FOR ME ANYHOW---MY EFFORTS ARE WASTED.

Card 14.

I DON'T CONCENTRATE OR MOVE, I JUST WANT TO FORGET ABOUT EVERYTHING.

Card 15.

I HAVE TOO MANY BAD THINGS IN MY LIFE.

Card 16.

EVERYTHING SEEMS UTTERLY FUTILE AND EMPTY.

Card 17.

I FEEL DIZZY AND FAINT - I NEED TO PUT MY HEAD DOWN AND NOT MOVE.

Card 18.

ALL OF THE UNHAPPINESS OF MY PAST LIFE IS TAKING POSSESSION OF ME.

Card 19.

I WANT TO GO TO SLEEP AND NEVER WAKE UP.

Card 20.

MY PARENTS NEVER REALLY TRIED TO UNDERSTAND ME.

APPENDIX A-6

Neutral Mood Induction Statements.

Card A.

THE NEXT CARD WILL BEGIN THE SERIES OF STATEMENTS. I WILL READ THE STATEMENTS TO MYSELF, THEN I WILL TRY TO EXPERIENCE THE MOOD AS WELL AS I CAN UNTIL THE EXPERIMENTER INDICATES TO MOVE ON TO THE NEXT CARD. I WILL TRY TO BUILD MY MOOD AS I GO THROUGH THE CARDS.

Card 1.

AT THE END APPEARS A SECTION ENTITLED "BIBLIOGRAPHY NOTES".

Card 2.

THIS BOOK OR ANY PART THEREOF MUST NOT BE REPRODUCED IN ANY FORM.

Card 3.

SATURN IS SOMETIMES IN CONJUNCTION, BEYOND THE SUN FROM THE EARTH, AND IS NOT VISIBLE.

Card 4.

SOME STREETS WERE STILL SAID TO BE LISTED UNDER THEIR OLD NAMES.

Card 5.

MANY STATES SUPPLY MILK FOR PRIMARY SCHOOL CHILDREN.

Card 6.

THE ORIENT EXPRESS TRAVELS BETWEEN PARIS AND ISTANBUL.

Card 7.

THE SHIP WAS ANCIENT AND WOULD SOON BE RETIRED FROM THE FLEET.

Card 8.

THERE ARE SOME FORMS IN WHICH NO OATH IS REQUIRED.

Card 9.

TWO MEN DRESSED AS REPAIRMEN WILL APPEAR SHORTLY AFTER THE VAN PULLS UP.

Card 10.

PAINTING IN A FEW OTHER NON-EUROPEAN COUNTRIES IS TREATED IN A SEPARATE VOLUME.

Card 11.

THE NAMES ON THE CHRISTMAS MAILING LIST ARE ALPHABETICALLY ORDERED.

Card 12.

THE MAGAZINE'S REPORT WAS SLANTED, AS USUAL.

Card 13.

BLACK AND WHITE PICTURES ARE ARRANGED IN TEN SECTIONS.

Card 14.

THE NOTICE MADE IT CLEAR THAT COFFEE BREAKS WERE BEING LIMITED.

Card 15.

BOEING'S MAIN PLANT IN SEATLE EMPLOYS 35,000 PEOPLE.

Card 16.

THE ORGANIZATION DEPENDED ON THE PEOPLE FOR SUPPORT.

Card 17.

IT ALL FITTED IN WITH THE OFFICER'S STORY.

Card 18.

THE MANSION WAS RENTED BY THE DELEGATION.

Card 19.

THE CHINESE LANGUAGE HAS MANY DIALECTS, INCLUDING CANTONESE, MANDARIN, AND WU.

Card 20.

A FREE SAMPLE WILL BE GIVEN TO EACH PERSON WHO ENTERS THE STORE.

APPENDIX B-1

Task Evaluation Scale

Instructions

Please indicate how strongly you agree or disagree with the following statements by placing a circle around the number that best represents your degree of agreement.

A circle around number one (1) indicates you strongly agree with the statement and a circle around number seven (7) indicates you strongly disagree with the statement. The other five numbers represent equal gradations between strongly agree and strongly disagree.

Scale Items

1. I enjoy the challenge of video games.
2. I never try hard at video games.
3. I can usually do quite well at things like video games.
4. How well I score on video games is not very important to me.
5. I'm usually not very good at things like video games.
6. I like to score as well as I can when I play video games.
7. How well I score on this video game is not important to me.
8. I want to do as well as I can on this video game.

Each item was followed by a seven point rating scale like the one below.

Strongly Agree	: 1	: 2	: 3	: 4	: 5	: 6	: 7	: Strongly Disagree

Scale Analysis

The scale reliability was assessed with an item total correlational analysis. The Task Evaluation Scale had an alpha reliability coefficient

of .769 and a honogeneity ratio of .296. The individual item total correlations ranged from .4 to .58 (see Table 55).

Table 55
Item Total Correlations for the Task Evaluation Scale

	Item Number							
	1	2	3	4	5	6	7	8
Mean	3.98	4.62	3.34	2.86	3.86	5.09	3.55	5.14
Standard Deviation	1.87	1.97	1.44	1.80	1.56	1.70	1.68	1.63
Correlation	.51	.43	.52	.52	.58	.40	.42	.40

Note: Item Numbers 3, 5, 6, and 8 are reverse score items.

APPENDIX B-2

Post Test Questionnaire

Please answer the following questions about participating in the experiment.

1. Did you find the experiment:

(a) Tiring..... Yes____No____

(b) Was it difficult to maintain concentration..... Yes____No____

(c) Was the computer equipment uncomfortable to use..... Yes____No____

(d) Any other comments:

_____

_____

_____

2. I would rate my current scores on this video game as: (tick one)

(a) much better than average..... ____

(b) better than average..... ____

(c) average..... ____

(d) worse than average..... ____

(e) much worse than average..... ____

You have now finished. Thank you for participating in the study, your help has been greatly appreciated.

APPENDIX C-1

Revised Task Evaluation Scale

TES (Value) Items

1. I usually try hard when I play video games.
2. I like to score better than other people when I play video games.
3. Scoring well on video games usually requires more effort than I am prepared to give. (R)
4. How successful I am at video games does not interest me.
5. Doing well at video games is reasonably important to me whenever I play.
6. Being able to score well at video games is not an ability I value very much. (R)
7. I usually lose interest in playing a video game before I become good at it. (R)

TES (Expectation) Items

1. I am usually easily bored by video games. (R)
2. I am usually quite good at things like video games.
3. Video games are usually exciting to play.
4. I usually manage to get by at things like video games.
5. I usually don't understand the point of things like video games. (R)
6. I usually manage to work out how to do OK at things like video games.
7. My scores on video games are usually fairly low.

Note: (R) indicates reverse score item.

Scale Analysis

The revised Task Evaluation Scales were piloted on 182 first year behavioural science students at the Canberra College of Advanced Education. Both the TES (Value) and TES (Expectation) scales provided reliable indices of evaluative beliefs. Their alpha reliability

coefficients were .843 and .787 respectively and their homogeneity ratios were .439 and .349 respectively. The individual item total correlations ranged from .53 to .63 for the TES (Value) scale and from .40 to .64 for the TES (Expectation) scale (see Table 56).

Table 56
Item Total Correlations for the Revised Task Evaluation Scales

	Item Number						
Scale	1	2	3	4	5	6	7
TES (Value)							
Mean	2.66	2.95	3.96	4.47	4.51	5.41	4.41
Standard Deviation	1.52	1.61	1.91	1.86	1.84	1.72	2.08
Correlation	.59	.62	.53	.63	.62	.61	.61
TES (Expectation)							
Mean	4.35	4.07	3.77	3.10	3.46	3.24	4.18
Standard Deviation	1.91	1.58	1.69	1.41	1.84	1.53	1.80
Correlation	.42	.64	.58	.40	.49	.52	.58

Note: The reverse score items for TES (Value) are 3, 4, 6, and 7 and for TES (Expectation) are 1, 5, and 7.

APPENDIX C-2

Evaluative Beliefs Scale

Scale Analysis

The scale reliability was assessed with an item total correlational analysis. The Evaluative Beliefs Scale had a alpha reliability coefficient of .704. The individual item total correlations ranged from .19 to .61 (see Table 57).

Table 57
Item Total Correlations for the Evaluative Beliefs Scale

	Item Number						
	1	2	3	4	5	6	7
Mean	4.12	2.98	3.28	4.16	4.07	4.74	3.15
Standard Deviation	1.91	1.85	1.83	1.79	2.10	1.72	1.64
Correlation	.53	.31	.19	.38	.61	.47	.42

Note: Item Numbers 2, 3, 5, and 7 are reverse score items.

Scale Items

The Evaluative Beliefs Scale items are listed in Appendix C-3.

APPENDIX C-3

Revised Post Test Questionnaire

Instructions:

Please indicate how strongly you agree or disagree with the following statements by placing a circle around the number that best represents your degree of agreement.

Circle (1) if you STRONGLY AGREE

Circle (2) if you MODERATELY AGREE

Circle (3) if you SLIGHTLY AGREE

Circle (4) if you NEITHER AGREE NOR DISAGREE

Circle (5) if you SLIGHTLY DISAGREE

Circle (6) if you MODERATELY DISAGREE

Circle (7) if you STRONGLY DISAGREE

It is not necessary to think over any item for very long. Mark your answer quickly and go on to the next statement.

Be sure to indicate how you actually feel about the statement, not how you think you should feel.

Try to avoid the neutral response (4) as much as possible. Select this answer only if you really cannot decide whether you tend to agree or disagree with the statement.

Each item was presented with a seven point rating scale as shown below.

Strongly Agree	: 1 : 2 : 3 : 4 : 5 : 6 : 7 :	Strongly Disagree

The items were:

1. My scores on this game were better than I expected.
2. I would rather other people did not know my scores on this game. (R)
3. My scores on this game reflect a low level of achievement. (R)
4. I believe I should have scored better on this game. (R)
5. The standard of my scores on this game was high.
6. I hope I get scores like these the next time I play a video game.
7. I think I could score better on this game. (R)

Instructions:

Please answer the following questions by using the rating scales provided. Again, circle the number above the label on each scale that best describes your position.

1. I think my scores on this video game were:

Better than AVERAGE	1	2	3	4	5	6	7	Worse than AVERAGE
	very much	much	somewhat	average	somewhat	much	very much	

2. Please rate how satisfied you were with your scores on this video game.

SATISFIED	1	2	3	4	5	6	7	DISSATISFIED
	extremely	quite somewhat		unsure	somewhat	quite	extremely	

3. Please rate how your scores on this video game compared to your expectations.

Better than EXPECTED	1	2	3	4	5	6	7	Worse than EXPECTED
	very much	much	somewhat	average	somewhat	much	very much	

4. What were the main reasons you were SATISFIED/DISSATISFIED with your scores on this game.

_____

_____

_____

5. Any other comments.

_____

_____

_____

APPENDIX C-4

Scores Feedback Rating Sheet

Positive Feedback

SCORE SHEET

YOUR SCORE WAS: " XX "

VERY GOOD	<-	70 +
GOOD		60 - 69
OK		50 - 59
AVERAGE		30 - 49
BELOW AVERAGE		20 - 29
POOR		10 - 19
VERY POOR		0 - 9

Negative Feedback

SCORE SHEET

YOUR SCORE WAS: " XXX "

VERY GOOD		160 +
GOOD		155 - 159
OK		150 - 154
AVERAGE		140 - 149
BELOW AVERAGE		125 - 139
POOR	<-	75 - 124
VERY POOR		0 - 74

APPENDIX D-1

Association Values and Preference Ratings of the Stimulus Slides.

Subjects

The 60 subjects were volunteers from a pool of 200 first year behavioural science students at the Canberra college of Advanced Education. Their age ranged form 17 to 48 years with a mean age of 23.65 years. None of the subjects had previously taken part in an experiment involving any of the experimental material. The students who were subjects in the experiment received course credit for their participation.

Materials

Stimuli. The stimuli were 80 stimulus slides of randomly generated 10 point solid black on white shapes. The random generation procedure used was described by Vanderplas and Garvin (1959). The 10 point shapes were chosen because they represent a level of complexity that is in the average processing range of university students (Munsinger & Kessen, 1964). It is thought that levels of stimulus complexity that are outside subjects processing capacity are also likely to be outside their judgmental capacity (Baltes & Wender, 1971). The appropriateness of 10 point shapes for university student subject populations has been demonstrated by a study that found that these subjects' affective responses are maximized for 10 point shapes (Hamid, 1972). Furthermore, the mere exposure effect has been reported for these type of stimuli (Hamid, 1972; Kunst-Wilson & Zajonc, 1980).

Equipment. The stimuli were projected on to a lecture room projection screen using the same projection equipment described in Experiment 6.

Data record sheets. Subjects responses for each slide were recorded on the following data record sheet.

1. (a) Remind you of something Yes___No___

(b) If possible what _____.

(c) :_____:_____:_____:_____:_____:
like somewhat like neither somewhat dislike dislike

Procedure

All 60 subjects were seated in a lecture theater and issued a booklet containing the experimental instructions, practice response sheet, and data record sheets. Subjects were asked to read the following instructions which were then read aloud by the experimenter.

> I am investigating the rational behind techniques used in advertising. Initially, I need some people to help me evaluate the stimuli I am going to use in my research. This will involve looking at some slides and filling in some rating scales.
>
> The slides will be of a variety of shapes. Each slide will be presented for only a brief time so you will need to concentrate on the screen when each slide is about to appear.
>
> Some of the shapes may remind you of a familiar object or situation while others may not remind you of anything.
>
> Therefore, after you have looked at each shape place a tick (/) either in the box marked "Yes" (if the shape reminded you of something) or in the box marked "No" (if it didn't). You must tick either "Yes" or "No" for every shape.
>
> If the shape reminds you of something that you can describe in a word or two please write it down in the space provided. Sometimes you may not be able to decide what a shape reminds you of or you may not be able to describe it in just a word or two. If this happens just place a tick in the box marked "yes" and leave the description space blank.
>
> Finally, rate your impression of each shape on the like/dislike scale provided. To do this place a cross on the line in the space above the word(s) that best represent(s) your degree of liking or dislike for the shape.
>
> Work rapidly. There are no right or wrong answers. The impression you have of the particular shape is what is

required. Don't puzzle over individual shapes or worry about being consistent in your judgments. Often a vague impression is all you will have to go on so just indicate your first reaction when making each judgment.

Make sure you answer for every slide and make sure the slide number corresponds with the number in the answer booklet.

I will give the signal "Ready" just before each shape appears so you will know when to expect it.

Any Questions ? There are two practice slides before we begin so turn to the next page now.

The first practice slide was then presented on the screen. The exposure time was 1 second. Subjects were then assisted in making the three judgments on the following more detailed response sheet.

Indicate if the shape reminds you of something or not by placing a (/) in the appropriate box.

Yes___ No___

If possible write down what the shape reminds you of

_____.

Place a cross on the in the space above the word(s) that best represent(s) your degree of liking or dislike for the shape.

like	somewhat like	neither	somewhat dislike	dislike

When all subjects were satisfied they understood the task the second practice slide was presented on the screen and subjects recorded their responses on a second practice response sheet. Subjects were then introduced to the abbreviated response sheet (see above) and the 80 experimental stimuli were presented sequentially for rating.

Results

The association value for each stimuli was calculated. The association value is the percentage of subjects who indicated the slide reminded them of something. The stimuli were rank ordered by association value and the 40 stimuli with the lowest association value were chosen to be stimuli for the current experimentation. These stimuli were then numbered from 1 to 40 (see Figures 2 and 3). Their association values ranged from 25.0 to 51.6 per cent (see Table 58).

The mean preference rating for each of these stimuli was also calculated. Preference ratings ranged from 2.4 to 3.42 on the 5 point like/dislike scale (see Table 58).

The stimulus slides were the assigned to stimulus set A or B as is shown in Table 59. The slides assigned to stimulus sets A and B were then assigned a ranking based on their mean preference ratings (see Table 59).

Each slide from set A was paired with a slide from set B on the basis of their preference ranking. The stimulus sets A and B were sub divided into the sub sets A1 and A2, B1 and B2 (see Table 60).

A one-way analysis of variance revealed that there were no significant differences between the mean association values and the mean preference ratings for the four stimulus sub sets (see Table 61).

A pilot study was conducted to compare the level of recognition of the stimulus sub sets. That is, sub set A1 was compared to sub set A2 and sub set B1 was compared to sub set B2 (see Appendix D-2).

Table 58
Table of Stimuli Association Values and Mean Preference Ratings

Slide No.	Association Value	Preference Rating	Slide No.	Association Value	Preference Rating
1.	25.0	2.98	21.	40.0	3.10
2.	26.6	3.01	22.	41.6	2.80
3.	30.0	2.90	23.	41.6	2.93
4.	30.0	3.12	24.	41.6	2.88
5.	31.6	3.13	25.	41.6	2.95
6.	31.6	2.90	26.	45.0	2.75
7.	33.3	3.42	27.	45.0	3.05
8.	33.3	2.77	28.	46.6	2.68
9.	33.3	2.97	29.	46.6	2.82
10.	33.3	2.77	30.	46.6	2.82
11.	35.0	3.03	31.	46.6	2.40
12.	35.0	3.15	32.	48.3	2.77
13.	35.0	3.07	33.	48.3	2.88
14.	35.0	3.07	34.	48.3	2.90
15.	35.0	2.93	35.	48.3	2.65
16.	36.6	2.92	36.	48.3	2.65
17.	36.6	2.98	37.	48.3	3.13
18.	38.3	2.85	38.	51.6	2.67
19.	38.3	2.93	39.	51.6	2.73
20.	40.0	2.80	40.	51.6	2.67

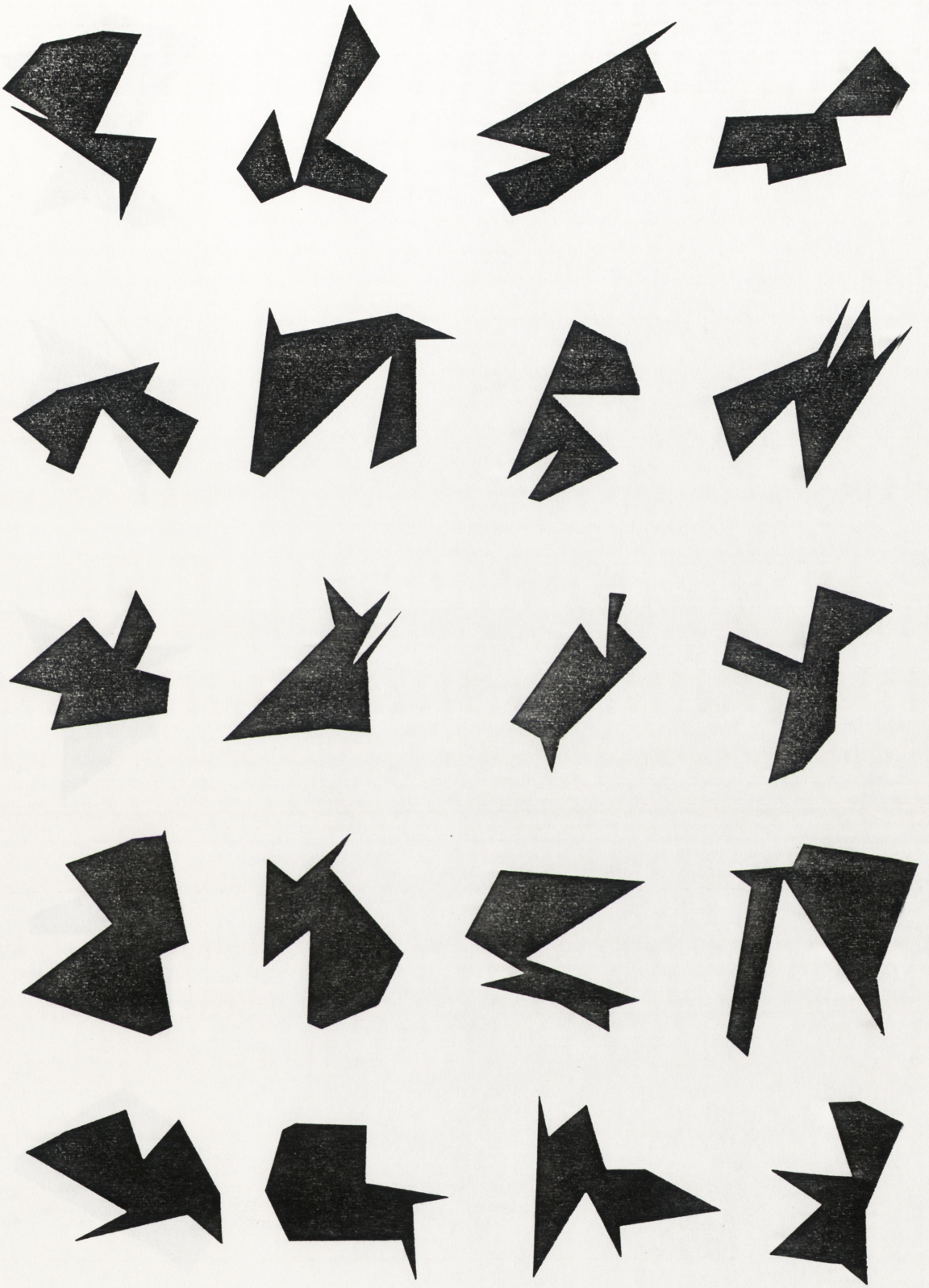

Figure 2. Stimulus slides 1 to 20 numbered from left to right and down the page.

Figure 3. Stimulus slides 21 to 40 numbered from left to right and down the page

Table 59
Stimulus Slides Assigned Sets A and B and their Preference Ranking

Stimulus Set A		Stimulus Set B	
Slide No.	Ranking.	Slide No.	Ranking.
1.	7	2.	5
4.	4	3.	9
5.	2	6.	10
8.	16	7.	1
9.	9	10.	15
12.	1	11.	4
13.	6	14.	2
16.	11	15.	6
17.	8	18.	12
20.	15	19.	7
21.	5	22.	14
24.	12	23.	8
25.	10	26.	16
28.	18	27.	3
29.	14	30.	13
32.	17	31.	20
33.	13	34.	11
36.	20	35.	19
37.	3	38.	18
40.	19	39.	17

Table 60
Table of Slide Numbers Assigned Stimulus Sub Sets and Slide Pairings

	Stimulus Slide Sub Sets			
Slide Pair	A1	B1	A2	B2
1.	1.	19.	4.	11.
2.	8.	26.	5.	14.
3.	9.	3.	12.	23.
4.	16.	7.	13.	15.
5.	17.	34.	20.	10.
6.	24.	18.	21.	2.
7.	25.	6.	28.	38.
8.	32.	39.	29.	22.
9.	33.	30.	36.	31.
10.	40.	35.	37.	27.

Table 61
Mean Association Values and Preference Ratings for the Stimulus Sub Sets

Stimulus Sub Set	Association Value	Preference Rating
A1	39.62	2.88
A2	40.14	2.97
Total	39.88	2.92
B1	41.13	2.89
B2	39.13	2.87
Total	40.13	2.88

APPENDIX D-2

Pilot Study 1

Method

Subjects

The 24 subjects were volunteers from a pool of 180 first year psychology students at the Australian National University. They had not previously participated in any experiment using these experimental materials. Their age ranged from 17 to 45 years with a mean age of 25.25 years. There were 11 males and 13 females. The students who volunteered received course credit for participating in the experiment.

Materials

Stimuli. The stimuli were the stimulus sets A and B described in Appendix D-1.

Equipment. The projection and slide viewing equipment described in Experiment 6 was used here.

Data record sheets. Subjects recorded their responses on the data record sheets described in Experiment 6.

Procedure

Subject were randomly assigned to either stimulus set A or B as the training stimuli. The procedure was then the same as that used for the nonrecognition no instruction control subjects in Experiment 6.

Results

A two-way analysis of variance was used to analyze the data. The

results are outlined below.

Effect of Stimulus Slide Set

There was no significant difference between the two stimulus slide sets A and B for the number of trained stimuli selected by either recognition or preference judgments. Furthermore, the mean number of trained stimuli selected was not significantly different to chance for either recognition or preference judgments for either stimulus set (see Table 62).

Effect of Stimulus Sub Set

There was no significant difference between the stimulus slide sub sets for the number of trained stimuli selected by either recognition or preference judgments. The mean number of trained stimuli selected did not differ significantly to chance for either recognition or preference judgments for any of the stimulus sub set groups (see Table 62).

Sets A and B Combined

The grand means for recognition and preference judgments represent a replication of the Kunst-Wilson and Zajonc (1980) study. As expected the recognition level of 55.25 per cent was not significantly different to chance. However, contrary to expectations the preference level of 49.6 per cent was also not significantly different to chance.

Table 62
Percentage of Trained Stimuli Selected by Recognition and Preference Judgments in Pilot Study 1.

Stimulus Sub Set	Judgment	
	Recognition	Preference
A1	52.50	45.00
A2	55.80	47.50
Mean (A1,A2)	54.20	46.3
B1	55.80	50.80
B2	56.70	55.00
Mean (B1,B2)	54.20	52.90
Grand Mean	55.25	49.60

Discussion

The results from this pilot study show that the stimulus sets and sub sets meet the empirical standards required for Experiment 6. The sets and sub sets are equally recognizable and attracted similar preference ratings (see Table 62).

The failure to replicate Kunst-Wilson and Zajonc's (1980) findings for preference judgments was surprising since this pilot study was a replication of their methodology. The only difference here was the number of stimulus slides. There would appear to be no theoretical reason why the increased number of slides should adversely influence the mere exposure effect for stimuli whose repeated exposure was below perceptual threshold. However, since this was the only substantial methodological difference between the two studies it was decided to

empirically test if the number of stimuli was critical for the mere exposure effect when the repeated exposure was below the perceptual threshold (see Appendix D-3).

APPENDIX D-3

Pilot Study 2

Method

Subjects

The 72 subjects were volunteers from a pool of 400 first year behavioural science students at the Canberra College of Advanced Education who had not previously taken part in any studies using the current experimental material. Their age ranged from 17 to 47 years with a mean age of 25.06 years. Students who were subjects in the experiment received course credit for their participation.

Design

The experimental design was a one-way factorial design with three levels of number of slides (6, 10, and 20).

Materials

Stimuli. The stimuli were six sets of slides (A,B,A1,B1,C,D). Stimulus slide sets A and B were 20 slide sets, A1 and B1 were 10 slide sets, and C and D were 6 slide sets. The sets A, B, A1, and B1 were the same as in previous studies. The sets C and D were 6 slide sub sets of sets A and B respectively. Set C was made up of second, fifth, and eighth slide from stimulus sets A1 and A2. Set D was made up of the stimulus pairs from set B1 and B2 of the stimuli in set C (see Table 63).

Equipment. The projection and slide viewing equipment was that used in Experiment 6.

Data Record Sheets. Subjects recorded their responses on the data

record sheets used in Experiment 6.

Table 63
Stimulus Slides Assigned to Stimulus Sets C and D

	Stimulus Slide Sub Set	
Slide No.	C	D
1.	4	11
2.	9	3
3.	16	7
4.	21	2
5.	28	38
6.	33	30

Procedure

Subjects were randomly assigned to either the 6, 10, or 20 stimulus slide set conditions. The procedure was then that used for Pilot 1.

Results

A one-way analysis of variance was used to analyze the data. The results are outlined below.

Effect of Number of Stimuli

There was no significant difference between the three groups for the mean number of trained slides selected by recognition judgments. The mean number of trained slides selected by recognition judgments was not significantly different to chance for any of the three experimental

groups (see Table 64).

There was a significant difference between the number of trained slides preferred by the stimulus slide groups, F (2,69) = 3.12, $p<.05$. The 10 stimulus slide group preferred significantly more trained slides than the 6 stimulus slide group, t (46) = $p<.02$. There were no other significant differences for preferences between the groups and none of the groups' degree of preference for trained slides was significantly different to chance (see Table 64).

Table 64
Percentage of Trained Recognized and Preferred by the 6, 10, and 20 Stimulus Slide Groups

	Stimulus Slide Set		
Judgment	6	10	20
Recognition	49.3	54.2	49.2
Preference	43.8	56.3	52.1

Discussion

The results form this study confirm that there is no empirical reason not to use stimulus sets of 20 stimuli. There were no significant differences between the 10 and 20 stimulus slide groups. There was surprisingly a significant difference between the 6 and 10 stimulus slide groups. It is possible that for the 6 stimulus slide group that 6 judgments are not sufficient to obtain a reliable estimate of subjects recognition and preference for trained stimuli.

It was also surprising to once again fail to find a mere exposure effect for any of the experimental groups. That is, the number of

trained stimuli selected as the preferred stimuli was not significantly different to chance for any of the experimental groups. This failure to find a mere exposure effect for stimuli trained below the perceptual threshold is again contrary to the results reported by Kunst-Wilson and Zajonc (1980).

APPENDIX D-4

Recognition and Preference Judgment Data Sheets

Recognition Judgment

			Circle One	
1.	(a)	Which slide have you seen before	Left	Right
	(b)	How sure are you about your choice		

: 1	: 2	: 3	: 4	: 5 :
very sure	sure	neither sure/unsure	unsure	very unsure

Preference Judgment

			Circle One	
1.	(a)	Which slide do you prefer	Left	Right
	(b)	How sure are you about your choice		

: 1	: 2	: 3	: 4	: 5 :
very sure	sure	neither sure/unsure	unsure	very unsure

APPENDIX D-5

Development of the Attitude to Intelligence and Creativity Scale.

The Attitude to Intelligence and Creativity Scale was developed to measure subjects' value of intelligence and creativity as a personal attribute. The 20 item scale was constructed from an original pool of 50 items. The original 50 items were based on suggestions from a sample of 30 first year behavioural science students at the Canberra College of Advanced Education. The students were asked to write down items that would reflect a value of intelligence and creativity as a personal attribute. These suggested items were then edited to ensure (a) the wording of the items were suitable, that is double negatives etc were removed, (b) that there were approximately even numbers of positive and negatively worded items, and (c) that a representative range of values were included. The 50 items were then submitted to 96 students for rating on a 6-point agree-disagree scale.

Method

Subjects

The 96 subjects were volunteers from a pool of 180 first year behavioural science students at the Canberra College of Advanced Education. Their age ranged from 17 to 48 years with a mean age of 25.2 years. The subjects had not previously taken part in an experiment that involved the use of any of the experimental materials. The subjects received course credit for taking part in the experiment.

Materials

The 50 items were typed on A4 paper with a 6-point agree-disagree scale for each item. The items in a booklet titled Attitudes to

Intelligence and Creativity Questionnaire.

Procedure

The questionnaires were administered in small groups of approximately 15 students at a time. Each subject was seated at a desk and given the questionnaire booklet. On the first page of the booklet were the following instructions.

> This questionnaire is being used to develop a scale to measure attitudes about intelligence and creativity.
>
> There are no right or wrong answers to these questions, but it is important you answer as truthfully and as accurately as you can. The way you answer will be used to select items to be used in the final scale.
>
> Please rate how strongly you agree/disagree with each statement by putting an "X" in the space above the word which most closely describes what you think about the statement.
>
> Make sure you respond to each item and only use the spaces provided. Remember your response does not have to be exactly right, just the closest to what you think.

Example:

A. Intelligent and creative people are usually good chess players.

If for example you strongly agree with this statement you would place your "X" as follows:

X					
strongly agree	agree	somewhat agree	somewhat disagree	disagree	strongly disagree

However, if you disagree with the statement you would place your "X" as follows:

				X	
strongly agree	agree	somewhat agree	somewhat disagree	disagree	strongly disagree

and so on choosing the description that best fits your position.

Subjects were then instructed to go ahead and rate the following 50 items.

Scale Items:

1. Intelligent and creative people are often insensitive. (R)
2. A civilized society depends on the leadership of it's intelligent and creative members.
3. Creative and intelligent people usually have high self esteem.
4. Intelligent and creative people are frequently difficult to understand. (R)
5. Many of the world's problems have been created by intelligent and creative people. (R)
6. I would like to be thought of as intelligent and creative.
7. Narrow minded people place the highest value on intelligence and creativity. (R)
8. I like being in the company of intelligent and creative people.
9. Intelligent and creative people make the best partners. (R)
10. Intelligence and creativity are the most valuable human qualities.
11. Intelligent and creative people rarely make practical contributions to society. (R)
12. Intelligent and creative people are usually difficult to get to know. (R)
13. I find that intelligent and creative people are usually honest.
14. I admire and respect intelligent and creative people.
15. Intelligent and creative people are interesting to talk to.
16. I believe intelligent and creative people are also courageous.
17. Ordinary people are unlikely to be intelligent and creative. (R)
18. Intelligence and creativity is not always reflected by the kind of work we do.
19. I find intelligent and creative people to be undemonstrative. (R)
20. Intelligent and creative people are often selfish. (R)
21. I think intelligent and creative people are often immature. (R)
22. To succeed in life you need to be intelligent and creative.
23. Intelligent and creative people are usually unambitious. (R)

24. Intelligent and creative people make good leaders.

25. Most worthwhile people value intelligence and creativity.

26. I find intelligent and creative people are often demanding. (R)

27. Intelligent and creative people are usually also artistic.

28. I think intelligent and creative people are often boring to talk to. (R)

29. Intelligent and creative people often behave irresponsibly. (R)

30. Intelligent and creative people develop new and different ways of doing things.

31. Intelligence and creativity are essential for effective communication.

32. I find that intelligent and creative people are often unreliable. (R)

33. Intelligent and creative people usually adopt conservative ways. (R)

34. I think intelligent and creative people are usually warm and loving human beings.

35. Intelligent and creative people usually do things the same way that other people do them. (R)

36. I think intelligent and creative people are fun to be with.

37. Success in business relies on intelligence and creativity.

38. I think intelligent and creativity contribute to developing self respect.

39. I think intelligence and creativity is associated with narrow mindedness. (R)

40. Intelligent and creative politicians usually lose touch with grass roots opinion. (R)

41. I think intelligent and creative people are usually conformists. (R)

42. Intelligent and creative people usually support the status quo. (R)

43. I like the enthusiasm that intelligent and creative people usually have.

44. I find intelligent and creative people are usually unfriendly. (R)

45. Success in life usually depends on intelligence and creativity.

46. Intelligent and creative people are easy to live with.

47. I would like to foster intelligence and creativity in my children.

48. I believe intelligent and creative people often lack a sense of humour. (R)

49. Intelligent and creative people have a healthy natural curiosity.

50. I usually avoid making friends with intelligent and creative people. (R)

Results

The results were analyzed by item total correlations and rating category frequencies. The negatively worded items were reverse scored prior to analysis. The 10 positively worded items and the 10 negatively worded items whose item total correlations were in the range .25 to .5 and whose cumulative frequency for the three agree and the three disagree categories was in the range 20 to 80 per cent, were chosen for the Attitude to Intelligence and Creativity Scale (see Table 65).

The 20 item Attitude to Intelligence and Creativity Scale had a alpha reliability coefficient of .73.

Table 65
Item Total Correlations and Frequency Distribution of Items in the Attitude to Intelligence and Creativity Scale

Item No.	Correlation	Agree (%)	Disagree (%)
1.	.39	22.9	77.1
2.	.30	80.0	20.0
4.	.25	44.8	55.2
5.	.29	60.4	39.6
7.	.34	46.9	53.1
9.	.28	64.6	35.4
12.	.36	24.0	76.0
16.	.25	30.2	69.8
20.	.29	32.3	67.7
21.	.49	20.7	79.3
22.	.24	38.5	61.5
24.	.44	77.1	22.9
25.	.28	64.6	35.4
29.	.33	31.3	68.7
32.	.50	29.2	70.8
34.	.36	54.2	45.8
37.	.41	77.1	22.9
38.	.34	80.3	19.7
40.	.25	51.0	49.0
45.	.35	45.8	54.2

APPENDIX D-6

Experiment 6 Post Test Questionnaire.

Please answer the following questions about participating in the experiment.

1. Did you find the experiment:

(a) Tiring ..... Yes____No____

(b) Was it difficult to maintain concentration ..... Yes____No____

(c) Was the viewing tunnel uncomfortable to use ..... Yes____No____

(d) Any other comments:

_____

_____

_____

2. The previous research suggested that intelligent, creative people preferred familiar/unfamiliar material (Circle the correct word).

3. How likely did you think it was that intelligent, creative people preferred familiar (unfamiliar) material:

(a) Before you attended the experiment

:_____:_____:_____:_____:_____:
likely somewhat likely neither somewhat unlikely unlikely

(b) After hearing about the previous research but before viewing the slides

:_____:_____:_____:_____:_____:
likely somewhat likely neither somewhat unlikely unlikely

(c) After viewing the slides

:_____:_____:_____:_____:_____:
likely somewhat likely neither somewhat unlikely unlikely

4. Was the exposure time for the slide pairs adequate for you to make judgments of preference, recognition and certainty.

Yes____No____

You have now finished. Thank you for participating in the study, your help has been greatly appreciated.