USE OF THESES

This copy is supplied for purposes of private study and research only. Passages from the thesis may not be copied or closely paraphrased without the written consent of the author.
ANGER AND REPRESSSION:

A TEST OF A MODEL

CAROL HALL

Submitted in partial fulfilment of the requirements of the degree of Master of Clinical Psychology, Department of Psychology, Australian National University.

1987
DECLARATION

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.

[Signature]
This thesis describes original research carried out by the author in the Department of Psychology at the Australian National University during 1986.
ACKNOWLEDGEMENTS

I would like to express my appreciation to the following people for their valuable contributions at various stages of this research. Dr Don Byrne provided formal supervision and encouragement during this study. Dr Penny Davis of Sydney University offered access to her own, as yet, unpublished findings. Others in the ANU Psychology Department who gave willingly were: Dr Mark Dickerson who was enthusiastic about my early interest in the topic; Dr Coby Brinkman who assisted with advice concerning physiological measurement; Drs Jacqui Holman and Val Braithwaite who gave moral support, friendship and humour; Mr Martin Schaefer and Mr Neville Whitworth who offered technical expertise and advice and established the test laboratory; Mrs Jess Giddings, Mrs Eunita Smith and Mrs Carol Beames provided constant assistance and encouragement throughout the research. Also, to my friends: John Raivars who brought the gifts of laughter and relaxation when these were most needed; Lex Beardsell who acted as an associate during subject selection; Jenny Ninham who verified handscored physiological data and was draft editor; and, Sue Butcher, Leonie Kinsella and Tony Corless who assisted in the final stages of manuscript preparation.
ABSTRACT

Anger or more specifically, repression, suppression or difficulties in coping with anger has achieved prominence in the literature of psychological medicine, as contributing or etiological factors in hypertension, coronary heart disease and cancer. In past studies, 'repression', operationally defined by a pattern of high defensiveness and low trait anxiety, has been linked consistently with elevated physiological arousal during stressful laboratory tasks, despite low self-reported disturbance. This model for operationalizing repression has also been used in studies which demonstrate that repression is associated with restricted access to memories from childhood and that this is particularly so for negative emotional experiences. The current research was designed to extend the previously mentioned model of repression to anger, to test whether similar effects to those noted in research into repression of anxiety also exist in anger repression. Defensiveness and trait anger were used to operationalize repression of anger and five groups of subjects participated in free-recall of angry, anxious and happy experiences from childhood. Heart rate, skin conductance level and facial skin temperature were monitored throughout baseline and recall, and subjective involvement during recall was assessed. Mixed-sex samples comprised eight 'repressors of anger', 10 'true-low angry' and 10 'true-high angry' subjects, eight traditionally-defined 'repressors of anxiety', and six individuals who repressed both emotions; the latter two groups being included to permit comparison of repressors of anger with repressors of anxiety and to allow for evaluation of possible additivity of effects in repression. Results revealed no group differences in physiological, subjective arousal, or access to affective memories. Explanations for the absence of effects similar to those in repression of anxiety were sought, both in terms of methodology and conceptual issues examining differences between the emotions of anger and anxiety. The latter suggested that repression of these emotions may not operate in a similar manner.
# TABLE OF CONTENTS

CHAPTER 1: INTRODUCTION; LITERATURE REVIEW, RATIONALE, PARAMETERS AND AIMS OF THIS RESEARCH

1.1 Anger and Disease 1
1.1.1 Anger and Hypertension 1
1.1.2 Anger and Coronary Heart Disease 2
1.1.3 Anger and Cancer 3
1.1.4 Repression and Disease? 4
1.2 Repression 5
1.2.1 Freud's Thesis: A Process of Repression 5
1.2.1.1 Early Experimental Studies 7
1.2.1.2 Current Status of the Repression Concept 7
1.2.2 Repression Operationalized as a Trait 8
1.2.2.1 The Repression-Sensitization Scale 8
1.2.2.2 Weinberger, Schwartz & Davidson's (1979) Model 9
1.3 Research Based on Weinberger et al.'s Model 11
1.3.1 Physiological Studies 12
1.3.2 Memory Recall Studies 27
1.4 Summary of Research Findings 42
1.4.1 Limited Access to Affective Memories 42
1.4.2 Elevated Physiological/Behavioural Arousal and Low Self-Reported Disturbance 43
1.5 Rationale, Aims and Parameters of This Research 47
1.5.1 Rationale 47
1.5.2 Aims 48
1.5.3 Parameters 48
CHAPTER 2: METHOD

2.1 Operationalizing Repression

2.1.1 Repression of Anxiety: High MC/Low TMAS

2.1.2 Repression of Anger: High MC/Low Trait Anger

2.1.2.1 Spielberger's Trait Anger Scale (T-Anger) (1979)


2.3 Selection of Dependent Variates

2.3.1 Mood Ratings

2.3.2 Memory Data and Subjective Variates

2.3.3 Physiological Measures

2.3.3.1 Skin Conductance Level

2.3.3.2 Heart Rate

2.3.3.3 Facial Skin Temperature

2.4 Apparatus

2.5 Procedure

2.5.1 Subject Selection

2.5.2 Experimental Testing

2.5.3 Data Reduction

2.5.3.1 Changes in Mood During Recall

2.5.3.2 Physiological Arousal

2.5.3.3 Memory and Subjective Data

CHAPTER 3: RESULTS

3.1 Psychometric Selection Criteria
3.1.1 Differences between Experimental Groups 77
3.1.2 Correlations Between Selection Scales 78
3.2 Mood Ratings 79
3.2.1 Moods Prior to the Experiment 79
3.2.2 Changes in Mood During Memory Recall 79
3.3 Physiological Arousal 80
3.3.1 Absolute Arousal During Minimal Stress 80
3.3.2 Absolute Arousal in Baselines Prior to Recall 81
3.3.3 Change in Arousal During Memory Recall 82
3.3.4 Arousal During Post-Experimental Baseline 86
3.4 Memory Data 87
3.4.1 Number of Memories/Number of Negative Memories 87
3.4.2 Age of Earliest Memory/Earliest Negative Memory 88
3.5 Subjective Data 89
3.5.1 Intensity of Original Emotion 89
3.5.2 Intensity of Current Emotion 90
3.5.3 Emotional Involvement During Recall 90
3.6 Relationships Amongst Dependent Variates 90
3.6.1 Correlations Between Physiological Variates 90
3.6.2 Correlations Between Physiological and Subjective Variates 91

CHAPTER 4: DISCUSSION
4.1 Specific Aims 92
4.1.1 Physiological/Subjective Arousal 92
4.1.2 Affective Memory Access
4.1.3 Patterns of Effects in Repression of Anger and Repression of Anxiety
4.1.4 Additivity of Effect
4.2 Explanation of Findings
4.2.1 No Effect with Repression of Anger?
4.2.2 Methodological Factors
4.2.2.1 Subject Selection Criteria
4.2.2.2 Anger Selection Scale
4.2.2.3 Sample Size
4.2.2.4 Physiological Apparatus and Technique
4.2.2.5 High Variability in Physiological Arousal
4.2.2.6 Experimental Task
4.2.2.7 Variations from Davis and Schwartz' (1984, 1987) Method
4.2.3 Conceptual Issues
4.3 Conclusion

REFERENCES

APPENDICES
CHAPTER 1

INTRODUCTION: LITERATURE REVIEW, RATIONALE AND AIMS OF THIS RESEARCH.

1.1 Anger and Disease

References to anger are ubiquitous in the literature of psychological medicine, particularly in association with hypertension, coronary heart disease and cancer. Detailed accounts of research examining the relationship between anger and cardiovascular disease are provided by Holt (1970), Harrell (1980), Diamond (1982), Chesney (1985), Chesney and Rosenman (1985), Gentry (1985), Julius, Schneider and Egan (1985), Manuck, Morrison, Bellack and Polefrone (1985), Rosenman (1985) and Williams, Barefoot and Shekelle (1985). A collection of works linking anger and cancer is edited by Fox and Newberry (1984). This research is not reviewed in depth here, the aim being simply to establish that there is converging evidence to suggest that issues related to anger contribute significantly and are possibly etiological factors in certain disease states.

1.1.1 Anger and Hypertension

Alexander (1939) first suggested that continual suppression of hostility leads to chronic hypertension. Some research has not verified this hypothesis (Mann, 1977; Matarazzo, 1953), some provides contradictory evidence (Schacter, 1957; Whitehead, Blackwell, De Silva & Robinson, 1977), but the thesis has gained substantial empirical
support (Gentry, 1985; Gentry, Chesney, Gary, Hall & Harburg, 1982; Harburg, Blakelock & Roeper, 1979; Harburg, Erfurt, Hauenstein, Chape, Schull & Schork, 1973; Matarazzo, 1953).

Although causal direction has not been established, prospective studies suggest that difficulty in coping with anger is an epidemiological factor (Kahn, Medalie, Newfeld, Riss & Goudbourt, 1972). The weight of evidence is such that in a recent review, Gentry (1985) concluded that "anger-coping styles do, in fact, operate to influence human blood pressure and thereby increase one's chances of developing hypertensive disease" (p. 139).

1.1.2 Anger and Coronary Heart Disease

Difficulties with anger-expression are also prevalent in individuals with coronary heart disease (CHD), angina and atherosclerosis (Haynes, Feinleib & Kannel, 1980; Holmes & Will, 1985; Kahn et al., 1972; Smith, Follick & Korr, 1984; Williams, Haney, Lee, Kong, Blumenthal & Whalen, 1980). Furthermore, the relationship appears independent of the Type A behaviour pattern (Haynes et al., 1980; Smith et al., 1984; Williams et al., 1980).

Prospective research suggests an etiological relationship. An eight-year longitudinal study of anger coping-styles (Haynes et al., 1980) revealed that suppression of hostility is a significant predictor of CHD in white-collar males and working females.
In possible causal relation, extreme cardiovascular reactivity has been found in individuals who have difficulties in coping with anger/hostility expression (Diamond, Schneiderman, Schwartz, Smith, Vorp & Pasin, 1984). However, the relationship is complex. Amongst high-hostile subjects, both Type A behaviour and overt anger expression were associated with high reactivity, whereas with low-hostile subjects, Type B behaviour and suppression of anger were more strongly related to extreme cardiovascular reactivity (Diamond et al., 1984).

1.1.3 Anger and Cancer

Lack of ventilation or inability to express anger has also been implicated as a contributing or causal factor in cancer. With malignant breast tumours, extreme suppression of anger and, in patients over 40 years, a generalized suppression of emotion was the most significant predictor of outcome (Greer & Morris, 1975). Prospective data obtained from malignant cutaneous melanoma sufferers indicated that non-expression of dysphoric affect was four times more effective in predicting relapse or death, than was delay in medical intervention (Temoshok & Fox, 1984). The etiological role of emotion has also been implicated with mammary carcinoma; prospective data suggests that low self-reported experience of negative affect and a 'repressive coping style' are more significant in predicting death or relapse than biological factors (Jensen, 1983, cited in Schwartz, 1983).
Collectively, the clinical and empirical evidence has given rise to a Type C (for cancer) 'personality' (Temoshok & Fox, 1984). Temoshok and Fox (1984) argue that Type C persons "suppress or repress negative emotions particularly anger, (and are) extremely cooperative, patient, passive, lacking assertiveness, appeasing and accepting" (p. 262).

1.1.4 Repression and Disease?

Overall, the research provides converging evidence that anger is a major contributing or etiological factor in these disease states, and furthermore indicates that it is not anger per se, but difficulties in coping with anger that is the critical issue. Specifically, some evidence suggests that those who repress negative emotions are particularly at risk for cancer and cardiovascular disease (Diamond et al., 1984; Jensen, 1983, cited in Schwartz, 1983).

In research which examined elevated physiological arousal amongst those who repress anxiety, Weinberger, Schwartz and Davidson (1979) noted that "individual differences in the tendency to become anxious continue to be an important dimension in theories of neurosis and stress-related illness." (p. 369) Subsequent to this, Schwartz (1983) highlighted the potential significance of repression of anger in disease. In an address to the American Psychological Association, he concluded "that although most of our research to date has examined ... anxiety, the same ... should apply to other emotions such as depression and anger." (p. 30)
1.2 Repression

1.2.1 Freud's Thesis: A Process of Repression

Although Freud (1914a) was not the first to refer to repression (Breuer & Freud, 1895/1955; Page, 1892, cited in Mackinnon & Dukes, 1964), the concept is generally attributed to him. In 1914a/1957, Freud emphasized the significance of the concept by stating that "the theory of repression is the cornerstone on which the whole structure of psychoanalysis rests." (p. 16)

For Freud (1915a/1957), "the essence of repression lies simply in turning something away, and keeping it at a distance, from the conscious." (p. 147) In his definitive paper on the process, Freud (1915a/1957) stated that "the motive and purpose of repression was nothing else than the avoidance of unpleasure" (p. 153). Freud (1915b/1957) suggested that in repression, material was selectively eliminated from awareness and relegated to the unconscious.

Technically, Freud (1915a/1957) distinguished two types of repression. The first, 'primal repression', was a process in which the ideational aspect of experience was, in some manner, detached from the affective component. The offending material entered the unconscious, prior to the individual becoming consciously aware of the experience. The other, 'repression proper' or 'after-expulsion', involved assignment of material to the unconscious after the experience has been consciously recognized by the individual. In both circumstances, repression was viewed as
a process serving the defensive function of eliminating psychological distress or 'unpleasure' associated with experience.

Repression was conceptualized as a highly individualized process, linked to cultural and self-adopted ethical standards. Freud (1914b/1957) asserted that "the same impressions, experiences, impulses and desires that one man indulges or at least works over consciously will be rejected with the utmost indignation by another, or even stifled before they enter consciousness." (p. 93) Awareness of conflict with internalized ideals was, according to Freud, the factor that initiated repression of particular experiences.

The specific types of psychological pain which initiate repression were, according to Strachey (1915a/1957, Editor's Note), a constant source of concern to Freud throughout his career. Freud documented fear and hostility (1914b/1957), trauma, shame, anxiety, guilt (1915a/1957), and tension, pain and mourning (1926/1957) as capable of causing sensations of 'unpleasure'. Any of these emotions could, depending on the individual's own standards, initiate repression. In 1933/1957, Freud argued that anxiety was not, as he had previously thought, a consequence of repression but was one of the primary factors leading to repression.
1.2.1.1 Early Experimental Studies

Early literature and research examining the psychoanalytic view of a repression process is vast and while some supportive evidence has emerged, this has been subject to severe criticism (Holmes, 1974).

1.2.1.2 Current Status of the Repression Concept

After more than 50 years of experimental research, controversy remains such that Erdelyi and Goldberg (1979) introduced the topic as "the problem of repression". In their influential paper, Erdelyi and Goldberg (1979) noted that no consensus has emerged as to whether the notion holds the status of 'a fact', 'a theory' or a 'discredited hypothesis' (p. 355), and conclude that repression remains "an emotionally loaded term in psychology" (p. 355).

At one extreme, some practitioners simply assert that the existence of repression has been verified through numerous clinical illustrations. This perspective holds closely to Freud's (1914a/1957) argument that "the concept of repression (is) not a premise or assumption underlying psychoanalytic theory but a theoretical inference legitimately drawn from innumerable observations." (p. 17)

In contrast, critics argue that experimental studies, largely based on differential recall of anxiety-provoking or ego-threatening material, provide no substantiation for the notion of repression (Holmes, 1974; Mischel, Ebbesen & Zeiss, 1976). Differences in memory recall have been attributed to other processes such as selective attention.
(Aborn, 1963), differential learning (Caron & Wallach, 1959; Tudor & Holmes, 1973), recall bias, response competition or interference (D'Zurilla, 1965; Holmes & Schallow, 1969; Russell, 1952; Truax, 1957), or report bias (Holmes, 1974). In 1974, Holmes summarized the critics' view by arguing that "there is no evidence that repression does exist" (p. 650).

Many assert that the lack of unequivocal empirical support is due to inadequate experimental techniques which fail to elicit the process in the laboratory (Erdelyi, 1974; Erdelyi, 1985; Erdelyi & Goldberg, 1979; Flavell, 1955; Merrill, 1953), and/or lack of an appropriate means to operationalize repression (Erdelyi, 1974; Erdelyi, 1985; Erdelyi & Goldberg, 1979; Weinberger et al., 1979).

1.2.2 Repression Operationalized as a Trait

1.2.2.1 The Repression-Sensitization Scale

Byrne, Barry and Nelson (1963) shifted away from viewing repression as a process and conceptualized the phenomenon as a personality trait. The Repression-Sensitization Scale (RS) (Byrne et al., 1963), which reportedly discriminates 'repressors' from 'sensitizers', has been used extensively in research.

Despite this widespread usage, Weinberger et al. (1979) argued that the RS did not provide a valid index of repression, because of the substantial overlap between this scale and measures of trait anxiety. Golin, Herron, Lakota and Reineck (1967) and Weinberger et al. (1979) reported correlations of .87 and .94 respectively, between the RS and
the Taylor Manifest Anxiety Scale (TMAS) (Taylor, 1953). Consequently, Weinberger et al. (1979) followed Holroyd (1972), and argued that the RS cannot discriminate between 'repressors', who do not recognize or acknowledge high subjective disturbance, from 'true low-anxious' individuals who do not experience such distress.

1.2.2.2 Weinberger, Schwartz and Davidson’s Model (1979)

Weinberger et al. (1979) agreed that repression could be conceptualized as a trait and pioneered a method to discriminate true low-anxious individuals from those who adopt a 'repressive coping style'. They proposed that scores on the Marlowe-Crowne Social Desirability Scale (MC) (Crowne & Marlowe, 1960, 1964), which was considered a poor measure of social desirability but a sound index of 'repressive defensiveness' or 'affect inhibition', and scores on the TMAS could be used to construct a 2 x 2 quadrant defining four distinct 'coping styles' or habitual modes of response.

For the first time in repression research, this permitted a distinction to be made between those who report low anxiety and who are also low in 'defensiveness', and those who report similarly little anxiety but who are high in defensiveness. In their model for operationalizing repression, Weinberger et al. (1979) designated these groups as 'true low anxious' (TLA) and 'repressors' (REP). People high on anxiety and low on 'defensiveness' were classed as 'true high anxious' (THA) while individuals high on both
dimensions were termed 'defensive high anxious' (DHA). As correlations between MC and trait anxiety range between -.2 and -.45 (Millimet, 1970), Weinberger et al. (1979) noted that the DHA coping style is relatively rare.

Although Weinberger et al.'s (1979) model is based on anxiety repression, the approach has influenced several studies of anger and disease. Jensen (1983, cited in Schwartz, 1983) found the 'repressive coping style' to be a significant predictor of outcome in breast cancer. Using this as an interpretive factor in a study of high cardiovascular reactors, Diamond et al. (1984) noted that their 'low hostile' sample would comprise two separate sub-groups; the 'true low hostile' and 'repressive/low hostile' individuals. They argued that low-hostile subjects who report an 'anger-in coping style' may be analogous to Weinberger et al.'s (1979) REP, and suggested that both groups may need to perceive maintenance of emotional control. This characteristic may lead low-hostile/anger-in persons to withhold anger, to allay fear of losing self-control (Diamond et al., 1984).

With respect to Freud's views on repression, Weinberger et al. (1979) explicitly stated that their use of the term 'repressor' simply reflected convention established in the early literature. They acknowledged that "the extent to which this defensive style is characterized by the use of repression relative to other defenses such as denial,
negation and suppression is not currently known."
(Weinberger et al., 1979, p. 370)

Although this proviso has not been stated explicitly by subsequent researchers using Weinberger et al.'s model, it appears to hold. The present writer also adheres to this convention. In reviewing the literature and presenting the current research, use of terms such as 'repression', 'repressor' and 'repressive' follows this practice, and is not intended to imply that the processes involved are, or are not, in line with Freud's conceptualization of repression.

1.3 Research Based on Weinberger et al.'s (1979) Model

Researchers using Weinberger et al.'s (1979) method for identifying those who are 'repressive' in coping style, have demonstrated that these individuals experience elevated physiological arousal (Asendorpf & Scherer, 1983; Davis & Schwartz, 1984; Gudjonsson, 1981; Weinberger et al., 1979) and limited access to certain types of emotional memories (Davis, 1987; Davis & Schwartz, 1987). These workers have used different laboratory techniques to evaluate repression. With the exception of Davis and Schwartz' (1984, 1987; Davis, 1987) method, which was adopted in this research, each is reviewed briefly. On occasion, some authors have reported significant results without noting associated probabilities. In such cases, these results are simply presented without further comment.
In total, the physiological research reviewed here and the memory-recall studies presented thereafter, provide substantial evidence of construct validity for the repression concept operationalized with Weinberger et al.'s (1979) model.

1.3.1 Physiological Studies

i) Weinberger et al. (1979)

In 1979, Weinberger et al. evaluated group differences in physiological, behavioural and subjective arousal under experimental conditions during a phrase association task comprising items selected from those of Mandler, Mandler, Kremen and Sholiton (1961). Sets of phrases, counterbalanced for neutral, sexual and aggressive material, were presented randomly by audiotape to permit assessment of trial effects independent of content.

Three samples of male undergraduates were selected using the MC and TMAS; 14 were high anxious and defensive (REP), 15 were low-anxious and non-defensive (TLA) and 11 were moderately high-anxious and non-defensive (MHA).

Heart rate (HR), frequency of spontaneous skin resistance responses (SSRR), facial muscle activity (EMG), latency in reaction time and verbal disturbance were monitored. Inter-rater reliability of verbal disturbance scores, judged from audiotaped responses using Mandler et al.’s procedure (1961) while blind to subject classification, averaged .88. Subjective data collected immediately after the experiment included: TMAS anxiety,
awareness of bodily reactions during the procedure, and 'usual' levels of cognitive and somatic anxiety.

Weinberger et al. (1979) predicted, firstly, that REP would exhibit longer reaction times, higher verbal disturbance and more physiological arousal than TLA subjects, while MHA would display intermediate physiological arousal but no avoidance of phrase content. Secondly, it was anticipated that REP would report substantially less cognitive than somatic anxiety. Thirdly, it was suggested that stress induced by phrase-associations may lead to a change in self-perceived trait anxiety, such that REP would under-report TMAS anxiety after the procedure, relative to that measured two months prior to the experiment.

Analysis of pre- and post-baseline physiological activity, (three one-minute periods prior to the procedure and two one-minute post-baselines), revealed the following results. SSRRs were less frequent and HR lower after the experiment ($p < .001$ and $p = .04$ respectively). While no time difference emerged for EMG, a significant group effect was evident ($p = .03$), with REP exhibiting the most and TLA the least muscle tension in baselines. Marginal group and interaction effects also existed for palmar sweating ($p = .068$ and $p = .059$ respectively), with REP having more SSRRs than other groups. No group effect was apparent for baseline HR.

To provide a better estimate of physiological arousal during minimal stress, minimum resting baseline levels (MRB)
were calculated for each individual. For each variate, MRB comprised the average of the two minutes, in any of five baselines, where activity was lowest. Analyses revealed no group differences in minimal HR, SSRR or EMG.

Change in arousal during phrase-associations relative to MRB yielded several significant results. HR analysis revealed a marginal group effect \((p = .059)\), with TLA experiencing less increase in HR than other groups during the entire experiment. A marginal trial by group effect was also noted \((p = .078)\). In the first trial, TLA had less increase in HR than MHA or REP \((p < .005\) and \(p < .02\) respectively), but this effect diminished as MHA and REP habituated to the task.

In electrodermal activity, a marginal group effect also arose \((p < .10)\) with TLA subjects experiencing less increase in SSRR than REP \((p < .01)\), while MHA were intermediate in response. Again, all groups habituated over time.

Change in frontalis muscle tension generated a significant group effect \((p = .016)\), with REP becoming more tense than either TLA \((p < .04)\) or MHA \((p < .01)\) subjects, who did not differ from each other. No habituation was noted for increase in muscular activity.

The behavioural index latency, also revealed a significant group effect \((p = .029)\) which was moderated by a significant group by time interaction \((p = .003)\). REP, unlike MHA and TLA groups, responded progressively more slowly over time. During the first trial TLA reacted more
quickly than MHA or REP ($p < .01$ and $p < .001$ respectively), who did not differ from each other. In the second block MHA responded more quickly, being similar to TLA, while REP reacted more slowly than they had initially (TLA vs REP, $p < .04$). This trend continued during the final session ($p < .005$) with REP responding more slowly (TLA vs REP, $p < .001$), while MHA and TLA were similar in reaction times.

Total verbal disturbance scores also revealed group differences in behavioural arousal ($p = .015$), with REP being more disturbed than either MHA or TLA. A significant phrase-type effect also emerged ($p < .001$), with sexual and aggressive phrases causing more disturbance than neutral material. The interaction was not significant.

Despite group differences in physiological arousal, self-perceptions of bodily reactions revealed no parallel effect. REP, TLA and MHA reported similar awareness of restlessness, cardiac activity, palmar sweating and muscle tension.

Self-reports of 'usual' levels of cognitive and somatic anxiety supported the hypothesis that REP would report fewer cognitive than physiological symptoms ($p < .005$). In contrast, neither TLA nor MHA exhibited any discrepancy between these indices.

Differences in absolute cognitive anxiety also discriminated between groups. Relative to TLA, REP reported less cognitive anxiety, while MHA reported substantially more (both probabilities $< .025$). In contrast, REP and TLA
were similar in self-reported somatic symptoms, with REP being significantly below MHA ($p < .04$).

Changes in TMAS anxiety subsequent to the experiment relative to that two months prior, supported the prediction of a group/time relationship ($p < .005$). Estimates of TLA subjects were stable, while MHA (‘sensitizers’) magnified and REP minimized trait anxiety following the experiment ($p < .02$ and $p < .002$ respectively).

Overall, Weinberger et al. (1979) argued that patterns of physiological, behavioural and subjective arousal provided construct validity for their proposal that different coping styles could be operationalized using trait anxiety and defensiveness levels, at least for male subjects.

TLA subjects did not experience high physiological or behavioural arousal. Furthermore, congruence between self-reports of cognitive and somatic anxiety indicated accuracy in self-perceptions of arousal in this group.

A second pattern was evident amongst MHA. Although self-perceptions of cognitive and somatic anxiety were congruent, MHA experienced intermediate physiological arousal relative to other groups. However, they did not exhibit high behavioural defensiveness during phrase-associations.

In contrast, Weinberger et al. (1979) argued that REP adopted a defensive strategy, involving avoidance of disturbing thoughts (high verbal disturbance scores and
reaction times) and relatively elevated heart rate, palmar sweating and muscle tension, not evident in other groups. Despite elevated physiological activity, REP did not perceive, or report, greater somatic arousal. Unlike other groups, REP also exhibited discordance between self-perceived cognitive/somatic anxiety, minimizing cognitive compared with bodily symptoms. From this, Weinberger et al. (1979) suggested that elevated behavioural and physiological arousal amongst REP demonstrated that, despite reports of low trait anxiety, a repressive coping style seems relatively ineffective in dealing with stressful situations.

ii) Gudjonsson (1981)

Following Weinberger et al.'s (1979) results, Gudjonsson (1981) suggested that direct observation of discrepancies between physiological and self-reported arousal during a stressful task, could be used to predict levels of MC defensiveness and trait anxiety. In line with Weinberger et al.'s (1979) model, he hypothesized that subjects reporting low subjective disturbance and exhibiting high electrodermal activity in response to emotionally-loaded questions, would also be high on defensiveness and low on trait anxiety (REP). Conversely, it was anticipated that subjects high on subjective arousal and low in electrodermal activity, would be high trait anxious and low-defensive; this group, conceptually similar to the
THA group in Weinberger et al.’s schema, were termed ‘sensitizers’ (SEN) (Gudjonsson, 1981).

Thirty-six male professionals, (mean age = 32 years), participated in a question and answer task comprising two emotional and five neutral items. Two measures of palmar sweating were monitored; skin conductance responses directly following stimulus questions (SCR) and spontaneous skin conductance responses (SSCR). After each question, subjects rated subjective disturbance in response to the item. Following the task, they completed the MC and the Neuroticism Scale as a measure of trait anxiety (Eysenck & Eysenck, 1964, cited in Gudjonsson, 1981).

Subjects were categorized into three groups using a median-split method for mean self-reported disturbance and physiological arousal. Individuals above the median on electrodermal activity and below the median on subjective disturbance were termed REP, with the reverse pattern identifying SEN. The remainder were classed as 'concommitants' (CON), indicating concordance between measures of arousal.

Analyses for separate classifications derived from both measures of electrodermal activity, revealed that REP were significantly more defensive and less anxious than SEN (both probabilities = .004 for SCR groupings and p = .012 and .003 for SSCR respectively).

Gudjonsson’s (1981) work replicated previous physiological and subjective results and extended these
findings to a sample of older professional males, thus providing initial construct validation for Weinberger et al.'s (1979) model for operationalizing repression.

iii) Asendorpf and Scherer (1983)

In 1983, Asendorpf and Scherer asserted that differences in arousal did not reflect general attitudes to emotionality amongst REP. They argued that these effects were restricted to anxiety and predicted that they would not emerge during experimental inductions of anger or happiness. To test this, Asendorpf and Scherer adopted Weinberger et al.'s (1979) schema in a study of physiological, self-reported and behavioural arousal. Subjects were four groups of 12 German male undergraduates, including 'defensive high-anxious' subjects (DHA) as well as REP, TLA and THA, selected for extreme MC and TMAS scores.

The procedure comprised: 15 minutes of adaptation; baseline 1 (two minutes); neutral phrase-associations; an 'anxiety-provocation' (videotaped blocks of sexual, aggressive and neutral phrases translated from those used by Weinberger et al., 1979); a neutral film; a 'happiness induction' (a funny film); a neutral film; an 'anger-provocation' (a Prisoner's Dilemma Game); and baseline 2 (two minutes).

Heart rate (HR), finger pulse volume amplitude (PVA) and SSRR were monitored throughout, while behavioural arousal was independently judged from videotaped facial reactions, rated for expressiveness, happiness, anxiety,
anger and surprise. Subjective awareness of anxiety, happiness, anger and fear was self-rated several times during the procedure.

The following group differences for each class of variate were predicted to emerge, exclusively during anxiety-provocation. In physiological activity, it was hypothesized that REP would not differ from THA, while both groups would be more aroused than TLA subjects. On behavioural arousal, REP would be more stressed than either TLA or THA subjects, who in turn, would not differ from each other. Self-rated anxiety would be low for REP, high for THA and intermediate for TLA subjects. With the exception of a prediction of high self-reported anxiety for DHA, no hypotheses were advanced.

Asendorpf and Scherer (1983) used changes in self-rated emotion to validate their methodology. Phrase-associations induced the most anxiety, while the humorous film was associated with the greatest happiness. In contrast, the Prisoner's Dilemma game was not associated with elevations of anger; from this, it was concluded that the anger-induction was unsuccessful.

Analyses of variance for mood-ratings provided support for predicted group effects. Anxiety was the only emotion which differentiated groups during the phrase-association task ($p < .003$) and the funny film ($p < .04$), and also approached significance in baseline periods ($p < .07$). In
all situations, REP experienced the least anxiety followed in order by TLA, DHA, THA groups.

Although Asendorpf and Scherer (1983) monitored electrodermal activity, results were not published. Use of a new impulse technique to prevent polarization of electrodes led to a loss of sensitivity in the data.

Minimum resting levels of physiological activity (MRB) were calculated in line with Weinberger et al.'s (1979) technique. Analyses revealed that groups did not differ in MRB for HR or PVA ($p < .10$ for all comparisons).

Increases in HR from MRB during mixed phrases confirmed that TLA subjects were less aroused than REP ($p < .05$), while REP and THA did not differ from each other. DHA were intermediate in response and did not differ from any other group.

To eliminate the possibility that changes reflected reactions to the task, irrespective of phrase content, Asendorpf and Scherer (1983) compared HR change during neutral and mixed phrases. This analysis was based on Autonomic Lability Scores (ALS) (Lacey, 1956), a procedure adopted to eliminate the significant negative correlation which existed between change scores in neutral and mixed phrases ($r = -.49$). Results confirmed that significant differences between the TLA group and REP and THA groups held only during mixed phrases.

Significant group differences in change in HR from MRB also existed during the neutral film following mixed
phrase-associations (p < .05), however, this effect did not persist in the second neutral film. Asendorpf and Scherer (1983) suggested that group difference in HR during the initial neutral film reflected a 'carry-over' from the phrase associations.

PVA analysis was also based on AL scores to eliminate moderate negative correlations between change from MRB in all conditions (median r = -.51). Predicted group differences (TLA > REP = HA) were not evident during either neutral or mixed phrases, but emerged in the last neutral film (p < .05). Asendorpf and Scherer (1983) suggested that these findings reflected a 'ceiling' effect in PVA, whereby group differences emerged only as subjects began to relax.

Discussion of behavioural arousal (facial expression of emotion) was restricted to Asendorpf and Scherer's (1983) central focus of anxiety during neutral and affective phrases. No significant differences emerged between TLA and REP during neutral phrases, but this comparison was significant for the anxiety-induction (p < .05). Both THA and DHA subjects showed intermediate facial anxiety and did not differ from other groups.

Asendorpf and Scherer (1983) concluded that their results supported the prediction that group differences would apply only to anxiety-provoking situations. Validation of anxiety and happiness inductions, combined with group effects during anxiety-provocation and the absence of such effects in the humourous situation substantiated this
prediction. However, their hypothesis could not be tested in entirety. The failure of the Prisoner’s Dilemma Game to induce anger did not allow Asendorpf and Scherer (1983) to assess groups under anger-provocation, consequently it cannot be concluded that differences do not exist and this aspect of the hypothesis remains untested.

iv) Davis and Schwartz (1984)

In a single study in 1984, Davis and Schwartz adopted Weinberger et al.’s (1979) model in an extension of previous research. These workers assessed physiological arousal in a female sample under an experimental method comprising free-recall of personal childhood memories associated with specific emotions. One paper (Davis & Schwartz, 1987), which tested the hypothesis of limited accessability to affective memories amongst REP, is presented later in this review. The other, as yet unpublished report (Davis & Schwartz, 1984), examined group differences in physiological activity during this memory-recall process.

Davis and Schwartz (1984) hypothesized that heightened physiological arousal would be evident in REP during recall of personal affective experiences, and that this would be particularly marked during recall of memories associated with negative emotion.

Physiological variates included HR, facial muscle activity and skin temperature of the face. Bipolar facial EMG was taken from zygomatic and corrugator regions, areas reported to be differentially sensitive to emotion (Brown &
Schwartz, 1980, cited in Davis & Schwartz, 1984). Temperature was detected from bilateral thermistors, symmetrically placed at an angle of 45 degrees and 2.5 centimetres below and to the side of the outer corner of the eye. Under constant environmental conditions, increased activity of the sympathetic nervous system is thought to be associated with vasoconstriction and a decrease in temperature (Guyton, 1977, 1981; Lynch & Schuri, 1978). Cardiac activity was monitored from a plethysmograph on the middle finger of the non-dominant hand.

Thirty female Yale undergraduates, selected from a pool of 94, were identified as REP, TLA or THA from scores on the MC and Bendig's 20-item TMAS (Bendig, 1956). Where possible, subjects comprised those with the most extreme responses on both scales.

Davis and Schwartz' (1984) interest in differential muscle involvement and cerebral laterality of emotion (reported in a mixed-sex sample by Polonsky & Schwartz, 1984, cited in Davis & Schwartz, 1984), are not relevant to this research and these results are not presented. Also, cardiac records were found to be contaminated by movement and those results were not published (Davis & Schwartz, 1984). Consequently, average facial temperature results are the only physiological data reviewed here.

Their task comprised six four-minute, free-recall periods in which subjects remembered and briefly described personal experiences up to the age of 14, which were associated with specific emotions. Initially, events of a 'general' nature were recalled, with no reference being made to affective content. Then, five randomly-presented conditions required recall of happy, sad, angry, fearful and wondrous experiences. Subjects were tested individually in a sound-proof, temperature-controlled room. A female experimenter, who presented in-vivo instructions, remained with subjects throughout the procedure.

Prior to the experiment, subjects rated the extent to which they felt relaxed, curious/interested, anxious, sad, embarrassed, happy, fearful/scared, frustrated and angry. A multiple analysis of variance on mood-ratings was not significant, allowing Davis and Schwartz (1984) to eliminate initial mood differences as a source of variation.

Mean temperature data revealed no group differences, but the effect for recall was significant ($p < .01$). Temperature was lowest during general recall, indicating subjects were more aroused in this condition than in those for specific emotions (happy, $p < .001$; wonder and anger, $p < .01$; fear, $p < .05$; and sad, $p = .10$). As general recall was presented first, it was suggested that this result reflected anticipatory anxiety. One other recall effect was significant: temperature was lower during recall of sad compared with happy experiences ($p < .05$).
However, a significant group/recall interaction indicated group differences across conditions ($p < .01$). In line with predictions, skin temperature of TLA subjects was consistently higher than that of REP ($p < .01$ for anger; $p < .001$ for all other conditions). Temperature varied for THA subjects, being significantly above that of REP in happy, sad, fear and wonder conditions and similar to that of REP during general and anger recall.

Davis and Schwartz (1984) offered the following conclusions from temperature data. REP's lower facial temperature relative to TLA in all conditions, suggested that REP were more aroused by the task despite similarity in self-reported trait anxiety (TMAS). In contrast with THA subjects, lower temperature amongst REP in happy, sad, fear and wonder conditions, suggested that REP were more aroused than those who actually report higher TMAS anxiety. Davis and Schwartz (1984) argued that their data replicated previous work, by again demonstrating that "repression is associated with increased levels of autonomic arousal" (p. 17).

Furthermore, Davis and Schwartz (1984) noted that their results extended prior findings to "a more naturalistic task involving the recall of real-life emotional experiences, in a female population, and to yet another physiological response, namely, skin temperature." (p. 18)
However, a significant group/recall interaction indicated group differences across conditions ($p < .01$). In line with predictions, skin temperature of TLA subjects was consistently higher than that of REP ($p < .01$ for anger; $p < .001$ for all other conditions). Temperature varied for THA subjects, being significantly above that of REP in happy, sad, fear and wonder conditions and similar to that of REP during general and anger recall.

Davis and Schwartz (1984) offered the following conclusions from temperature data. REPs' lower facial temperature relative to TLA in all conditions, suggested that REP were more aroused by the task despite similarity in self-reported trait anxiety (TMAS). In contrast with THA subjects, lower temperature amongst REP in happy, sad, fear and wonder conditions, suggested that REP were more aroused than those who actually report higher TMAS anxiety. Davis and Schwartz (1984) argued that their data replicated previous work, by again demonstrating that "repression is associated with increased levels of autonomic arousal" (p. 17).

Furthermore, Davis and Schwartz (1984) noted that their results extended prior findings to "a more naturalistic task involving the recall of real-life emotional experiences, in a female population, and to yet another physiological response, namely, skin temperature." (p. 18)
1.3.2 Memory Recall Studies

i) Davis and Schwartz (1987)

Within the same research, Davis and Schwartz (1987) simultaneously addressed the fundamental, but previously untested, assumption that repression serves "to keep painful unpleasant experiences out of consciousness" (p. 156). From theoretical accounts of repression, they predicted that REP would exhibit limited access to personal memories, and that this would be particularly so for experiences linked with negative affect.

The number of memories recalled comprised the primary dependent variable. Additional data were also collected for: age of earliest memory; intensity of emotion experienced at the time of each situation (original intensity); and intensity of initial emotion, re-experienced during recall of each event (current intensity).

Analyses of number of memories data yielded significant effects for group (p = .01) and recall (p < .001). REP reported fewer memories than TLA (M = 13.0 and 7.8 respectively, p < .05), while THA subjects did not differ from either group (M = 9.8). 'General' memories were more often recalled than happy events (M = 15.6 and 11.7 respectively, p < .001), and happy memories were more readily recalled than those linked with other emotions (p < .01). No differences existed between the number of sad, angry, fearful and wondrous memories recalled (M = 8.17, 8.37, 9.33 and 7.60 respectively).
An analysis for total negative affective memories (sad, angry and fearful combined), generated a significant group effect ($p = .02$). REP reported fewer negative memories than TLA ($p < .01$) or THA subjects ($p < .05$) (respective group means of 18.8, 34.0 and 25.7).

Age of earliest memory data produced no group differences, but a main effect emerged for condition ($p < .025$). 'General' experiences were recalled from an earlier age than specific affective memories ($M = 3.84$, 4.92, 5.81, 5.77, 5.53, and 5.63 years for general, happy, sad, angry, fearful and wonder). An error in this publication listed these data incorrectly, and those given here were obtained by personal communication (Dr P.J. Davis, 28th May, 1987).

A separate analysis for age of earliest negative memory produced a marginal group effect ($p = .07$). The a priori prediction that REP would report their earliest negative experience later in life than would other groups found support, with REP being significantly older than TLA or THA groups ($p < .05$ in each case; $M = 6.37$, 5.09 and 5.65 years respectively).

Mean ratings of original and current intensity of predominant affect (happiness, sadness, anger, fear, wonder) revealed no group effects, but significant results emerged for recall ($p < .01$), time ($p < .001$) and recall by time interaction ($p < .001$). Originally, all emotions were reported to be equally intense. However, differences
existed in the extent to which these affects were re-experienced during recall. Positive emotions remained moderately intense, while negative affects lost salience to various degrees; sadness did not endure as strongly as happiness \((p < .01)\) or wonder \((p < .001)\), but remained more intense than anger or fear \((p < .001\) in each case).

Group differences in mood during recall were evaluated from pre and post-recall ratings. THA individuals experienced negative feelings more intensely and positive moods less intensely than other groups. Moods of REP and TLA were relatively similar, although REP reported more happiness after recalling sad, fearful and wonder experiences.

Overall, results supported Davis and Schwartz' (1987) prediction of limited access to memories for personal experience, particularly those associated with negative affect, amongst individuals who adopt a repressive coping style. REP recalled fewer negative memories than THA and fewer positive and negative experiences than TLA. In addition, the observation that REP were significantly older at the time of earliest negative memory, also suggested limited access to affective memories.

Intensity of affect ratings associated with recalled events contrasted with the memory data for REP and TLA. Although REP reported similarly intense original emotion, they recalled fewer experiences. It was proposed that, in conjunction, these results suggest that repression acts as
an all-or-none phenomenon. Rather than simply being linked with less intense emotion, some memories simply appear inaccessible to REP. Davis and Schwartz (1987) concluded that their findings provided some support for Freud's (1915a/1957) thesis that repression acts as a process whereby events associated with 'unpleasure' are eliminated from consciousness.

Davis and Schwartz (1987) noted that current theoretical accounts of repression would not predict the finding of limited access to positive as well as negative experiences in REP relative to TLA subjects. They argued that "although the effects of repression are most pronounced for experiences involving negative affect, repression is also associated in some way with the suppression or inhibition of both positive and negative emotional experience." (Davis & Schwartz, 1987, p. 160)

In conjunction, observations of elevated physiological arousal during recall of all types of affective memories (Davis & Schwartz, 1984) and limited access to positive and negative experiences amongst REP relative to TLA subjects, led Davis and Schwartz (1987) to conclude that adopting "a repressive coping style may have implications for the broader domain of emotional experience in general." (p. 160)

In anticipation of alternate interpretations of these data, Davis and Schwartz (1987) examined the feasibility of other explanations for differential recall of affective experience.
Firstly, it has been suggested that recall is determined, in part, by intensity of emotion experienced at the time of the event, with more intense events being easier to remember than those which were less intense (Dutta & Kanungo, 1967, 1975 cited in Bower, 1981; Menzies, 1936). In Davis and Schwartz' (1987) study, groups were similar in ratings of original intensity across all types of emotional experience, yet they differed significantly in number of experiences recalled. Consequently, Davis and Schwartz (1987) pointed out that this argument does not explain differential group performance.

Another explanation suggests that it is not intensity of original affect, but the intensity of feeling that is experienced during recall which influences accessibility (Holmes, 1970). In Davis and Schwartz (1987), both REP and TLA reported similarly intense current affect, but REP reported significantly fewer experiences. Therefore, Davis and Schwartz (1987) rejected this type of explanation for their data.

Others propose a mood-state-dependency process, whereby people more readily recall experiences that are affectively congruent with mood during recall (Bower, 1981; Laird, Wagener, Halal & Szegda, 1982). Mood-ratings of Davis and Schwartz' (1987) subjects revealed that REP were as happy as TLA during recall, but they reported substantially fewer happy experiences. Thus, Davis and Schwartz (1987) noted
that mood-congruence could not account for differential group recall.

Report-bias was also rejected as an explanation for limited recall. Although Davis and Schwartz (1987) noted this would be a feasible explanation of restricted recall of negative events, REP also reported fewer positive memories. Therefore, Davis and Schwartz (1987) argued that report-bias would not reasonably explain why REP should be unwilling to admit to positive experiences. Therefore, these researchers do not accept this interpretation for their data.

Although, Davis and Schwartz (1987) acknowledged that the accessibility/availability debate (Tulving & Pearlstone, 1966) cannot be resolved in research of this type, they explicitly argue for a retrieval rather than a storage problem. Davis and Schwartz (1987) pointed out that adopting an availability stance, would require one to accept as fact that REP have stored only approximately 10 happy memories from the first 14 years of life. This, they argued, is simply an untenable position.

Davis and Schwartz (1987) also rejected criticism of the use of recall of pleasant/unpleasant personal experiences in repression research (Holmes, 1974). Holmes (1974) asserted that this method is not a legitimate tool with which to investigate repression, as from theory, he argued that it is necessary to encompass 'ego-threat' rather than simply 'unpleasantness' if one is to assess repression in the traditional sense. However, as Davis and Schwartz
(1987) note, Freud (1915a/1957) did not precisely specify the type of psychological pain to be avoided via repression, saying only that "the motive and purpose of repression was nothing else than the avoidance of unpleasure" (p. 153). Therefore, Davis and Schwartz (1987) argued that "the ability to access affective memories is a fundamental and defining characteristic of repression." (p. 162)

ii) Davis (1987)

In further research in 1987, Davis recognized two issues which could not be clarified by her earlier work with Schwartz (1987). The first was whether limited access is exclusive to REP (low anxiety/high defensiveness), or if it is characteristic of all high-defensive individuals. The second was the question of report-bias. To assess these factors, Davis (1987) conducted three studies of Australian female undergraduates which included defensive/high anxious samples (DHA). In two of these experiments, she adopted a cued-recall, latency-to-report paradigm which required no disclosure of recalled experiences.

Davis (1987) also aimed to address several further questions in her research. Is limited access restricted to affective experiences of 'the self' or does it also hold when the emotion is experienced by another? Is the effect confined to childhood or does it operate later in life? Does it apply to all negative emotions or are some more susceptible to repression than others?
In Experiment 1, Davis (1987) used the original free-recall method (Davis & Schwartz, 1984, 1987), and evaluated access for experiences of 'self' versus 'other' by randomly assigning half the subjects in each group to 'self' and 'other' conditions. 'Self' subjects recalled circumstances from childhood where they, themselves, had experienced emotion, while 'other' subjects recalled events in which another person had felt the emotion. It was predicted that REP would recall fewer negative emotional memories for 'self' relative to other groups, but no hypotheses were advanced for the 'other' condition.

Davis' (1987) method differed from that of Davis and Schwartz (1987). Davis and Schwartz' experimental groups were chosen from a pool on the basis of extreme TMAS and MC scores, then subjects were tested individually in the presence of a female researcher giving brief verbal descriptions of six types of memories. In contrast, in Davis (1987) a pool of 211 completed the TMAS, MC and a mood rating scale and immediately thereafter, all were tested in small groups under four randomly-presented recall conditions (happy, sad, anger, fear) in which they wrote brief descriptions of memories. Then while blind to memory data, Davis (1987) selected four groups of 20 for extreme TMAS and MC scores (REP, TLA, THA and DHA), half of each group having been tested in 'self' and 'other' conditions.

Initial mood-ratings revealed significant group differences ($p < .02$), although REP and TLA were similar
in moods. THA subjects were sadder, more frustrated and less happy than all others, were more anxious than TLA or REP and, like DHA, were also less relaxed than REP.

The number of memories recalled yielded significant effects for emotion ($p < .001$) and the group/emotion interaction ($p < .02$). Most subjects recalled more positive than negative experiences, although THA recalled equally as many happy, sad, angry and fearful memories. A significant self/other effect existed, with more memories of personal affective experience being recalled ($p < .001$). This was qualified by an emotion by self/other interaction ($p < .01$); subjects remembered more happy, sad and fearful events for 'self', while angry experiences were equally as frequent in 'self' and 'other' situations. Particularly relevant to Davis' (1987) focus was a significant group/self-other interaction ($p < .01$). Under 'self', REP reported fewer emotive memories than either TLA or THA subjects ($p < .05$ for each comparison), while DHA subjects did not differ from other groups ($p > .10$). In contrast during 'other', REP and DHA recalled substantially more memories than did TLA or THA subjects ($p < .05$ in each case).

Comparing 'self' results with previous work, Davis (1987) noted that recall of fewer personal memories for REP compared with THA and TLA individuals, provided a partial replication of her results with Schwartz (1987). In that study, REP recalled fewer emotional memories of all types than TLA and fewer negative events than THA subjects,
whereas in this research, limited access amongst REP held across both positive and negative memories relative to THA.

Davis' (1987) work clarified previous findings, in supporting the hypothesis that limited access amongst REP would hold for personal experience of emotion and by demonstrating that this does not extend to memories where the affect was felt by another. The observation that DHA did not differ from REP in recall of personal affective experience, did not allow Davis (1987) to resolve the issue of whether limited access is exclusive to REP or whether it is characteristic of all highly defensive individuals.

In her second study, Davis (1987) addressed three further aspects of limited access amongst REP. Is this due to a report-bias? Is the effect restricted to childhood? Is it confined to emotional experience or does it also hold for affectively-neutral events? To explore these questions, Davis (1987) adopted the latency paradigm, extended the task to memories from any time during life, and tested half the subjects in each group for recall of common non-emotional events.

Samples comprised 10 females in each of four groups (REP, TLA, THA, DHA), selected for extreme MC and TMAS scores. As in Davis and Schwartz (1987), subjects were tested individually in the presence of a female investigator. Subjects recalled experiences associated with cue words in five conditions (general, happy, sad, anger,
fear) and responded by pressing a button when a memory came to mind.

Three latency measures were derived for each condition: mean latency for all stimuli; mean latency for words that cued a memory; and the number of words which failed to elicit recall of an experience. Davis predicted that REP would be slower to respond than other groups, particularly for memories linked with negative emotion. No group differences were anticipated in recall of non-affective memories.

Initial mood-ratings revealed a similar pattern to Davis' (1987) first experiment, with both THA and DHA being more anxious and THA being sadder, more frustrated, less relaxed and less happy than other groups.

Analysis of commonplace experiences produced no significant group differences. This allowed Davis (1987) to eliminate the possibility that a general memory deficit for personal experience accounted for limited access in REP.

Latency for all stimuli revealed a significant recall effect ($p < .001$) and a group/recall interaction ($p < .05$). All groups were similar in recalling general and sad memories, but REP were slower to recall fearful and angry memories than all other groups (fear all probability levels $< .01$; anger TLA, $p < .001$; THA $p < .05$; DHA $p < .10$).

In contrast, no group effect emerged from analysis of data based only on those stimuli which elicited recall. This demonstrated that it is not delayed recall which
distinguishes REP from other groups, but inability to access as many affective memories (Davis, 1987).

This interpretation was supported by analysis for cues which failed to prompt recall. A significant group by recall interaction (p < .05) emerged, with REP recalling significantly less fearful experiences than TLA (p < .01) or THA (p < .01) and marginally fewer fearful events than DHA (p < .10). Similarly, REP reported fewer angry memories than TLA (p < .01), THA (p < .001) or DHA subjects (p < .05).

Overall, REP recalled angry and fearful memories as quickly, but simply did not recall as many of these negative experiences, supporting the argument that repression appears as an all-or-none phenomenon (Davis & Schwartz, 1987).

Davis' (1987) second study clarified and extended previous results pertaining to limited access amongst REP; she demonstrated that the effects are not due to a general memory deficit, are not restricted to childhood memories, cannot be attributed to a report-bias, and do not appear in all highly defensive individuals but are restricted to those who adopt a repressive coping style.

In her final study, Davis' (1987) female samples comprised 11 TLA, 11 THA, 11 REP and seven DHA subjects, selected for extreme TMAS and MC responses. In this experiment, Davis pursued her previous observation that while REP did not differ in access to sad experiences, they exhibit limited access for angry and fearful events. Specifically, Davis aimed to determine whether limited
access for negative memories is generalized or is restricted to particular affects. To assess this, Davis utilized more affectively meaningful cues and broadened her coverage to include guilt and self-consciousness. These two emotions were incorporated as a mood-diary study (Davis, 1986, cited in Davis, 1987) revealed that, although REP did not differ in everyday experience of anger, they reported fewer fearful, guilty and self-conscious incidents than other groups.

Latency for recall associated with all cues revealed a significant group by emotion interaction ($p < .01$), due to group differences in angry, fearful and self-conscious recall. REP were slower to recall fearful events than all other groups ($p < .001$ in each case), and took longer to retrieve self-conscious memories than did DHA ($p < .01$), TLA and THA individuals ($p < .05$ for each comparison). During anger recall, both REP and THA subjects were slower to respond than TLA, although the REP/TLA comparison just failed to reach significance ($p < .10$).

Analyses of latency for those prompts which elicited recall revealed no group differences, however, that based on primes which did not cue responses generated a significant group/emotion interaction ($p < .05$). REP recalled fewer fearful memories than other groups ($p < .001$ in each case) and marginally fewer self-conscious events than other subjects ($p < .10$ for all comparisons). In comparison, no group differences emerged for anger, as almost all subjects
responded to every prime. This finding, taken in conjunction with that for all cues, indicated that both REP and THA subjects were, in fact, slower to recall angry memories than TLA subjects.

In summary, Davis' (1987) final experiment revealed no group differences in recall of happy, sad and guilty experiences, but demonstrated that groups varied significantly for anger, fear and self-consciousness. REP were slower to recall fearful and self-conscious events than all other groups, and both REP and THA subjects were slower to recall angry experiences than TLA individuals. Results also revealed that it is not simply that REP remember negative emotional memories more slowly, but that they recall significantly fewer fearful events and marginally fewer self-conscious experiences. Collectively, results of her three experiments led Davis (1987) to the following conclusions pertaining to limited access for affective memories amongst REP.

The phenomenon is consistently apparent and does not seem to be due to report bias, as it persists when disclosure is not required. It does not reflect a generalized memory deficit, as there is no similar effect for commonplace non-emotive experiences. It appears to be restricted to memories in which emotion was experienced personally, as it does not hold for events where the affect was felt by another individual. The effect is not characteristic of all highly-defensive individuals, but is
restricted to those who adopt a repressive coping style. Nor is this confined to childhood, as it extends to experiences at any time in life. The effect does not operate equally across all negative emotions but exists, to varying degrees, for angry, fearful and self-conscious experiences. In combination with the finding that REP recall fewer negative experiences from childhood than THA and fewer childhood events of all affective types compared with TLA subjects (Davis & Schwartz, 1987), results of her later studies led Davis (1987) to suggest that, during childhood, limited access may operate for all affective memories, but later in life it appears to be confined to self-consciousness, angry and fearful experiences. Davis (1987) suggested that the critical factor in these three situations may be attention focussed on 'the self' in an evaluative and/or threatening manner.

Following her studies, Davis (1987) attempted to identify whether particular types of angry, fearful and self-conscious experiences appear prone to repression. However, a principal components analysis, conducted on latency data for all cues for these affects in Experiment 3, produced no meaningful results.

Viewing her work within the context of early attempts to induce repression in the laboratory and the general failure to verify this phenomenon, Davis (1987) concluded that,

in the present research the approach adopted in the study of repression represents a
methodological shift away from experimental inductions of repression toward studying individuals who typically use repression as a defensive strategy when confronted with unpleasant situations in their daily lives. The finding that these individuals do indeed appear to have limited access to certain negative affective memories suggests that the phenomenon is a real one (p. 41, submitted manuscript, cited with the author's permission).

At the time the current study was designed and conducted, Davis' (1987) unpublished manuscript was not available. Consequently, modifications in methodology which allowed Davis (1987) to clarify some aspects of restricted memory access in repression, were not contemplated in designing this research.

1.4 Summary of Findings Based on Weinberger et al.'s Model for Operationalizing Repression

1.4.1 Limited Access to Affective Memories

Adopting Weinberger et al.'s (1979) model for operationalizing repression, Davis and Schwartz (1987) tested the theoretically-derived prediction that repression is associated with limited access to affective memories. They demonstrated that, in American undergraduate females, REP recall significantly fewer personal childhood experiences associated with negative affect than either TLA or THA. REP were also significantly older at the time of their earliest negative memory than other groups. Furthermore, REP also recalled fewer positive emotional events than TLA subjects. These results supported Davis and Schwartz' (1987) hypothesis that repression involves an inability to access negative emotional memories and also
suggested that repression "is associated in some way with suppression or inhibition of emotional experiences in general." (p. 2)

Davis' (1987) studies of a similar population in Australia, clarified and extended previous findings. Collectively, Davis' (1987) work demonstrated that the phenomenon of limited access amongst REP: extends beyond childhood to events in later life; is restricted to personal experience of affect and does not operate where another has felt the emotion; is most pronounced for negative experiences, particularly those associated with anger, fear and self-consciousness; cannot readily be attributed to report bias; and, is restricted to individuals who adopt a repressive coping-style and is not evident amongst those who are simply high on defensiveness.

1.4.2 Elevated Physiological/Behavioural Arousal and Low Subjective Disturbance

A substantial body of physiological research provides evidence that, despite low self-reported trait anxiety, people who are repressive in coping style experience increased autonomic arousal relative to others who also report similar levels of trait anxiety (TLA).

This was first demonstrated in male subjects by Weinberger et al. (1979). These researchers noted a strong tendency for REP and MHA subjects to experience greater increases in both cardiac and electrodermal activity than TLA subjects and to show significantly more forehead muscle tension than either TLA or THA subjects during
anxiety-provoking phrase associations. Group differences in heart rate and palmar sweating tended to habituate over time but no similar effect occurred with muscular tension.

A similar pattern of group differences was evident in behavioural disturbance. REP were significantly slower to respond to phrase-associations than TLA. Total verbal disturbance scores and avoidance of phrase content also indicated that REP were substantially more aroused than both TLA or MHA subjects.

Self-ratings of somatic reactions during the task contrasted with physiological data. No group differences existed in self-perceived restlessness, cardiac activity, palmar sweating and forehead muscle tension, despite a substantial variation in actual bodily arousal.

Significant group differences also existed in self-reports of usual levels of cognitive and somatic reactions to stress. REP reported significantly less cognitive anxiety than did TLA subjects, a result which stood in contrast with physiological and behavioural measures of arousal. REP also reported significantly less cognitive than somatic anxiety, suggesting a discrepancy between self-perceptions of anxiety, a pattern which was not apparent in self-reports of other groups.

Self-estimates of trait anxiety also highlighted group differences. Comparisons of two TMAS testings, seven weeks before and immediately following the task, revealed that REP acknowledged significantly less trait anxiety after the
experiment. In comparison, MHA subjects' estimates of trait anxiety were more extreme following the procedure. Both results contrasted with the stable responses of the TLA group.

Overall, these findings suggested that although REP report the lowest subjective disturbance, they actually experience higher physiological and behavioural arousal than other subjects.

Findings of high physiological arousal and low subjective disturbance amongst repressors were replicated and extended to a sample of older professional males by Gudjonsson's (1981) research. Subjects exhibiting elevated electrodermal activity and low self-reported distress during anxiety-provocation, were subsequently identified as REP (low anxiety/high defensiveness). Individuals characterized by the reverse pattern (low electrodermal activity/high subjective stress) were found to be THA (high anxiety/low defensiveness). Thus, Gudjonsson's (1981) study provided initial construct validation for Weinberger et al.'s (1979) model for operationalizing repression.

In further research with male undergraduates, Asendorpf and Scherer (1983) replicated the pattern of elevated autonomic arousal and discordance between objective and subjective measures of anxiety amongst repressors. During a phrase-association task, REP were characterized by elevated cardiac activity, high facial distress and low self-reported anxiety. In contrast, TLA subjects were intermediate on
subjective anxiety and low in both heart rate and facial disturbance.

Davis and Schwartz (1984) replicated and extended these findings by adopting facial skin temperature as a physiological measure, using an alternate memory-recall method and assessing female undergraduates in America. During free-recall of emotional childhood memories, REP experienced elevated autonomic arousal relative to TLA in angry, happy, sad, fearful and wondrous conditions, and relative to THA subjects during the recall of happy, sad, fearful and wondrous events.

The potential significance of these physiological findings for Freud's views about the process of repression requires clarification. Freud (1915a/1957) argued that repression was not an event which occurred once with permanent effects, but conceptualized this as an extremely active process which "demands a persistent expenditure of force." (p. 151) Should this effort cease, Freud (1915a/1957) asserted that the success of repression would be jeopardized and another act of repression would be necessary to relegate the offending material to the unconscious. Freud (1915a/1957) argued that "the maintenance of repression involves an uninterrupted expenditure of force" (p. 151). In current physiological research, it appears to be an implicit assumption that it is this 'effort' which underlies the elevated autonomic arousal observed amongst REP.
1.5 Rationale, Aims and Parameters of this Research

1.5.1 Rationale

Findings of elevated physiological arousal and limited access to affective memories in repression, provides substantial construct validity for Weinberger et al.'s (1979) model for operationalizing repression of anxiety. Repression researchers have argued that repression of emotion may be a significant factor leading to ill-health (Schwartz, 1983; Weinberger et al., 1979). A brief review of the literature in psychological medicine has demonstrated that there is also converging evidence that anger, or more specifically, suppression or repression of anger, is implicated as a contributing or etiological factor in several life-threatening disease states (Chesney & Rosenman, 1985; Diamond, 1982; Fox & Newberry, 1984; Gentry, 1985; Haynes et al., 1980; Kahn et al., 1972; Manuck et al., 1985; Temoshok & Fox, 1984). That, alone, provides ample justification for selecting anger as a topic for research. From these two areas of enquiry, it appears that there is a substantial empirical basis from which to argue that meaningful connections may be made in research which brings together repression and anger. This research represents such an attempt, being an exploratory study designed to extend Weinberger et al.'s model (1979) for operationalizing repression of anxiety, to evaluate repression of anger.
As a theoretical foundation, there is only Freud's (1914b/1957) passing reference to anger and hostility as factors which, for some individuals, may prompt repression.

1.5.2 Aims

This research aimed to evaluate the following questions:

1. Is high physiological and low self-reported arousal, demonstrated in repressors of anxiety, also evident in individuals who repress anger?

2. Is limited access to affective memories, particularly for negative experience, evident in repressors of anxiety also apparent in those who repress anger?

3. If physiological/subjective arousal and/or memory effects are evident in repressors of anger, then are the patterns for repressors of anger identical to those found previously in repressors of anxiety?

4. If one represses both emotions, rather than only anger or anxiety, is there an additive effect?

To address these aims, groups comprising true low angry, true high angry, repressors of anger, repressors of anxiety and repressors of both emotions were evaluated in a study evaluating physiological and subjective arousal and access to affective memories from childhood.

Given the exploratory nature of this extension of Weinberger et al's model of repression to anger, no specific hypotheses were advanced.

1.5.3 Parameters

Time constraints were such that no attempt could be made to assess the implications of repression of anger for health. Should results of this investigation indicate that this approach has potential, other researchers involved in
the study of anger and disease may see a role for further exploring the notion of 'repression' operationalized with the model proposed by Weinberger et al. (1979).
CHAPTER 2

METHOD

2.1 Operationalizing Repression

2.1.1 Repression of Anxiety: High MC/Low TMAS

Weinberger et al.'s (1979) model was used to operationalize repression of anxiety. However, as in Davis and Schwartz (1984, 1987) and Davis (1987), Bendig's (1956) short-form of the TMAS was used here to ensure that repressors of anxiety (RAX), who would be compared with repressors of anger (RAG) and those who repress both emotions (RAA), were equivalent to repressors of anxiety studied by those researchers.

2.1.2 Repression of Anger: High MC/Low Trait Anger

In selecting an anger measure for this research, it was necessary to assess trait anger as the TMAS, used to operationalize repression of anxiety previously, taps trait anxiety. A number of scales reportedly assess anger (Buss & Durkee, 1957; Evans & Stangeland, 1971; Novaco, 1975; Zelin, Alder & Myerson, 1972). However, most do not clearly distinguish anger from other states such as hostility (Biaggio, 1980; Spielberger, Jacobs, Russell & Crane, 1983). Many tap transitory and often situation-specific reactions, and some confound this with relatively stable individual differences in the tendency to become angry (Biaggio, 1980; Biaggio, Supple & Curtis, 1981; Siegel, 1985; Spielberger et al. 1983).
2.1.2.1 Spielberger’s (1979) Trait Anger Scale (T-Anger)

In collaboration with others, Spielberger has constructed a State-Trait Anger Inventory (Spielberger, Jacobs, Crane, Russell, Westberry, Barker, Johnson, Knight & Marks, 1979; Spielberger, Westberry, Barker, Russell, Silva De Crane & Ozer, 1980; Spielberger et al 1983). These anger scales, analogous in concept and format to Spielberger’s State/Trait Anxiety Inventories, were not published at the time of this study. However, some psychometric data were available and permission was granted for their use (Prof C. Spielberger, personal communication, 25 April, 1987).

The scope of this research did not allow psychometric evaluation of the T-Anger Scale. While it is, obviously, less than ideal to use a relatively unknown instrument in research Spielberger’s reputation in psychometrics and the lack of an appropriate alternative, led to the decision to use the Trait (T-Anger) Scale as the criterion measure for operationalizing repression of anger.

Working definitions of anger, hostility and aggression in the literature brought Spielberger et al. (1980) to the following conclusions:

Anger is generally considered to be a simpler concept than hostility or aggression. The concept ... usually refers to an emotional state that consists of feelings that vary in intensity, from mild irritation or annoyance to fury and rage. Although hostility usually involves angry feelings, this ... has the connotation of a complex set of attitudes that motivate aggressive behaviors directed toward destroying objects or injuring other people.
While anger and hostility refer to feelings and attitudes, ... aggression generally implies destructive or punitive behavior directed towards other persons or objects. It should be noted, however, that aggression and hostility are often used interchangeably. A useful convention for distinguishing between these concepts is the distinction between hostility and instrumental aggression. Whereas hostile aggression refers to behavior motivated by anger, instrumental aggression refers to aggressive behavior directed toward removing or circumventing an obstacle that stands between an aggressor and a goal, and may not involve angry feelings. (p. 1)

In scale construction, Spielberger et al. (1980) defined State Anger (S-Anger) as

... an emotional state or condition that consisted of subjective feelings of tension, annoyance, irritation, fury and rage, and by activation or arousal of the autonomic nervous system. (It was) further assumed that S-Anger could vary in intensity and fluctuate over time as a function of the amount of frustration and annoyance that resulted from perceived injustice or the blocking of goal-directed behaviour. (p. 2)

In contrast, trait anger was defined as

... individual differences among people in the disposition to perceive a wide range of situations as annoying or frustrating, and in the tendency to respond to such situations with marked elevations in state anger. Persons high in T-Anger are more likely to experience more intense elevations in S-Anger whenever annoying or frustrating conditions are encountered. (Spielberger et al. 1980, p. 3)

The 10 item T-Anger scale assesses the frequency with which respondents generally experience angry feelings. Ratings are given on a five-point Likert scale with options ranging from almost never to almost always.

Normative data were derived from approximately 7,000 individuals including college students (995 females and 622 males). Reliability of the scale, based on internal
consistency, appears quite high. Within the college group
in the normative sample, Cronbach's alpha was .91 for
females and .89 for males (Spielberger et al. 1983, p. 177).
Construct validity would seem to be satisfactory, with
correlations between T-Anger and the Buss-Durkes Hostility
Scale ranging from .66 to .73 (Spielberger et al, 1979).

Spielberger et al. (1980) reported low to moderate
positive correlations between T-Anger and measures of
anxiety. Coefficients for Spielberger's Trait Anxiety Scale
and T-Anger were .39 and .30 for college females and males
(p < .01) with higher correlations for the N Scale of the
EPI (r = .46 for females and .50 for males, p < .01 in both
cases).

Factor analysis of T-Anger responses revealed two
factors which Spielberger et al. (1979) termed Angry
Temperament and Angry Reaction. It was tentatively
concluded that trait anger, (as measured by the T-Anger
scale), comprised two distinct but related components. These
were "individual differences in the disposition to express
anger, without specifying any provoking circumstances ... (and) anger responses to situations that involve frustration
and/or negative evaluation." (Spielberger et al. 1983, p.
176)

Despite the two-factor structure, separate use of the
subscales in preference to the full scale is not recommended
(Spielberger et al. 1979; Spielberger et al. 1980;
Spielberger et al. 1983).
The T-Anger Scale has been used in several research studies, but these do not provide additional data. Sebel, Mullner and Farkas (1984) assessed physiological and subjective responses of 28 German subjects but did not report T-Anger scores. Similarly, Smith et al. (1984) did not publish T-Anger data for 50 subjects tested in a study of anger, neuroticism, Type A behaviour and angina. No other research using the T-Anger Scale has been found in the literature.

2.2 Experimental Task

The laboratory method used in this research was a modification of Davis and Schwartz' (1984, 1987) memory-recall task. This was chosen in preference to other methods, such as phrase-associations, for a number of reasons. Firstly, it is naturalistic and appears ecologically valid for a study of repression. Secondly, use of this method would permit comparison of memory data and physiological arousal in repressor groups with those obtained by Davis (1987) and Davis and Schwartz (1984, 1987).

Although Davis and Schwartz (1984, 1987) evaluated access for six types of memory (general, happy, sad, anger, fear, wonder), given the complexity of analysis in repeated-measures multi-factorial designs, the number of conditions in this study was restricted to those of prime interest. As the aim was to evaluate differences between subjects who repress anger, those who repress anxiety and
those who repress both emotions, recall for events associated with these two affects was considered essential. Comparative data for recall of positive memories was also viewed as important, as considerable evidence exists for differential recall of positive and negative memories (Bower, 1981). Therefore, happy recall was included as the third condition in this design.

Davis and Schwartz (1987) presented recall for specific emotions in random order. In consultation with statistical advisors, several alternatives were considered for this design. Fixed order presentation minimizes within-group variance, which is essential with small samples. However, this introduces an order effect which limits inferences being made about particular treatments, without reference to the specific order of presentation. Counterbalancing can increase within-group heterogeneity and also brings into question the validity of the assumption of independence of errors required for analysis of variance. Randomization can also increase within-group variance, but does not introduce the potential bias inherent in counterbalancing and is also more likely to meet necessary assumptions for analyses. Given these issues, randomized presentation of the three recall conditions was selected.

An addition was also made to the method used in Davis and Schwartz' (1984) physiological study. These researchers did not monitor baseline activity and it is possible that group differences may have existed in prior arousal and
these could have contributed to physiological differences observed during recall. To eliminate this, baselines were included before each recall condition and following the entire experimental procedure.

Subjects in Davis and Schwartz (1984, 1987) were tested in the presence of a female researcher. However, in this experiment it was necessary to constantly monitor physiological apparatus to ensure accurate measurement. As the equipment was bulky and noisy and would disturb and/or induce anxiety in subjects, it was essential to locate it in a room next to that in which subjects were to be tested. The experimenter remained with equipment during baseline and recall and only joined subjects between recall phases.

2.3 Selection of Dependent Variates

2.3.1 Mood Ratings

Although subjects' moods were not of primary interest, these were monitored for several reasons. Firstly, to eliminate the possibility that group differences in memory recall or physiological arousal could be influenced by mood variation prior to the experiment and secondly, as change in affect across recall conditions would provide some validation of the recall task.

Mood ratings were adapted from the nine-mood rating scale used by Davis and Schwartz (1987). To reduce the complexity of analyses, only six affects were assessed in this study (relaxed, anxious, sad, happy, fearful/scared and angry, rated on a 1 to 7 Likert scale).
2.3.2 Memory Data and Subjective Variates

Memory variables were chosen to allow comparison with Davis and Schwartz (1987). These comprised: number of memories recalled in each condition; total negative memories recalled; age of earliest memory in each condition; and age of earliest negative memory.

Subjective measures used by Davis and Schwartz (1987) were also incorporated as a means to eliminate alternate explanations of differential recall. These were intensity of primary emotion at the time of the event (Original Intensity) and intensity with which that emotion was re-experienced during recall (Current Intensity). Following recall, each event was rated for original intensity (1 mildly intense to 7 extremely intense), and for current intensity (0 not at all intense to 7 extremely intense).

Subjects' experience was also assessed with a rating of the intensity of emotional involvement during the recall process estimated on a 10 point Likert scale (1 not at all involved to 10 extremely involved). This, combined with current intensity of affect for recalled memories, provided subjective indices of arousal for comparison with physiological activity.

2.3.3 Physiological Measures

Choice of physiological variates was influenced by both the literature and the availability of equipment.
2.3.3.1 Skin Conductance Level (SCL)

Edelberg (1972) pointed out that electrodermal activity is an important correlate of activation, arousal, vigilance and other components of emotional experience. However, it does not provide a direct index of anxiety, or of any specific emotion (Autogen 3400 manual; Edelberg, 1972).

Electrodermal measures have been incorporated into three studies of repression (Asendorpf & Scherer, 1983; Gudjonsson, 1981; Weinberger et al. 1979). Frequency of spontaneous skin resistance responses (SSRR) was assessed by Weinberger et al. (1979). Amplitude of skin resistance responses to specific stimuli (SSR) and frequency of SSRR were also monitored by Gudjonsson (1981). Asendorpf and Scherer (1983) also aimed to measure SSRR, but lack of sensitivity in technique caused them to abandon analysis of these data. Results from Weinberger et al. (1979) and Gudjonsson (1981) suggest that, during laboratory tasks, repressors exhibit higher electrodermal activity than other groups.

In their review of deception detection techniques, Podlesney and Raskin (1977) noted that "skin conductance responses (SCR) and skin resistance responses (SRR) have been found to be more effective in discriminating deception than have any other (physiological) measure" (p. 781). SCR or SRR are tonic changes which occur in response to specific, instantaneous cues such as phrase associations or slide presentations. However, as no such discrete stimuli
were used in this study, momentary responses in electrodermal activity were not a valid index of arousal.

Furthermore, experimental research (Pennebaker & Chew, 1985; Waid & Orne, 1982) suggests that a phasic measure of electrodermal activity, skin conductance level (SCL), is the most reliable physiological indicator of efforts at other-deception. Given the conceptual similarity between other-deception and the self-deception, that is postulated as the motivation for repression (Freud, 1915a/1957), SCL was chosen as the most appropriate electrodermal measure for this design.

2.3.3.2 Heart Rate (HR)

Cardiac activity has also been used in studies of repression (Asendorpf & Scherer, 1983; Davis & Schwartz, 1984; Weinberger et al. 1979). Davis and Schwartz (1984) monitored HR but did not publish data as records were contaminated by movement artifact. Weinberger et al. (1979) reported change from minimum resting baseline approached significance for groups, with TLA subjects being lower in HR than both REP and THA subjects. Similarly, TLA subjects in Asendorpf and Scherer's (1983) research experienced significantly less increase in HR than either REP or THA individuals. Given these findings HR was also selected for inclusion.

2.3.3.3 Skin Temperature.

Davis and Schwartz (1984) incorporated facial skin temperature in repression research. They reported
significant recall differences in average temperature with recall of sad events being linked with lower temperature than happy experiences. Although temperature was lowest during general recall, as this condition was presented first, this was interpreted as a reflection of anticipatory anxiety. A significant interaction indicated differences in groups across conditions. Temperature of REP was lower than that of TLA subjects in all situations, and below that of THA subjects during happy, sad, fearful and wondrous recall. Davis and Schwartz (1984) concluded that these data verified previous findings of increased physiological arousal amongst REP, and extended this observation to the parameter of facial temperature. Given these results, average facial skin temperature was selected as the final physiological measure in this research.

2.4 Apparatus

A multi-channel Grass Model 79 polygraph, comprising two interface modules (Autogen models 2000b and 3400) and a 7P5 wide-band AC EEG pre-amplifier directly interfaced with a PDP 11 computer, was used to monitor average facial temperature (degrees Fahrenheit), SCL (microhoms) and HR in beats per minute (bpm), respectively.

Skin temperature and SCL signals were sampled every 2.5 seconds, and each heart beat was registered. All data were converted via an analogue to digital interface unit and were relayed direct to the PDP 11, which output averaged data per minute for each variate. The Autogen 2000b has a reported
accuracy of plus or minus .3 degrees Fahrenheit and the Autogen 3400 detects SCL in micromhos with a specified accuracy of plus or minus 2 percent of absolute SCL. A hard copy of physiological activity was simultaneously recorded with a multi-channel Grass Chart Drive Writer Unit to permit hand-scoring of HR.

Heart rate was detected from two 9 mm silver surface electrodes, filled with highly conductive electrode gel, placed on the inner wrists. A similar reference electrode was located on the outer ankle of the non-dominant leg. Saline-soaked cotton pads were placed under electrodes to maximize conductivity.

The Grass 7P5 wide-band EEG/EKG high gain AC pre-amplifier incorporates sensitivity controls to vary the EKG activity. In line with specifications, the signal was recorded with a 0.15 Hz filter and a time constant of 0.45 seconds (Grass 7P5 manual). The pre-amplifier input directly to the Grass Model 7 DC driver amplifier which operated a writer-unit oscillograph to display the output waveform. The driver amplifier incorporated a high-level, low-impedance output (J6) which was interfaced to a TTL unit, the output being compatible with the digital interface of the PDP 11. As subjects' heart rate amplitudes vary, sensitivity was individually adjusted to a level compatible with the TTL interface unit which requires an input above 2.3 volts for correct output triggering.
Temperature was monitored with two thermistors comprising semi-conductors embedded in epoxy beads, supplied with the Autogen 2000b. These were secured to the subjects' right and left cheeks with Leucoplast, at an angle of 45 degrees and 2.5 cm below the outer corner of each eye. This placement was identical to that of Davis and Schwartz (1984).

SCL was detected from finger electrodes supplied with the Autogen 3400. Finger-placement was selected in preference to palmar monitoring (Venables & Christie, 1980), a small pilot study revealed that, despite the use of adhesive collars with palmar electrodes, minimal palmar creasing caused electrodes to lift causing loss of data. Two active 1 sq. cm silver-plate electrodes were attached to the middle phalanx of the second and third fingers of the non-dominant hand with velcro bands. An identical ground reference was located on the index finger.

The Autogen 3400 detects SCL by application of a constant voltage of 10 microvolts/micromho or 1 volt = 100 micromho with a source impedance of 1000 ohms (Autogen 3400 Manual). An AC technique using a 10 Hz sine wave was selected as the experimental procedure required electrodes to be connected for up to 90 minutes. DC methods are more susceptible to electrode polarization and data contamination during prolonged measurement (Autogen 3400 Manual).

To prevent polarization of the SCL signal, subjects were asked to wash and dry their hands immediately prior to
application of the electrodes, a procedure recommended by Venables & Christie (1980). No electrode gel was used as this was considered likely to increase the risk of polarization during the lengthy experimental period (Technical Advisor, Psychology Department, ANU).

To avoid extraneous variation in temperature and SCL data, temperature within the experimental environment was maintained within a range of 19 and 21 degrees Celsius.

2.5 Procedure

2.5.1 Subject Selection

Eight weeks prior to the laboratory study 48 male and 121 female First Year Psychology students, who ranged in age from 17 to 58, were issued a questionnaire battery during lectures (Appendix A). This included the MC, the Bendig TMAS, Spielberger's State and Trait Personality Inventories (incorporating S-Anger and T-Anger Scales), Spielberger's Anger Expression Scale (Spielberger, Johnson, Russell, Crane, Jacobs & Worden, 1985) and the Public and Private Self-Consciousness Scale (Fenigstein, Scheier & Buss, 1975). The additional instruments (Anger Expression Scale, State/Trait Anxiety and State/Trait Curiosity Scales and the Self-Consciousness Scale) were included in the battery to obscure the focus of the study. All instruments, with relevant items marked, are presented as Appendices A.1 through A.6 respectively.
Subjects were assured of confidentiality and informed they would receive one hour’s credit for questionnaire completion. Instructions covering the battery informed students that they may also be asked to take part in a second phase of the study, a laboratory investigation of recall of childhood memories and associated physiological responses. Two hours’ additional credit was offered for participation in the laboratory research.

Completed questionnaires were returned by 41 males and 106 females. Of these respondents, seven were not available for experimental participation; six were not willing to do so and one reported brain damage and associated memory difficulties. From the remaining 140 subjects, five experimental groups were selected on the basis of patterns of TMAS, MC and T-Anger scores.

Experimental groups were selected for extreme scores on scales of specific interest. True low angry (TLAG) and true high angry (THAG) individuals were chosen for low MC and low and high T-Anger respectively, regardless of TMAS scores. All repressor groups were selected for high MC scores. RAG had high T-Anger scores, RAX were high on the TMAS, while RAA were high on both scales.

Sampling was conducted with assistance from an associate, such that the experimenter was blind to subjects’ group membership during laboratory testing. Prior to scoring, questionnaires were coded and identification sheets removed. Selected respondents were contacted by mail
(Appendix B) by the experimenter's associate, who remained unaware of questionnaire responses. Subjects were asked to contact the experimenter to arrange laboratory testing. Individuals not meeting experimental group criteria were advised that they were not needed for further participation (Appendix C).

Subjects requested to participate comprised: 10 TLAG, 10 THAG, 10 RAG, eight RAX and six RAA. Equal numbers could not be obtained for each repressor group because of the limited number of high defensive subjects in the initial pool and the inclusion of three separate samples of repressors. At laboratory testing, two RAG subjects could not be assessed. One had a contagious illness and the other could not be located. Consequently, the RAG group was reduced to eight individuals.

Previous researchers have studied single-sex samples which were relatively homogeneous in age. In this instance, questionnaires revealed insufficient numbers would be available if sex or age were restricted. Therefore, subjects were included regardless of age or sex.

Table 2.1 presents sex distribution, mean ages and means and standard deviations (in brackets) for the MC, TMAS and T-Anger for the selection pool and the five experimental groups.

Prior to the experiment, a one-way analysis of variance was conducted to assess age as a potential confound. Although results revealed no significant differences in mean
ages for experimental groups ($p = .14$), considerable variation existed within RAX and RAA groups.

Table 2.1 Sex, Age and Scale Scores for Groups

<table>
<thead>
<tr>
<th>Groups</th>
<th>TLAG</th>
<th>RAG</th>
<th>RAX</th>
<th>RAA</th>
<th>THAG</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>n</td>
<td>10</td>
<td>8</td>
<td>8</td>
<td>6</td>
<td>10</td>
<td>147</td>
</tr>
<tr>
<td>Male</td>
<td>4</td>
<td>1</td>
<td>0</td>
<td>3</td>
<td>1</td>
<td>41</td>
</tr>
<tr>
<td>Female</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>3</td>
<td>9</td>
<td>106</td>
</tr>
<tr>
<td>$\bar{x}$ Age</td>
<td>22.1</td>
<td>21.5</td>
<td>22.5</td>
<td>26.0</td>
<td>19.3</td>
<td>22.1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Scales</th>
<th>MC</th>
<th>TMAS</th>
<th>T-Anger</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(2.3)</td>
<td>(2.4)</td>
<td>(2.0)</td>
</tr>
<tr>
<td>11.1</td>
<td>23.6</td>
<td>22.4</td>
<td>23.0</td>
</tr>
</tbody>
</table>

Table 2.2 presents mean scores on MC, TMAS and T-Anger for 10 males and 32 females in the experimental groups.

Table 2.2 MC, TMAS and T-Anger Scores for Males and Females in Experimental Samples

<table>
<thead>
<tr>
<th>Sex</th>
<th>M</th>
<th>F</th>
<th>M</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>n</td>
<td>(10)</td>
<td>(32)</td>
<td>(10)</td>
<td>(32)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Scales</th>
<th>Mean Scores</th>
<th>Stand. Dev.</th>
</tr>
</thead>
<tbody>
<tr>
<td>MC</td>
<td>15.4</td>
<td>6.4</td>
</tr>
<tr>
<td>TMAS</td>
<td>8.4</td>
<td>4.9</td>
</tr>
<tr>
<td>T-Anger</td>
<td>17.4</td>
<td>8.1</td>
</tr>
</tbody>
</table>
As these data revealed that males tended to be lower in both defensiveness and anger than females and the potential influence of sex was evaluated prior to laboratory testing. Separate t-tests comparing responses of both sexes on criterion scales revealed no statistically significant sex differences.

For comparative purposes, Table 2.3 provides MC and TMAS scores from Davis and Schwartz' (1987) American female undergraduates and Davis' (1987) Australian female undergraduates (Experiment 1). Data for participants in 'self' and 'other' conditions in Davis' (1987) study were combined for this comparison.

Although Davis' (1987) Australian sample comprised females only, the mixed-sex subject pool in this research (Table 2.1) was virtually identical to her selection pool on MC and TMAS scores (Table 2.3). Both groups are slightly higher on defensiveness and lower on anxiety than American females (data from Davis & Schwartz, 1987 in Table 2.3).

<table>
<thead>
<tr>
<th>Experimental Group</th>
<th>TLA</th>
<th>REP</th>
<th>THA</th>
<th>DHA</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>MC: D &amp; S</td>
<td>8.3</td>
<td>18.5</td>
<td>6.9</td>
<td>-----</td>
<td>12.1</td>
</tr>
<tr>
<td>Davis</td>
<td>8.8</td>
<td>20.6</td>
<td>9.4</td>
<td>20.1</td>
<td>15.0</td>
</tr>
<tr>
<td>TMAS: D &amp; S</td>
<td>4.7</td>
<td>5.9</td>
<td>16.2</td>
<td>-----</td>
<td>9.9</td>
</tr>
<tr>
<td>Davis</td>
<td>6.5</td>
<td>3.0</td>
<td>13.1</td>
<td>7.8</td>
<td>8.3</td>
</tr>
</tbody>
</table>
Data presented in Tables 2.1 and 2.3 also reveal conceptual similarity between experimental groups in this research and those of Davis and Schwartz (1987) and Davis (1987). MC scores are similar for relative comparison groups, as are patterns of scores on the remaining criterion measures (T-Anger in this research and TMAS in both other studies). Also the RAX group in the current study was similar in MC and TMAS scores to the equivalent group (REP) in Davis and Schwartz (1987) and Davis (1987).

Comparison of samples in the current study with Crowne and Marlowe's (1964) normative sample of undergraduates reveals that all RAG and RAX subjects were above the 70th percentile, all RAA fell above the 83rd percentile, and all TLAG and THAG subjects were below the 29th and 18th percentiles respectively.

Normative data on the MC indicates that the selection pool in this study was higher on MC ($\bar{M} = 15.4$) than Crowne and Marlowe's (1964) Ohio undergraduates ($\bar{M} = 11.7$ and 13.5 for males and females respectively). Females in Davis' (1987) Australian study were also above their American counterparts on the MC (Davis & Schwartz, 1987). This appears to be a cultural effect, with Australians being consistently higher than Americans on defensiveness.

No normative data are available for the Bendig short-form of the TMAS.

Spielberger et al. (1983) published mean T-Anger scores for a normative college sample. These are presented in
Table 2.4 to provide a comparison for scores from the total selection pool (Table 2.1) and experimental subjects of both sexes (Table 2.2).

Table 2.4 Means and Standard Deviations for T-Anger Scale in Spielberger's Normative College Sample (1983).

<table>
<thead>
<tr>
<th>Sex</th>
<th>n</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Males</td>
<td>622</td>
<td>19.28</td>
<td>4.98</td>
</tr>
<tr>
<td>Females</td>
<td>995</td>
<td>19.56</td>
<td>5.05</td>
</tr>
</tbody>
</table>

Comparison of Table 2.1 with Table 2.4 indicates similarity between the total pool in this research and Spielberger et al.'s (1983) samples. However, males participating in the laboratory phase (Table 2.2) tended to be lower in T-Anger than males in Spielberger et al.'s (1983) normative sample.

2.5.2 Experimental Testing

On arrival at the laboratory, subjects were seated in a reclining chair and were read a set of standard instructions (Appendix D). They were informed that the experiment was designed to examine the types of experiences people remembered from childhood and to measure physiological activity that occurred during recall. In line with Davis and Schwartz (1984, 1987) childhood was specifically defined as "any time up to the age of 14 years". Subjects were assured of complete confidentiality.
Subjects were informed that there would be three, four-minute recall periods in which they would be asked to remember experiences associated with particular feelings. They were told that, prior to each recall condition, the experimenter would specify the emotion of interest. Participants were told that, after receiving recall instructions, they were simply to think back to their childhood and to give a keyword characterizing each remembered incident. To avoid report-bias, they were assured that keywords did not have to be meaningful to the experimenter. However, it was essential that they be able to recognize the associated memory when given back these cues after the recall phase, as they would be asked to estimate their age at the time of each event.

Participants were asked to use only one or two keywords for each memory, to ensure that sufficient time was available to recall multiple experiences and to minimize movement caused by speech. Emphasis was given to the need to remain as still as possible during monitoring periods, as it was explained that even minimal movement could contaminate physiological data.

Subjects were told that when a memory came to mind they should simply say the keyword clearly into the microphone beside their chair. After providing this cue, they were to forget that event and think back until another appropriate memory was recalled and to give a keyword for that experience. Subjects were asked to continue this process
until the experimenter informed them that the recall period had concluded.

Participants were informed that their heart rate, skin temperature and skin conductance would be measured during recall, in four-minute baselines preceding each recall period and in another baseline following the entire experiment. The researcher explained that, as she must monitor equipment, she would be in the next room during all baseline and recall phases. Subjects were told that instructions would be given and keywords detected via intercom.

Subjects were informed that a 15 minute rest period would occur after physiological apparatus were connected to allow them to settle before the experiment began. A minimum of 15 minutes habituation is recommended to ensure that physiological activity has stabilized in the experimental environment (Arena, Blanchard, Andrasik, Cotch & Myers, 1983).

After these instructions, subjects were familiarized with the electrodes to reduce any anticipatory anxiety associated with their use in psychology experiments. If subjects appeared apprehensive, care was taken to reassure them about safety and confidentiality. Participants were also told that, if necessary, they could speak to the experimenter at any time during the procedure.

Following this, a research consent form was signed (Appendix E), subjects washed and dried their hands and
electrodes were connected. During the adaptation period the experimenter monitored the subject’s arousal and calibrated the apparatus.

Initial mood ratings were completed following the habituation period (Appendix F). These mood scales were completed prior to and following each recall phase.

At the beginning of each baseline, subjects were simply asked to relax and sit still for four minutes. The following instructions were given at commencement of each recall condition.

'For the next four minutes I want you to let your mind wander back to experiences you had up to around 14 years of age. I want you to recall incidents about which, at the time, you felt ... (angry/anxious/happy). That is experiences, events or situations during which you actually felt ... (angry/anxious/happy), when the event took place'.

As subjects gave keywords for each memory, the experimenter noted these on a data sheet (Appendix G) for follow-up in the post recall interview.

At the conclusion of the recall period, the experimenter asked subjects to relax and told them she would be with them momentarily. Output was noted from the PDP 11 and the experimenter joined the subject.

Prior to discussing recalled experiences, subjects completed mood scales and rated the intensity of their emotional involvement during recall of those particular events (Appendix H).

The experimenter then obtained data for each keyword. Firstly, subjects estimated the age at which each incident
occurred. They then rated the Original Intensity of the specified emotion experienced at the time of the event (Appendix I) and the intensity with which the specified emotion had been re-experienced during the recall of each event (Current Intensity, Appendix I). These data were collected for each keyword.

At the conclusion of post-recall interviews, participants were asked to clear their mind of recalled memories and to relax for a few minutes prior to the next baseline. The experimenter asked subjects to use the intercom to advise when they felt relaxed and ready to begin the next phase. When this occurred, the experimenter asked subjects to complete another six-mood rating scale and the next baseline commenced.

This procedure continued until all three pre-experimental baselines, three recall periods and a post experimental baseline had been completed.

Finally, debriefing by the experimenter ensured that participants were not disturbed by any recalled event and that, emotionally, they felt firmly back in their present life context. Subjects were then thanked for their cooperation, told they would be credited for their time and informed that they would receive a letter outlining the results of the study on completion.
2.5.3 Data Reduction
2.5.3.1 Changes in Mood During Recall

Difference scores were calculated (pre minus post-ratings for each mood) to provide an index of changes in affect during recall.

2.5.3.2 Physiological Arousal

HR, SCL and temperature data were compiled as beats per minute, micromhos and degrees Fahrenheit.

i) Minimal Arousal During Resting Baselines (MRB).

Following Weinberger et al. (1979) and Asendorpf and Scherer (1983), MRB were calculated separately for each variate as an estimate of arousal during minimal stress. MRB comprised the one-minute average of the two consecutive minutes, from any of four baselines, in which HR and SCL were lowest and temperature was highest.

ii) Arousal During Baselines Preceding Recall (PB).

In addition, physiological arousal was calculated for baselines immediately preceding recall (PB). During pilot testing, it was noted that SCL tended to rise sharply between the end of recall and the subsequent baseline, the period in which the experimenter joined subjects to obtain subjective ratings. Although subjects were asked to inform the experimenter when they felt sufficiently relaxed to commence the next baseline, frequently, SCL continued to drop back in the early stages of baseline. This suggested a carry-over from the post-recall interview. To eliminate this, SCL PB comprised the one-minute average of the final
two minutes of baseline. As no carry-over was noted for HR or temperature, PB comprised the one-minute average of each four-minute baseline.

iii) Change from Minimum Resting Baseline During Recall

Change scores of HR and temperature comprised the difference between MRB and the one-minute average of absolute arousal during the four-minute recall segments. For SCL, change scores were the difference between MRB and the average of the first two minutes of recall activity.

iv) Change from Preceding Baselines During Recall

For HR and temperature change scores comprised the differences between PB and a one-minute average of activity during four-minutes of recall. In pilot testing, it was also noted that SCL tended to increase sharply at the beginning of recall and then decrease slowly over the four-minutes. Because of this tendency, change in SCL comprised the difference between PB and one-minute average for activity during the initial two minutes of recall.

v) Arousal During Post-Experimental Baseline (PEB)

The post-experimental baseline (PEB) provided a measure of arousal following the entire procedure. For HR and temperature, PEB comprised the one-minute average of activity in the four-minute period. As with other baselines for SCL, PEB was the average of the two final minutes of post-experimental baseline period.
2.5.3.3 Memory and Subjective Data

The following memory data were identified for each subject: age of earliest memory in each condition; age of earliest negative memory (angry or anxious); number of memories recalled in each condition; and number of negative memories (angry plus anxious).

Subjective measures were reduced to means for subjects' memory data in each recall situation. These comprised average Original Intensity of emotion and average Current Intensity of emotion experienced during recall. Intensity of emotional involvement in the recall process did not require reduction, being rated only once after each condition.
Unless otherwise specified, data were analysed with 5 (group) by 3 (recall condition) factorial analyses of variance with repeated measures on the last factor and with Fisher's Least Significant Differences tests, adjusted for unequal sample sizes (Kirk, 1968) for post-hoc comparisons. Pearson's technique was used for correlation analyses. Prior to analyses, diagnostic plots were compiled to identify departures from normality and Bartlett's statistic was used to test for homogeneity of variance (Kirk, 1968). Where data transformations were necessary, these are noted in the text.

3.1 Psychometric Selection Criteria

3.1.1 Differences Between Experimental Groups

One-way analyses of variance, conducted to ensure that appropriate between-group differences existed on selection scales (Table 2.1), revealed significant differences in line with selection requirements.

Analysis of defensiveness scores (MC) yielded a highly significant group effect ($F (4,37) = 46.24, p < .00005$), with all repressor groups being similar and more defensive than TLAG and THAG groups ($p < .001$ in each comparison), who did not differ from each other.

Anxiety score (TMAS) analysis also revealed appropriate between-group effects ($F (4,37) = 7.93, p < .0001$).
Samples chosen for low anxiety (RAX and RAA) were similar to each other and were less anxious than other groups ($p < .01$ for both RAG and THAG; $p < .05$ for TLAG). RAG, THAG and TLAG groups did not differ from each other in anxiety.

Trait anger (T-Anger) data also yielded a highly significant group effect ($F(4, 37) = 72.23, p < .00005$). THAG subjects obtained the highest anger scores and differed significantly from all other groups ($p < .0001$ for all comparisons). RAX, selected without reference to anger level, were higher in anger than RAG ($p < .01$). RAA were also less angry than TLAG ($p < .05$), but neither differed significantly from RAG.

3.1.2 Correlations Between Selection Scales

Responses on MC, TMAS and T-Anger scales were correlated for the selection pool ($n = 147$) to assess relationships between scales. As data for anxiety and anger measures violated the homogeneity of variance assumption, these were transformed to logs. Coefficients and observed probabilities are presented in Table 3.1

<table>
<thead>
<tr>
<th>Scales</th>
<th>Pearson $r$</th>
<th>Percentage of Common Variance</th>
</tr>
</thead>
<tbody>
<tr>
<td>MC / TMAS</td>
<td>-.287 +</td>
<td>7.5</td>
</tr>
<tr>
<td>MC / T-Anger</td>
<td>-.473 +</td>
<td>21.8</td>
</tr>
<tr>
<td>TMAS / T-Anger</td>
<td>.278 +</td>
<td>7.1</td>
</tr>
</tbody>
</table>

+ $< .001$ probability level
Defensiveness was negatively related to both anger and anxiety (p < .001 in each case), and a positive association existed between anxiety and anger (p < .001).

3.2 Mood Ratings

3.2.1 Moods Prior to the Experiment

Initial mood-ratings were assessed with a 5 (group) by 6 (moods) multivariate analysis of variance. Results revealed no group differences in moods prior to the task (p = .11).

3.2.2 Changes in Mood During Memory Recall

Separate analyses of variance were conducted on difference scores for each of the six moods (pre- minus post-recall ratings) to assess changes in affect during recall. No significant group differences existed. Significant recall effects were evident for all emotions with the exception of fear, where the recall effect was marginal (relaxation F(2,8) = 8.143, p = .012; anxiety F(2,8) = 10.712, p = .005; sadness F(2,8) = 6.012, p = .025; happiness F(2,8) = 21.046, p = .0007; anger F(2,8) = 11.556, p = .004; fear F(2,8) = 4.126, p = .059).

Positive moods (relaxation and happiness) decreased during angry and anxious recall and increased during recall of happy events (happy mood p < .001 for both anger and anxious recall compared with happy recall; relaxed mood p < .001 and p < .01 for anxiety and anger recall relative to happy recall respectively). Negative feelings (anxiety, sadness, fear and anger) intensified equally during the
recall of both anxious and angry memories, and this differed significantly from a decrease in these emotions which followed recall of happy experiences. Subjects were more anxious after recalling angry and anxious events and less anxious following happy recall ($p < .01$ for anger and happy recall; $p < .001$ for anxious and happy recall). Sadness increased following recall of anxious and angry events compared with a decrease in sadness after happy recall ($p < .01$ in each case). Anger increased markedly after angry recall and was greater than the level of anger reported after recall of anxious and happy events ($p < .001$ for each comparison). The marginal effect for fear reflected a substantial increase in fear after recall of anxious memories, compared with a reduction in fear following happy recall ($p < .01$). Change in fear after angry recall was intermediate to and no different from that which occurred during anxious or happy conditions.

3.3 Physiological Arousal

Equipment malfunction caused loss of SCL data for three subjects (one RAX and two TLAG), therefore degrees of freedom vary in physiological analyses. Where data are tabulated, units represent beats per minute (HR), micromhos (SCL) and degrees Fahrenheit (temperature).

3.3.1 Absolute Arousal During Minimal Stress (MRB)

To evaluate whether groups differed in minimal arousal, separate one-way analyses of variance were conducted on mean MRB for each variate. Data are presented in Table 3.2.
Heart rate during MRB was more variable across groups and was often higher than that noted by Weinberger et al. (1979), who reported means of 67.4, 67.6 and 68.1 bpm for TLA, REP and MHA respectively.

Although Table 3.2 shows considerable between-group variation, analyses revealed no significant differences in minimal arousal for HR, SCL or facial temperature.

### Table 3.2 MRB for HR, SCL and Temperature for Groups.

<table>
<thead>
<tr>
<th>Groups</th>
<th>HR</th>
<th>SCL</th>
<th>Temp</th>
</tr>
</thead>
<tbody>
<tr>
<td>TLAG</td>
<td>73.20</td>
<td>11.05</td>
<td>92.23</td>
</tr>
<tr>
<td>RAG</td>
<td>71.69</td>
<td>8.33</td>
<td>91.78</td>
</tr>
<tr>
<td>RAX</td>
<td>60.44</td>
<td>7.62</td>
<td>91.20</td>
</tr>
<tr>
<td>RAA</td>
<td>69.00</td>
<td>10.60</td>
<td>92.78</td>
</tr>
<tr>
<td>THAG</td>
<td>72.15</td>
<td>9.63</td>
<td>90.63</td>
</tr>
</tbody>
</table>

3.3.2 Absolute Arousal in Baselines Prior to Recall (PB)

Data obtained during preceding baselines were analysed separately for each physiological variate. SCL data were transformed to logs to comply with the normality assumption and temperature data for one recall period for two subjects were eliminated to satisfy the homogeneity assumption.

Although PB analyses did not generate any statistically significant group, recall or interaction effects, high between-group variability was apparent relative to lower variation across recall conditions. Table 3.3 summarizes mean PB for HR, SCL and facial temperature across groups and
conditions to illustrate this point. Untransformed SCL units are presented to allow for meaningful comparisons.

Table 3.3  PB for HR, SCL and Temperature for Groups and Recall Conditions

<table>
<thead>
<tr>
<th>Recall Condition</th>
<th>HR</th>
<th>SCL</th>
<th>Texp</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Ang</td>
<td>Anx</td>
<td>Hap</td>
</tr>
<tr>
<td>TLAG</td>
<td>76.5</td>
<td>79.8</td>
<td>77.8</td>
</tr>
<tr>
<td>RAG</td>
<td>75.7</td>
<td>76.0</td>
<td>76.7</td>
</tr>
<tr>
<td>RAX</td>
<td>66.8</td>
<td>64.2</td>
<td>62.8</td>
</tr>
<tr>
<td>RAA</td>
<td>72.0</td>
<td>72.2</td>
<td>75.7</td>
</tr>
<tr>
<td>THAG</td>
<td>78.8</td>
<td>77.2</td>
<td>76.6</td>
</tr>
</tbody>
</table>

3.3.3 Change in Arousal During Memory Recall

To ascertain whether recall was associated with increased physiological arousal, separate t-tests for dependent samples were computed for data from all subjects (n = 42) for each variate, comparing activity during PB with absolute arousal during recall. Significant results emerged from each analysis: HR during baseline was lower than that in recall (74.17 bpm compared with 76.62 bpm, \( t(41) = -6.77, p < .0005 \)); SCL in baseline was below that in recall (\( M = 10.90 \) and 12.46 micromhos respectively, \( t(38) = -5.67, p < .0005 \)); and temperature increased significantly from baseline during recall (\( M = 90.98 \) and 91.12 degrees Fahrenheit, \( t(41) = -4.55, p < .0005 \)).

Prior to analysis of change scores, it was necessary to assess the extent to which change was limited by prior
arousal. Table 3.4 presents coefficients and probabilities for both MRB and PB and change during recall.

Table 3.4 Correlations Between MRB and PB and Change in HR, SCL and Temperature During Recall

<table>
<thead>
<tr>
<th></th>
<th>HR</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pearson r</td>
<td>p level</td>
<td></td>
</tr>
<tr>
<td>MRB/Change in Angry</td>
<td>.27</td>
<td>.09</td>
<td></td>
</tr>
<tr>
<td>MRB/Change in Anxious</td>
<td>-.15</td>
<td>.35</td>
<td></td>
</tr>
<tr>
<td>MRB/Change in Happy</td>
<td>.28</td>
<td>.07</td>
<td></td>
</tr>
<tr>
<td>PB/Change in Angry</td>
<td>.34</td>
<td>.03</td>
<td></td>
</tr>
<tr>
<td>PB/Change in Anxious</td>
<td>-.18</td>
<td>.25</td>
<td></td>
</tr>
<tr>
<td>PB/Change in Happy</td>
<td>.12</td>
<td>.46</td>
<td></td>
</tr>
<tr>
<td>SCL</td>
<td>MRB/Change in Angry</td>
<td>.33</td>
<td>.04</td>
</tr>
<tr>
<td></td>
<td>MRB/Change in Anxious</td>
<td>.35</td>
<td>.03</td>
</tr>
<tr>
<td></td>
<td>MRB/Change in Happy</td>
<td>.37</td>
<td>.02</td>
</tr>
<tr>
<td></td>
<td>PB/Change in Angry</td>
<td>.36</td>
<td>.03</td>
</tr>
<tr>
<td></td>
<td>PB/Change in Anxious</td>
<td>.05</td>
<td>.74</td>
</tr>
<tr>
<td></td>
<td>PB/Change in Happy</td>
<td>.20</td>
<td>.22</td>
</tr>
<tr>
<td>TEMP</td>
<td>MRB/Change in Angry</td>
<td>-.17</td>
<td>.28</td>
</tr>
<tr>
<td></td>
<td>MRB/Change in Anxious</td>
<td>.01</td>
<td>.98</td>
</tr>
<tr>
<td></td>
<td>MRB/Change in Happy</td>
<td>-.11</td>
<td>.49</td>
</tr>
<tr>
<td></td>
<td>PB/Change in Angry</td>
<td>-.38</td>
<td>.02</td>
</tr>
<tr>
<td></td>
<td>PB/Change in Anxious</td>
<td>.20</td>
<td>.19</td>
</tr>
<tr>
<td></td>
<td>PB/Change in Happy</td>
<td>-.34</td>
<td>.02</td>
</tr>
</tbody>
</table>

The Law of Initial Values (Wilder, 1950, cited in Lacey, 1956) predicts a negative relationship between prior arousal and change. In such situations, transformation to Autonomic Lability Scores (ALS) is recommended to eliminate this dependency (Lacey, 1956). Lacey notes that Wilder reported negative relationships between prior arousal and change in 75 percent of human studies, and Lacey's work
indicates that this is frequently observed for blood pressure, heart rate and electrodermal activity.

The predominance of significant positive correlations in Table 3.4 and the absence of relationship between some measures indicates that, in general, these data do not conform to the Law of Initial Values. It was concluded that the inconsistent relationship between prior activity and change during recall did not justify transformation of change scores to ALS.

As groups did not differ in minimum arousal (MRB) or baseline activity (PB), covariance procedures holding prior arousal constant were unnecessary. Separate factorial analyses of variance were computed for change in arousal during recall relative to both MRB and PB for each variate.

No significant group, recall or interaction effects emerged in change from MRB for HR, SCL or temperature. As between-group variation was, again, far greater than within-group differences, only group data for change from MRB are presented in Table 3.5.

Table 3.5 Change from MRB During Recall for HR, SCL and Temperature for Groups.

<table>
<thead>
<tr>
<th>Groups</th>
<th>HR</th>
<th>SCL</th>
<th>Temp</th>
</tr>
</thead>
<tbody>
<tr>
<td>TLAG</td>
<td>6.36</td>
<td>3.15</td>
<td>-0.416</td>
</tr>
<tr>
<td>RAG</td>
<td>7.55</td>
<td>3.44</td>
<td>-0.198</td>
</tr>
<tr>
<td>RAX</td>
<td>7.32</td>
<td>1.89</td>
<td>-0.779</td>
</tr>
<tr>
<td>RAA</td>
<td>4.64</td>
<td>3.86</td>
<td>-0.604</td>
</tr>
<tr>
<td>THAG</td>
<td>8.31</td>
<td>2.85</td>
<td>-0.446</td>
</tr>
</tbody>
</table>
Although MRB change data for SCL violated the normality assumption and log transformations were used in this analysis, Table 3.5 provides untransformed units for comparative purposes.

Change in HR from MRB can be referenced to data estimated from figural material presented by Weinberger et al. (1979); in that study, TLA, REP and MHA groups experienced approximately 4.2, 6.7 and 7.1 bpm respectively averaged across phrase trials.

Consistent with previous data here, variation in change from PB was markedly greater between groups than across recall conditions. Group data are displayed in Table 3.6.

<table>
<thead>
<tr>
<th>Groups</th>
<th>HR</th>
<th>SCL</th>
<th>Temp</th>
</tr>
</thead>
<tbody>
<tr>
<td>TLAG</td>
<td>3.66</td>
<td>1.45</td>
<td>0.174</td>
</tr>
<tr>
<td>RAG</td>
<td>4.98</td>
<td>1.56</td>
<td>0.130</td>
</tr>
<tr>
<td>RAX</td>
<td>3.44</td>
<td>1.24</td>
<td>-0.027</td>
</tr>
<tr>
<td>RAA</td>
<td>2.20</td>
<td>1.99</td>
<td>-0.051</td>
</tr>
<tr>
<td>THAG</td>
<td>5.31</td>
<td>1.57</td>
<td>0.133</td>
</tr>
</tbody>
</table>

No significant group, recall or interaction effects emerged in change from prior level for any variate. However the group effect for HR approached significance ($F(4, 37) = 2.449, p = .06$) with increases in HR for RAG and THAG being greater than that experienced by RAA ($p < .05$ and $p < .01$ respectively).
The only temperature data available for comparison are those of Davis and Schwartz (1984), who monitored absolute arousal during recall, rather than baseline activity and change. Tables 3.7 and 3.8, which present their results (degrees Fahrenheit) and comparable data from this study, indicate that temperature in this study was several degrees above that observed by Davis and Schwartz (1984).

Table 3.7 Facial Temperature for Groups During Recall (Davis & Schwartz, 1984).

<table>
<thead>
<tr>
<th>Recall Condition</th>
<th>Groups</th>
<th>G</th>
<th>H</th>
<th>S</th>
<th>A</th>
<th>F</th>
<th>W</th>
</tr>
</thead>
<tbody>
<tr>
<td>TLA</td>
<td></td>
<td>88.69</td>
<td>89.54</td>
<td>88.92</td>
<td>89.07</td>
<td>89.19</td>
<td>89.13</td>
</tr>
<tr>
<td>REP</td>
<td></td>
<td>87.85</td>
<td>87.94</td>
<td>87.81</td>
<td>88.40</td>
<td>87.71</td>
<td>87.70</td>
</tr>
<tr>
<td>THA</td>
<td></td>
<td>88.25</td>
<td>88.89</td>
<td>88.72</td>
<td>88.26</td>
<td>89.00</td>
<td>89.24</td>
</tr>
</tbody>
</table>

G general; H happy; S sad; A anger; F fear; W wonder

Table 3.8 Absolute Mean Facial Temperature for Groups During Recall.

<table>
<thead>
<tr>
<th>Recall Condition</th>
<th>Groups</th>
<th>Anger</th>
<th>Anxiety</th>
<th>Happy</th>
</tr>
</thead>
<tbody>
<tr>
<td>TLAG</td>
<td></td>
<td>91.62</td>
<td>91.97</td>
<td>91.87</td>
</tr>
<tr>
<td>RAG</td>
<td></td>
<td>91.65</td>
<td>91.34</td>
<td>91.61</td>
</tr>
<tr>
<td>RAX</td>
<td></td>
<td>90.45</td>
<td>89.82</td>
<td>90.25</td>
</tr>
<tr>
<td>RAA</td>
<td></td>
<td>92.20</td>
<td>92.33</td>
<td>91.98</td>
</tr>
<tr>
<td>THAG</td>
<td></td>
<td>90.01</td>
<td>90.24</td>
<td>90.28</td>
</tr>
</tbody>
</table>

3.3.4 Arousal During Post-Experimental Baselines (PEB)

Post-experimental arousal was assessed with separate one-way analysis of variance to evaluate whether groups differed in HR, SCL or temperature. Table 3.9 depicts these
data. No significant group differences existed in PEB activity for HR or SCL, but temperature data revealed a significant group effect ($F(4,37) = 2.751, p = .042$). RAA subjects had significantly higher facial temperature than THAG following the experiment ($p < .01$).

Table 3.9 PEB HR, SCL and Temperature for Groups.

<table>
<thead>
<tr>
<th>Groups</th>
<th>HR</th>
<th>SCL</th>
<th>Temp</th>
</tr>
</thead>
<tbody>
<tr>
<td>TLAG</td>
<td>75.63</td>
<td>14.05</td>
<td>91.88</td>
</tr>
<tr>
<td>RAG</td>
<td>74.13</td>
<td>11.24</td>
<td>91.54</td>
</tr>
<tr>
<td>RAX</td>
<td>62.20</td>
<td>9.51</td>
<td>90.29</td>
</tr>
<tr>
<td>RAA</td>
<td>70.90</td>
<td>15.46</td>
<td>92.36</td>
</tr>
<tr>
<td>THAG</td>
<td>75.47</td>
<td>12.72</td>
<td>89.88</td>
</tr>
</tbody>
</table>

3.4 Memory Data

3.4.1 Number of Memories/Negative Memories.

Diagnostic plots revealed violation of the normality assumption, due to one RAX subject who reported an extremely high number of happy experiences. To satisfy the distribution requirement, this datum was eliminated from the analysis. Mean number of memories in each condition and total negative memories (angry plus anxious) are presented in Table 3.10. Although substantial between-group variation is evident in angry and anxious conditions, group differences were not statistically significant. The recall effect was highly significant ($F(2,8) = 23.25, p < .0005$). Subjects reported fewer angry compared with anxious memories ($M = 4.50$ and $5.52$ respectively, $p < .05$) and more happy than angry or anxious situations ($M = 7.40; p < .001$ in each case). The interaction did not attain significance.
Table 3.10 Number of Angry, Anxious, Happy and Total Negative Memories for Groups.

<table>
<thead>
<tr>
<th>Groups</th>
<th>Angry</th>
<th>Anxious</th>
<th>Happy</th>
<th>Negative</th>
</tr>
</thead>
<tbody>
<tr>
<td>TLAG (10)</td>
<td>3.7</td>
<td>5.5</td>
<td>6.8</td>
<td>9.2</td>
</tr>
<tr>
<td>RAG (8)</td>
<td>5.8</td>
<td>6.0</td>
<td>7.1</td>
<td>11.8</td>
</tr>
<tr>
<td>RAX (8)</td>
<td>3.3</td>
<td>3.4</td>
<td>7.2</td>
<td>6.7</td>
</tr>
<tr>
<td>RAA (6)</td>
<td>3.5</td>
<td>6.5</td>
<td>8.8</td>
<td>10.0</td>
</tr>
<tr>
<td>THAG (10)</td>
<td>5.9</td>
<td>6.3</td>
<td>7.5</td>
<td>12.2</td>
</tr>
</tbody>
</table>

Separate one-way analysis for total number of negative memories (Table 3.10) revealed no significant group differences.

3.4.2 Age of Earliest Memory/Earliest Negative Memory.

One subject in both RAX and RAA groups did not recall any angry memories. Although this was directly relevant to the focus of the research, these results could not be meaningfully incorporated. Data were compiled on a years/months basis up to 14 years (defined as the cut-off point for childhood), therefore, it was not possible to score these subjects for age of angry memories. Estimation or elimination of these data were not satisfactory, as either procedure would artificially reduced the effect of interest. In the absence of a feasible alternative, however, data for these subjects were eliminated from the anger condition. Consequently, analyses for mean age of earliest memory data, presented in Table 3.11, included samples of five RAA and seven RAX.
Table 3.11  Mean Age (in Years) of Earliest Angry, Anxious and Happy Memory, and Earliest Negative Memory for Groups

<table>
<thead>
<tr>
<th>Groups</th>
<th>Angry</th>
<th>Anxious</th>
<th>Happy</th>
<th>Negative</th>
</tr>
</thead>
<tbody>
<tr>
<td>TLAG</td>
<td>7.2</td>
<td>5.2</td>
<td>5.1</td>
<td>4.9</td>
</tr>
<tr>
<td>RAG</td>
<td>6.9</td>
<td>5.6</td>
<td>7.0</td>
<td>5.1</td>
</tr>
<tr>
<td>RAX</td>
<td>7.7</td>
<td>8.3</td>
<td>6.5</td>
<td>6.0</td>
</tr>
<tr>
<td>RAA</td>
<td>6.1</td>
<td>5.0</td>
<td>4.7</td>
<td>4.6</td>
</tr>
<tr>
<td>THAG</td>
<td>6.0</td>
<td>6.3</td>
<td>6.0</td>
<td>5.2</td>
</tr>
</tbody>
</table>

Although Table 3.11 reveals substantial variation in age of earliest anxious and happy memories, no significant effects were apparent for group, recall or interaction.

A one-way analysis of variance for age of earliest negative memory revealed no significant group differences.

3.5  Subjective Data

3.5.1  Intensity of Original Emotion.

The only significant effect to emerge from estimates of intensity of emotion experienced at the time of the event was that for recall ($F (2, 8) = 4.619, p = .046$). Scaled from 1 to 7, anxious events were associated with the most intense original emotion ($\bar{M} = 5.943$), differing significantly from angry events which were experienced as least intense ($\bar{M} = 5.604, p < .01$). Intensity of original emotion for happy experiences was intermediate to and did not differ from either situation ($\bar{M} = 5.821$).
3.5.2 Intensity of Current Emotion.

The extent to which subjects re-experienced original emotions while recalling childhood memories produced a significant recall effect ($F (8, 72) = 45.907, p < .0001$). Ratings from 0 to 7 revealed that recall of happy experiences evoked happy feelings which were more intense than feelings of anxiety about anxious events or anger felt about angry memories, while the latter were similar in intensity (happy $M = 3.598$; angry $M = 1.527$; anxious $M = 1.907$; $p < .001$ for both comparisons). Again, group and interaction effects were not significant.

3.5.3 Emotional Involvement During Recall.

Subjects' ratings of the intensity of emotional involvement during recall did not produce any statistically significant effects, although the recall factor approached significance ($F (2, 8) = 3.493, p = .081$). On a 10 point scale, subjects tended to be more involved in the recall of happy ($M = 5.4$) compared with angry memories ($M = 4.4$), and anxiety was intermediate to other conditions ($M = 4.9$).

3.6 Relationships between Variates

3.6.1 Correlations Between Physiological Variates

To assess the extent to which arousal on one physiological dimension was associated with that on another, correlations were computed for HR, SCL and facial temperature averaged across the recall situations. Table 3.12, which presents coefficients and observed
probabilities, reveals that a moderate positive relationship between HR and SCL was the only significant finding.

Table 3.12 Correlations Between HR, SCL and Temperature During Memory Recall.

<table>
<thead>
<tr>
<th></th>
<th>Pearson r</th>
<th>p level</th>
</tr>
</thead>
<tbody>
<tr>
<td>HR and SCL</td>
<td>.411</td>
<td>.009</td>
</tr>
<tr>
<td>HR and Temperature</td>
<td>.195</td>
<td>.217</td>
</tr>
<tr>
<td>SCL and Temperature</td>
<td>.251</td>
<td>.123</td>
</tr>
</tbody>
</table>

3.6.2 Correlations Between Physiological and Subjective Variates.

Two variates provided estimates of subjective arousal: ratings of emotional involvement taken after each condition (Emot Inv); and the average of ratings of intensity of initial emotion, re-experienced for each event (Curr Emot). Table 3.13, which presents correlations between these measures and average absolute HR, SCL and temperature in recall, reveals no significant relationships between subjective and physiological arousal.

Table 3.13 Correlations Between Subjective and Physiological Variates During Recall

<table>
<thead>
<tr>
<th></th>
<th>Pearson r</th>
<th>p level</th>
</tr>
</thead>
<tbody>
<tr>
<td>HR and Emot Inv</td>
<td>-.059</td>
<td>.71</td>
</tr>
<tr>
<td>HR and Curr Emot</td>
<td>.039</td>
<td>.81</td>
</tr>
<tr>
<td>SCL and Emot Inv</td>
<td>-.061</td>
<td>.71</td>
</tr>
<tr>
<td>SCL and Curr Emot</td>
<td>.026</td>
<td>.88</td>
</tr>
<tr>
<td>Temperature and Emot Inv</td>
<td>-.160</td>
<td>.31</td>
</tr>
<tr>
<td>Temperature and Curr Emot</td>
<td>-.132</td>
<td>.42</td>
</tr>
</tbody>
</table>
CHAPTER 4

DISCUSSION

4.1 Specific Aims

Results addressing the specific aims of this study did not provide support for the notion of repression of anger, at least, not as operationalized with Weinberger et al.'s (1979) model, a schema which has accrued considerable construct validity in defining repression of anxiety. This suggests, therefore, that repression of anger cannot be operationalized in the same manner or that it does not operate in the same manner as repression of anxiety.

4.1.1 Physiological/Subjective Arousal

The initial aim was to ascertain whether high physiological and low subjective arousal, evident in repressors of anxiety, particularly relative to true low-anxious subjects (Asendorpf & Scherer, 1983; Davis & Schwartz, 1984; Gudjonsson, 1981; Weinberger et al. 1979), would also be found in repressors of anger. Subjective ratings of current intensity of affect and emotional involvement in the recall process, revealed that RAG were no less aroused than TLAG or any other group. Furthermore, HR, SCL and facial temperature indicated that RAG were no more physiologically aroused than TLAG at any stage in the experiment (minimal resting level, baselines preceding recall, recall, or post-experimental arousal).
Although no evidence of repression emerged, the physiological and subjective data were in accord with other areas of research. Physiological data did not conform with Wilder's (1950) Law of Initial Values (cited in Lacey, 1956); however, this does not seem to be an uncommon occurrence (Prof. I. McCloskey, Department of Physiology & Pharmacology, University of NSW, personal communication, 27 May, 1987). The only significant correlation between physiological variates was a moderate positive association between SCL and HR. This is consistent with previous research (Marks, Marset, Boulougouris & Huson, 1971) and the argument that HR and SCL are positively linked in tasks requiring active cognitive involvement (Fowles, 1980; Obrist, 1976). The lack of association between the remaining physiological measures is in accord with other researchers' observations (Ax, 1953; Thayer, 1970), and supports the concept of individual response specificity (Lacey, Bateman & Van Lehn, 1953; Lacey & Lacey, 1958). Non-significant correlations between subjective and physiological indices of arousal have also been reported previously (Hodges, 1978; Schacter, 1964; Weinberger et al. 1979; Weinstein, Averill, Opton & Lazarus, 1968). Therefore, although physiological and subjective data obtained here did not conform with findings from research evaluating repression of anxiety, they were consistent with the wider literature.
4.1.2 Affective Memory Access

Secondly, this research was designed to identify whether repressors of anger also experience limited access to affective memories, as do repressors of anxiety (Davis, 1987; Davis & Schwartz, 1987). In all conditions, RAG actually reported marginally more memories than TLAG and recalled as many as THAG, and they were equal to other groups in total negative memories recalled. Furthermore, RAG did not differ from other groups in age of earliest memory, or in age of earliest negative memory. No aspect of the pattern of limited memory access evident in anxiety research, emerged in this extension of the model to anger.

Collectively, the physiological, subjective and memory data provide no evidence to substantiate the central thesis in this research; that there may be effects in repression of anger which parallel those in repression of anxiety. This clearly suggests that Weinberger et al.'s (1979) model for operationalizing repression of anxiety, has no validity when applied to anger.

4.1.3 Patterns of Effects in Repression of Anger and Anxiety

The third aim was, that if significant effects emerged in physiological/subjective arousal or in memory access amongst repressors of anger, were these effects similar to or different from that noted in repressors of anxiety relative to true low-anxious and true-high anxious subjects. Given the absence of significant differences in physiological, subjective and memory data for repressors of
anger relative to these traditional comparison groups, no further discussion of this point is warranted.

4.1.4 Additivity of Effect

Finally, this study aimed to assess the potential for additivity of effect amongst individuals who repress both anxiety and anger. In subjective arousal, RAA did not differ from RAG or RAX. HR and SCL revealed that RAA were no more aroused than either group in minimum resting activity, baselines preceding recall, memory-recall, or post-experimental baseline. Although change in HR from preceding baseline revealed a marginal group effect, this was due to RAA showing slightly less, rather than more, acceleration of cardiac activity than both THAG and RAG subjects. Facial temperature of RAA was also similar to that of other groups at all times, except during the post-experimental period when, although they did not differ from repressor groups, they were less aroused than THAG. In addition, memory data revealed no statistically significant differences between RAA and other repressor samples. Overall, these data provide no evidence to suggest that there is any additivity of effect in individuals who repress both anger and anxiety.

Although comments based on data which did not generate significant group effects must be viewed with caution, particularly as the RAA sample only comprised six individuals, several observations of interest emerged from the memory data. In age of earliest angry memory (Table
3.8), RAA were similar to repressors of anger, however in recalling anxious memories, RAA were more than three years younger than repressors of anxiety at the time of their first anxious experience. It is difficult to suggest why RAA, who in previous research would be classed as repressors of anxiety, should differ so markedly from this group in age of earliest anxious memory.

4.2 Explanation of Findings

A number of potential explanations may be offered for the fact that effects, similar to those in repression of anxiety, did not emerge in this extension of Weinberger et al.'s (1979) model to anger.

4.2.1 No Effect with Repression of Anger?

It is possible that, despite the sound rationale on which this research was based, there may simply be no effects in repression of anger which parallel those which appear with repression of anxiety. This will be discussed, in depth, after reviewing potential explanations related to methodology.

4.2.2 Methodological Factors

4.2.2.1 Subject Selection Criteria

Firstly, experimental groups differed significantly from each other on the relevant selection dimensions. Slightly lower anxiety and higher defensiveness were noted in the total selection pool relative to Davis and Schwartz (1984, 1987) Yale findings, but this was consistent with Davis' (1987) observations amongst Australian samples.
Furthermore, relationships between the selection scales were in accord with the literature. Moderate negative correlations between the MC and TMAS, reported by Weinberger et al. (1979) and Davis (1987), also emerged here ($r = -0.29$). Similarly, the relationship between the T-Anger and TMAS ($r = 0.28$) was in line with Spielberger et al.’s (1980) correlations between T-Anger and the Trait Anxiety Scale (from 0.25 to 0.46). The validity of the moderate negative association between T-Anger and MC observed here ($r = -0.47$), cannot be confirmed as no research assessing this link has yet been published. Nevertheless, it is consistent with correlations which have been noted between other anger/hostility scales and the MC (between -0.26 and -0.56, Biaggio, 1980).

Both sample characteristics and relations between selection criteria suggest that sampling factors do not explain the absence of significant results in this study.

4.2.2.2 Anger Selection Scale

The nature of the anger measure adopted may, itself, provide some insight into these findings. In research which became available after this study was conducted, Davis (1987) observed that it appears to be "attention focussed on the self in a threatening and/or evaluative way" (p. 34) that is central to repression. Furthermore, with anger, she noted that although "the results (were) by no means consistent across studies (p. 38), ... it may be that repressors only have difficulty in accessing those anger
experiences specifically provoked by threats to self-esteem." (p. 39 of submitted manuscript, cited with the author’s permission).

With respect to the potential centrality of 'self', it is noteworthy that T-Anger items are primarily apersonal (Appendix A.4: 'I am quick-tempered'; 'I have a fiery temper'; 'I am a hot-headed person'; 'When I get mad, I say nasty things'). Even the more personal statements, ('I feel annoyed when I am not given recognition for doing good work'; 'It makes me furious when I am criticised in front of others'), which seem pertinent to evaluation and self-esteem, do not focus on particularly critical issues.

Although the T-Anger scale contains two distinct factors, Angry Temperament and Angry Reaction, Spielberger does not recommend their separate use (Spielberger et al., 1979; Spielberger et al., 1980; Spielberger et al., 1983). Despite this, the Reaction subscale addresses more personally-threatening issues (items 42, 45, 54, 60; Appendix A.4) than the Temperament factor (items 33, 36, 39, 48). Therefore, the former rather than the full scale may have been more suitable for subject selection.

Some TMAS items also appear relatively non-threatening. However, face validity of other items suggests that this scale assesses dimensions of anxiety which are highly relevant to evaluation and self-esteem (Appendix A.2: 'At times I think I am no good at all'; 'I certainly feel useless at times') than the T-Anger scale. With the benefit
of hindsight, provided by Davis' (1987) observations, it may be that an emphasis of this type is essential to tap into repression. Because the full T-Anger Scale does not focus on highly personal, evaluative aspects of anger it may not be an appropriate selection criterion for repression research.

Alternately, the literature suggests that it is lack of ventilation, suppression, or repression of anger that is linked with disease. Spielberger et al.'s (1985) Anger Expression Scale was administered as part of the questionnaire battery (Appendix A), but it was not used in sampling because a measure of trait anger was essential to retain conceptual equivalence with Weinberger et al.'s (1979) model. Although it would depart from this scheme, mode of expression of anger rather than trait anger may be a more valid selection criterion for assessing repression of anger.

Use of the Reaction subscale or the Anger Expression Scale may have identified samples other than those included in this research and differences, similar to those found in repression of anxiety, may have emerged between repressors and other groups.

4.2.2.3 Sample Size

Inclusion of three separate repressor groups in this research resulted in some samples which were quite small. However, other workers have identified group differences in physiological arousal and memory recall using samples of
only 10 (Davis & Schwartz, 1984 & 1987) and even seven individuals (Davis, 1987, Experiment 3). Consequently, insufficient sample size does not appear to account for the absence of significant effects.

4.2.2.4 Physiological Technique/Apparatus

The equipment used to detect SCL and temperature is reported to be relatively accurate (Autogen 3400 and 2000b manuals). Nevertheless, these were designed for clinical rather than research purposes and, therefore, may be marginally less sensitive than more sophisticated apparatus available to, for instance, Davis and Schwartz (1984) in the Yale laboratory. Also, Davis and Schwartz (1984) sampled activity 10 times per second and this technique would have detected momentary changes not recorded with the procedure used here (sampling every 2.5 secs). However, advisors on physiological function, consulted during the design of this study, considered this method and the Autogen apparatus adequate to detect effects of the magnitude reported in the repression literature.

With respect to electrodermal activity, SCL monitored with two 1 sq. cm electrodes would be expected to fluctuate between .5 and 50 micromhos (Autogen 3400 Manual; Mitchell & Venables, 1980). During minimal resting baselines, group means ranged from 8.33 to 11.05, with raw data varying between 4.90 and 17.54 micromhos. Means during baselines varied from 8.20 to 12.48, with peak individual activity at 23.70 micromhos. Although these data fall into the lower
half of the anticipated range, it would be expected that extreme palmar sweating would only occur under severe stress or activity.

Facial temperature, measured under ambient conditions ranging from 19 to 21 degrees Celsius, was generally several degrees above that noted by Davis and Schwartz (1984), despite identical electrode placement. Nevertheless, both sets of data fall within the range noted by other researchers (Prof. I. McCloskey, Department of Physiology & Pharmacology, University of NSW, personal communication, 27 May, 1987). Differences in environmental temperature are recognized to be associated with marked variation in autonomic response (Dr D Atrens, Psychology Department, University of Sydney, personal communication, 28 May, 1987). However, as Davis and Schwartz (1984) reported only that testing occurred in a 'temperature-controlled environment' (p. 10), it is not possible to conclude whether differences in environmental conditions account for the skin temperature variation between studies.

Regardless of the issue of sensitivity of apparatus or technique in SCL and temperature monitoring, hand-scoring of HR permitted elimination of artifact. Despite this, no group differences emerged in HR although previous researchers have noted statistically significant (Asendorpf & Scherer, 1983) and marginal group effects in cardiac activity (Weinberger et al. 1979). This suggests that the absence of physiological differences between groups cannot
be dismissed simply as being due to use of equipment or procedure which was less sophisticated than that of other workers.

4.2.2.5 High Variability in Physiological Arousal

Raw physiological data revealed that substantial individual differences contributed to high within-group variability, particularly in SCL and HR. For example, in HR during anger recall, preceding baseline HR of RAG subjects ranged from 57.8 to 106.8 bpm, RAX varied between 44.5 and 84.0, RAA from 58.5 to 86.5, while TLAG and THAG subjects varied between 66.8 to 100.3 and 63.8 to 100.5 bpm. Within-group variation was also high in change from baseline during recall; ranging from -2.5 to +12.0 bpm for RAG, +1.3 to +7.8 for RAX, -2.2 to +7.3 for RAA, while TLAG and THAG varied from 0.0 to 11.8 and -1.5 to +20.0 bpm change. Equally high variation in HR has previously been observed (Obrist, 1976). Substantial individual differences also existed in SCL, although group means were relatively low. This pattern is also consistent with others' findings (Pennebaker & Chew, 1985).

Individual differences have not been discussed in previous repression research and there is no reason to suspect this was greater here than in other studies. However, the examples cited indicate that high within-group variation could have obscured between-group effects, unless these were of considerable magnitude.
4.2.2.6 Experimental Task

The memory-recall technique used here has previously elicited significant and theoretically meaningful group effects (elevated physiological arousal/limited memory access) amongst repressors of anxiety relative to other groups (Davis, 1987; Davis & Schwartz, 1984, 1987). However, some evidence is required to validate use of this task in the current study.

Firstly, recall of positive and negative memories was associated with significant elevations of skin temperature, electrodermal and cardiac activity. The observed rise in temperature during negative recall does not support the argument that increased sympathetic arousal during negative affective experience, will result in vasoconstriction and a subsequent decrease in surface temperature (Guyton, 1977, 1981; Lynch & Schuri, 1978). Davis and Schwartz (1984) noted lower facial temperature during negative compared with positive recall, but the absence of baseline measures in their study allows for the possibility that variation in prior levels may account for these results. No literature has been found which clearly documents concurrent variation of HR, SCL and temperature. Although the self-regulatory function of the body will, over time, produce homeostatic restraint (Guyton, 1977, 1981), it is possible that, within a four minute period, increased HR and palmar sweating may also be associated with elevations in facial temperature.
It is possible that elevated physiological arousal may be due, simply, to increased mental activity stimulated by instructions or unrelated cognitive processes. However, this explanation would not account for the mood changes, consistent with the affective nature of material to be recalled, which were noted after the recall process. Elevation of negative moods occurred following recall of angry and anxious experiences and positive emotions increased during happy recall. Observations of changes in moods is consistent with the thesis of multiple affect states (Boyle, 1985; Polivy, 1981) and patterns of emotions (Izard, 1972, 1977).

Furthermore, the memory data provide some validation of the experimental task, although some differences existed in comparison with Davis and Schwartz (1987) data. In both studies, subjects recalled more positive than negative memories, and this substantiates a vast body of research which indicates that, with the exception of depressed individuals, people recall more positive than negative experiences from their lives (Bower, 1981; Holmes, 1970; Jersild, 1931). In the conditions common across studies (happy and angry), subjects here recalled their earliest experience somewhat later in life than they did in Davis and Schwartz (1987) (M = 5.9 and 6.8 years for happy and angry compared with 4.92 and 5.77 respectively). The number of memories recalled in this study was also considerably below that noted by Davis and Schwartz (1987) (M for happy and
angry = 7.4 and 4.5 years compared with 11.7 and 8.6 respectively). Despite these variations, the pattern of data obtained here replicates that found by Davis and Schwartz (1987), and is consistent with previous memory research.

Use of recall of pleasant/unpleasant memories has been criticised as an inappropriate technique with which to investigate repression, because it does not necessarily entail 'ego threat' (Holmes, 1974). However, this is a separate argument and it does not explain the presence of theoretically meaningful group differences obtained in research into repression of anxiety (Davis, 1987; Davis & Schwartz, 1987), nor the absence of such effects in this extension of the model to anger.

Davis and Schwartz (1987) noted that their findings could not be explained by a mood-state dependency argument; the same applies here. Originally, the intensity of emotion felt about anxious experiences was greater than that for angry events, while happy situations were intermediate and did not differ from other conditions. During recall, intensity of emotion felt about happy memories was greater than that for either angry or anxious situations, for which intensity of current affect was similar. Neither the intensity of initial emotion (Menzies, 1936) nor the intensity of affect during recall (Holmes, 1970) can explain
why happy events were more readily recalled than anxious experiences, and anxious situations were more easily recalled than angry memories.

In conjunction, the pattern of results comprising elevated physiological arousal, mood changes meaningful to the content of the recall conditions and the memory data, suggests that Davis and Schwartz (1984, 1987) memory-recall task is valid for repression research.

4.2.2.7 Variations from Davis & Schwartz' Method

Several departures from Davis and Schwartz' (1984, 1987) original method which were incorporated in this research, may provide insight into differences in results across studies.

Here, to obtain samples of reasonable size, it was necessary to include both males and female subjects while Davis and Schwartz (1984, 1987) assessed females only. It seems reasonable to suspect that, although the sexes were similar on selection scales, they may differ in compliance and/or ability to recall affective memories. As a small number of males (n = 10) compared with females (n = 32) participated, no statistical analyses were conducted to assess sex differences. However, if sex differences did exist it would be expected that this effect would be evident in the memory data. Females and males were similar in age of earliest memory (M = 6.6 and 6.8 years for angry; M = 6.1 and 6.0 for anxious; M = 5.7 and 5.6 for happy events), and differed only marginally in number of memories.
recalled (anger $M = 4.8$ and $3.7$; anxious $M = 5.7$ and $4.5$; and happy $M = 7.8$ and $6.4$). Consequently, sex differences do not seem to account for the variation in memory data between this research and Davis and Schwartz (1987).

Secondly, in this study it was essential that the experimenter monitor physiological apparatus, therefore subjects were alone during recall and instructions/responses were communicated via intercom. In contrast, in Davis and Schwartz (1987) a female researcher gave in vivo instructions and remained with subjects throughout, noting details of recalled experiences. In the presence of an experimenter, particularly one seen to be recording responses, participants may have felt greater pressure to comply with instructions and/or be more focussed on 'self'.

The effect of experimenter presence has been linked to social facilitation, whereby the presence of an observer or co-worker is linked with improved performance on well-learnt (simple) tasks and impaired performance on unfamiliar (complex) tasks (Zajonc, 1965). No research has assessed the effect of experimenter presence/social facilitation on free-recall and it is unclear whether this would be considered a simple or complex task. However, it seems reasonable to suggest that in Davis and Schwartz' (1987) study experimenter presence may, in some way, have facilitated memory recall performance.

Henchey and Glass (1968) have that suggested the presence of others effects performance as a direct
consequence of evaluation apprehension. If Davis (1987) is correct in suggesting that being the focus of evaluative or threatening attention is highly salient to repression, then this may be a relevant factor to be controlled in future repression research.

4.2.3 Conceptual Issues

In addition to methodological factors such as these, explanation of results which support a null hypothesis also demands examination of the concept of repression of anger. Repression was reviewed in the introduction. More specifically, anger and anxiety must be discussed in seeking to explain findings which suggest that Weinberger et al.'s (1979) model for operationalizing repression cannot be meaningfully applied to anger. The goal at this point is to ascertain whether there are characteristics of anger which suggest that repression of anger may not operate in a parallel fashion to that of anxiety, or that it is not possible to operationalize repression in the same manner. The extent to which the conceptual matters raised here actually provide explanations, represent topics for future research. The aim here is to only suggest points of departure.

Several different theories have been advanced specifying the primary or fundamental emotions and depicting the interrelations between these emotions (Izard, 1972, 1977; Plutchik, 1962, 1980). Izard's (1972, 1977) differential emotions theory, derived from imagery research
into patterns of fundamental emotions and associated subjective experience (Bartlett & Izard, 1972), was chosen for exploration in this discussion. This perspective was selected, not because it is considered superior to others, but because it is research-based and the coverage of anger is substantial.

Izard (1977) defined emotion as "a complex process with neurophysiological, neuromuscular, and phenomenological aspects" (p. 48) and proposed 10 fundamental emotions (interest, joy, surprise, distress, anger, disgust, contempt, fear, shame and guilt), each having unique motivational/experiential properties and cognitive and behavioural correlates. Although they are unique, the fundamental emotions comprise "a system of interacting and mutually influencing components" (Izard, 1972, p. 52) which can activate, amplify and/or attenuate each other.

Like others (Boyle, 1985; Polivy, 1981), Izard (1977) argued that discrete emotions exist only for extremely brief periods, and more usually co-exist in patterns, being

... combinations of two or more fundamental emotions which, under particular conditions, tend to occur together, simultaneously or in a repeating sequence, and interact in such a way that all of the emotions in the pattern have some impact on the organism and its behavior (p. 55).

Although it would seem a diversion from the focus of this discussion, adopting Izard’s (1977) framework to examine Davis’ (1987) results provides some insight into the outcome of this research. Davis (1987) found limited access to fearful, self-conscious and angry memories in repressors
of anxiety. From this, she suggested that experiences which seem particularly vulnerable to repression are those in which the individual has been the focus of threatening or evaluative attention. However, with anger, Davis (1987) noted that her results were not consistent across studies: mood-diary research found everyday experiences of anger equally prevalent amongst repressors, yet in one cued-recall study repressors recalled fewer angry memories than all other groups (Davis, 1987, Experiment 2), while in another, although slower to respond, they did not differ in number of memories recalled (Davis, 1987, Experiment 3). Collectively, these data prompted the conclusion that "it may be that repressors only have difficulty in accessing anger experiences specifically provoked by threats to self-esteem." (Davis, 1987, p. 39) Viewed within Izard's (1977) framework, experiences which seem prone to repression may encompass the common element of fear, although in anger this may, as Davis (1987) proposed, be fear related to potential or actual loss of self-esteem.

Fear, according to Izard (1977), is the most constricting of all emotions. Depending on its intensity, fear "is experienced as apprehension, uneasiness, uncertainty, complete insecurity. ... One feels a threat to one's very existence, which may be sensed as a threat to the body, the psychological self, or both." (p. 365)

In the profile of emotions aroused in fear imagery, Izard (1977) noted that fear dominated a pattern in which
interest, surprise and distress were also elevated. Anger, guilt and shame contributed little, and Izard (1977) argued that "ordinarily none of these fundamental emotions plays a highly significant role in a fear situation, (although) for some individuals any of these emotions may be a part of the ... dynamics" (p. 368). Experientially, fear was characterized by extreme tension, moderate impulsivity and extremely low self-assurance.

Self-consciousness, Davis' (1987) conceptual equivalent of Izard's (1977) shame, also seems subject to repression. In shame, an emotional response relating to the integrity of self with a valued relationship, Izard (1977) found that fear was second only to shame itself. However, in guilt, which seems unaffected by repression (Davis, 1987), distress and fear were equally prominent after the key emotion (Izard, 1977). Although elevated fear in guilt seems counter to the argument that fear may be a critical factor in repression, a comparison of shame and guilt reveals why the former may be prone to repression while the latter is not. Ausubel (1955, cited in Izard, 1977) held that "shame always involves external sanctions, either overtly expressed by others or imaged by the individual. Guilt, on the other hand, includes self-reactions that are independent of the judgement of other people." (p. 423) This suggests that in shame, it is fear of the negative impact of others upon the 'self' which determines repression of such experiences;
while guilt, in which fear stems from one’s own sanctions, remains unaffected.

Davis (1987) found that sadness, the equivalent of Izard’s (1977) distress, seems unaffected by repression. In Izard’s (1977) profile for distress, fear followed sadness in prominence; however, the level of fear was only half that of the key affect, and was similar in magnitude to that of other significant components (interest, surprise, anger, guilt and shame). Distress tends to elicit positive rather than negative attention from others (Izard, 1977), and this may explain why sad memories do not seem prone to repression.

In anger, fear was lower both in absolute value and in relative rank than it was in any other negative emotion (Izard, 1977). The actual level of anger was also greater than that of the key emotion in any other negative emotional profile and disgust, contempt and interest were also considerably elevated. Subjectively, anger was characterized by a level of tension almost equal to that in fear, more self-assurance than in any other negative emotion and high impulsivity (Izard, 1977).

Commenting on the minimal presence of fear during anger imagery, Izard (1977) argued that anger actually inhibits fear. However, he also noted that anger is often linked with fear, but he considered it to be fear specific to the possible consequences of anger. The latter relationship, he suggested, may initiate a rapid reduction of angry feelings.
(Izard, 1977). Although, Izard appears to support two incompatible arguments, both may, in fact, occur in temporal sequence. For many individuals anger may have the potential to inhibit fear initially, but if fear or guilt about the consequences emerges at some later point, then anger may diminish. This would accord with Izard's (1977) opinion that patterns of emotions may exist simultaneously or sequentially.

In contrast to anger which is characterized by an absence of fear, Izard (1977) defined anxiety specifically, by a predominance of fear. Izard viewed anxiety as a

... pattern of fundamental emotions including fear and two or more of the emotions of distress, anger, shame, guilt, and the positive emotion of interest-excitement (p.93). (But), fear must always be the dominant emotion ..., if the pattern is to be considered a form of anxiety. (p. 378)

The centrality of fear in anxiety, and in some emotions for which memory access seems limited in repressors of anxiety (fear and self-consciousness), provides insight into Davis' (1987) findings; fear-related experiences may be less accessible to individuals who are defensive about, or repress, anxiety. However, the minimal presence of fear in angry situations (Izard, 1977) does not explain the finding that repressors of anxiety also have some difficulty accessing angry memories (Davis, 1987). In this regard, Davis (1987) suggested that repression of angry experiences may be determined by the extent to which these events threaten self-esteem. Using Davis' (1987) insight concerning self-esteem, it is possible now to explore the
nature of anger more fully in seeking explanations for the results of this research.

Averill's (1982) research into the nature of everyday experiences of anger highlights the centrality of self-esteem to this emotion. Anger is primarily an interpersonal emotion; more than half the typical incidents of anger arise within a valued affectional relationship (Averill, 1982). The causes of anger are many and varied, but "almost any potential harm may provoke anger if it is appraised as unjustified and/or avoidable." (Averill, 1982, p. 172) Although anger is most often aroused by frustration, these situations were followed closely by those causing loss of self-esteem and events posing threats to interpersonal relationships (Averill, 1982).

In respect to the link between self-esteem and the potential for anger arousal, Averill (1982) noted that

... the relationship between a person's customary level of self-esteem and instigations to anger is undoubtedly complex. Persons with very low self-esteem may perceive a threat as justified (congruent with their own self-image), or they may not believe that they are capable of an effective response. In either case, such a person would most likely respond with anxiety and/or depression than with anger. At the other extreme, persons with high self-esteem are less likely than others to perceive as threatening minor slights or rebuffs. There may thus be a curvilinear relationship between level of self-esteem and susceptibility to anger ... For opposite reasons, persons of very low and very high self-esteem may not respond with anger unless an insult is particularly severe and unambiguous. (p. 174)

Although anger is often caused by situations which threaten self-esteem, the subjective experience of anger is
not associated with a sense of personal incompetence or inadequacy (Averill, 1982; Izard, 1972, 1977). Using the experiential dimension self-assurance/insecurity, Bartlett and Izard (1972) assessed perceptions of emotional, cognitive and behavioural competence and adequacy associated with emotional arousal. Anger and fear, and by Izard's (1977) definition anxiety, elicited extreme responses on this dimension, being characterized, respectively, by the greatest and the least self-assurance relative to all other emotions (Izard, 1977).

The reason for this seems inherent in the nature of these experiences. Typically, in anger, one perceives an unjust or negligent offence, attributes the blame to others and believes there is ample justification for retaliation (Averill, 1982). There is often a sense of self-efficacy in being able to restore matters to order (Averill, 1982) and one is more likely to actively attempt to take control than to be passive or to withdraw (Averill, 1982; Izard, 1977). In contrast, anxiety is most frequently aroused by cognitions; thoughts of threat, trouble, being overpowered, isolated, rejected, losing self-esteem, impending failure and personal inadequacy (Izard, 1977). Uncertainty prevails and the individual will most often attempt to withdraw from the situation (Izard, 1977). At least at the time of the incident, then, it seems that situations which evoke anger may lead to consequences which are more tolerable than those which follow arousal of fear or anxiety. This finds
clinical support in that Rothenberg (1971) argued that "anxiety is more disruptive and more uncomfortable than anger" (p. 91) and Novaco (1976a) agreed that "it is less distressing to be angry than anxious." (p. 1125)

Furthermore, anger serves multiple functions: it can energize, but may also disrupt behaviour; it may be expressive and thus communicative of needs; it promotes self image, as it is preferable to be seen as angry rather than apprehensive; it defends one's rightful position; it induces a sense of potency; it may instigate aggression; and, anger can provide cues to aid the discrimination of the meaning of experience (Novaco, 1976a). Although anxiety also serves a number of these same functions, it differs in that anxiety does not present self in a positive light, does not defend one's position, nor does it induce a sense of competence and adequacy.

Despite the positive functions of anger and a predominance of well-intentioned motives for expressing anger (Averill, 1982), the reports of both angered individuals and recipients of anger, led Averill (1982) to conclude that "anger is perceived as a negative experience and it is widely condemned." (p. 319) This substantiates the work of others who have noted that anger is less acceptable than anxiety both to the individual (Izard, 1977; Rothenberg, 1971) and to society (Izard, 1977; Tavris, 1982), possibly because of the erroneous belief that anger is synonymous with hostility or aggression (Novaco, 1976a,
Socialization is one mechanism which leads to the general condemnation of anger. Izard (1977) noted that "one of the most common parental techniques for the socialization of emotion involves the use of one emotion to influence another." (p. 369) Shame is often used to control anger expression during childhood (Halberstadt, 1984; Izard 1977), such that "the rules for expressing or acting out anger are carefully laid down during socialization." (Izard, 1977, p. 331) Patterns of discipline experienced in childhood also appear to have a direct impact on anger coping-styles in adulthood (Gentry, 1985). In this sense, anger appears to differ markedly from anxiety in that prescriptions for expressing anxiety are not so firmly instilled during childhood.

Further differences between these two emotions are apparent in Averill’s (1982) cross-disciplinary analysis, in which he classified emotions as impulsive, conflictive or transcendental. While Averill (1982) acknowledged that "no actually occurring emotional syndrome fits neatly into any of the three (ideal) subclasses" (p. 18), he noted that joy, aggression initiated by pain and many common fears are impulsive emotions; these are desires or aversions so compelling that they are not perceived as stemming from the 'self-as-agent' (Averill, 1982). In contrast, anxiety and rage were classed as transcendental emotions, those in which
"the self is, in a sense, transcended; as a result, behaviour tends to be disorganized and lacking in purpose." (Averill, 1982, p. 18) Unlike anxiety, anger is not aimless, but epitomizes a conflictive emotion, "a symbolically transformed compromise reaction that helps to meet conflicting demands within the social system, and/or between society ... and incompatible biological or psychological impulses" (Averill, 1982, p. 319).

Averill (1982) suggested that the major conflicts in anger exist at a societal level where they are institutionalized, historically, religiously, and legally, such that "norms involve an injunction, on the one hand, to retaliate forcefully against perceived injustice and wrongdoing, and on the other hand, to settle disputes in a forgiving and reasoned way." (p. 319) Although typical incidents of anger do not clearly reveal this, Averill (1982) argued that the conflictual nature of anger is evident in "the ambivalence with which most people regard anger." (p. 319) Although anxiety may be seen as unnecessary or indulgent by some, it is not characterized by institutionalized social conflict or widespread attitudinal ambivalence.

The contrast between anger and anxiety, which Averill (1982) viewed as an undirected and purposeless emotion, becomes even more pronounced when the motivational aspects of anger are considered. Averill (1982) found that the most
frequently endorsed motives for expressing, or wishing to express, anger were intended

... to assert your authority or independence, or to improve your image ... (Thus, he concluded that), on a very broad level, it seems that anger is often subsidiary to the more inclusive goal of achieving personal control ... and re-establishing the sense of personal worth that is often associated with such control. This is one of the most fundamental motives of human behavior, and it incorporates many subsidiary responses, not just anger. (p. 196)

The multiple facets of motivation to anger, when viewed in conjunction with the centrality of self-esteem in instigations to anger, the suggested curvilinear relationship between anger arousal and self-esteem, the rigorous socialization, widespread condemnation and ambivalence toward this emotion, the elevated self-assurance and sense of potency associated with anger and the conflicts which appear to be embedded in social teachings, clearly reveal the complexities of this emotion; a fact which has previously been recognized by those who have closely investigated anger (Averill, 1982; Novaco, 1975, 1976a, 1976b, 1977, 1978, 1985; Novaco & Robinson, 1984; Rothenberg, 1971).

Despite the differences which have been highlighted between anxiety and anger, these emotions are also intimately related (Novaco, 1976a; Rothenberg, 1971; Speilberger et al. 1983), although no consensus exists about the nature of the relationship. Sullivan (1956) noted that "anger blunts the feeling of personal insecurity" (p. 96, cited in Novaco, 1976a, p. 1126) while Rothenberg (1971)
claimed that "when the roots of anger are adequately explored another more basic phenomenon almost invariably appears: anxiety..." (p. 90). Many agree that, in some circumstances at least, anger serves as an ego-defense against anxiety (Novaco, 1976a; Rothenberg, 1971). In reviewing arguments about whether anger is a primary emotion or a secondary emotion, arising as a consequence of insecurity or ego-threat, Novaco (1976a) labelled this...

... a pseudo problem, (but recognized that) the arousal of anxiety is at times undoubtedly associated with the arousal of anger. Fear stimuli elicit anger as a defense, but whether this is exclusively the case is unfounded in evidence or theory... anger serves as a means to induce the experience of personal control. The relationship between the arousal of anxiety and the arousal of anger is by no means a simple one. (p. 1124)

Whatever the nature of the link between anger and anxiety, Speilberger et al. (1983) agreed that it is "an intrinsic relationship... that cannot readily be eliminated from psychometric measures of these constructs" (p. 171).

4.3 Conclusion

At this point, issues raised in this discussion are drawn together to formulate tentative conclusions as to why this extension of Weinberger et al.'s (1979) repression model to anger, did not generate effects similar to those observed in repression of anxiety.

Despite the sound rationale underlying this research, it may be that repression of affective experience is determined solely by one's ability to cope with fear; an
affect which Izard (1977) argued was the most toxic of all emotions. Angry experiences may be repressed if, as Davis (1987) has suggested, they are associated with threats to self-esteem. However the impetus to repress may reside in the consequences; the fear which is aroused by such experiences. That is, repression may be solely a means of eliminating anxiety, regardless of the affective nature of the events which aroused that anxiety.

Repression appears to be a mechanism which is fundamental to, and specifically directed at, avoidance of negative consequences associated with some types of emotional experience. Anger and anxiety differ markedly, not only in their antecedents and subjective experience, but more importantly for this argument, in their consequences. Given the differences in consequences of anger and anxiety and the fact that repression is a means of avoiding aversive consequences of emotional experience, then one might also expect differences to exist in the operation of repression of these two affects.

At a surface level, this seems paradoxical when Freud argued that fear and hostility, trauma, shame, anxiety, guilt, tension pain and mourning were all, depending on the individual's ideals, capable of initiating repression. However, this may be misreading Freud (1914b), who also acknowledged that repression was a highly individualized process whereby the experiences which may be accepted by some will be rejected by others. This brings into focus the
individual's values, attitudes and beliefs. These are
cognitive factors, which Erdelyi (1974, 1985) has argued are
central to the phenomenon of repression (Erdelyi & Goldberg,
1979).

Attitudes, values and beliefs "... are heavily
influenced by the value system of a society, and by the
system of social rewards and punishments." (Rosenberg, 1979,
p. 76) In discussing self-concept, Rosenberg (1979) also
argued that "the very sense of self arises through the
process of adopting the attitudes of others toward the
self." (p. 64) Two motives are central to self-concept
(Rosenberg, 1979). These are; the self-esteem motive, a wish
to think well of oneself, and the self-consistency motive, a
need to protect self-concept against change and to maintain
self-image. Given this and the prevailing social
condemnation of anger, it would be reasonable to expect that
many individuals hold anger to be negative or if not, may
experience some conflict about this emotion.

For at least some individuals, repression may occur
when one's thoughts, emotions or behaviour violate
self-values to such an extent as to seriously threaten
self-esteem or the stability of the self-concept. Such
situations, whether they arise because of anger, shame or
fear, would provoke anxiety related to the essence of self.
Thus, it may be that angry experiences are repressed, but
only if the incident arouses sufficient anxiety to initiate
the process. If this is so, then it would only be valid to
operationalize repression using Weinberger et al.'s (1979) method incorporating trait anxiety and defensiveness as selection criteria.

Alternately, it may be that repression of anger proceeds independent of anxiety, and that it may be possible to operationalize this by use of the Marlowe-Crowne defensiveness scale and an anger measure. However, as previously noted, it would seem that the anger instrument used should assess highly personal issues relevant to self-esteem or, as suggested by the medical literature, factors pertaining to the direction of anger expression. If further research of this nature is attempted it may be, as Schwartz (1983) has suggested, that the same types of effects found in anxiety repression research will also be revealed in repression of anger.

The current research has achieved the goal for which it was designed; ascertaining whether Weinberger et al.'s (1979) model for operationalizing repression of anxiety could be meaningfully applied to anger. Results obtained clearly suggest that the model does not hold for anger, at least not as it has been tested in this study.

The issue which provided the primary impetus for this study remains; anger now holds a position of prominence in the literature of psychological medicine (Chesney & Rosenman, 1985; Diamond, 1982; Fox & Newberry, 1984; Gentry, 1985; Manuck et al., 1985; Temoshok & Fox, 1984; Williams et al., 1985). As such, research assessing the role of anger
in disease and that evaluating the broader significance of
this emotion, will be likely to continue and expand. In
contemplating such endeavours, researchers would be wise to
heed the multiple complexities of anger discussed here and
Chesney's (1985) conclusion:

Anger now assumes a position similar to that
assigned in the past to anxiety ... (But), unlike
anxiety, an accepted operational definition
distinguishing anger from hostility, aggression
and other related emotional states (e.g.
irritation) does not yet exist. (Despite this,
she argues that) a consensus among leading
researchers in the field is not far off." (p. 277)
REFERENCES


Appendix A Questionnaire Battery Issued to Selection Pool

My name is Carol Hall. I am a second year student in the Master of Clinical Psychology Program, undertaking a thesis supervised by Dr Don Byrne. We would appreciate your assistance in completing the attached questionnaires about attitudes and feelings to provide the initial data for my research. We have several aims in collecting this information. Firstly, we wish to identify the relationships between psychological factors tapped by the various questionnaires. Secondly, we are interested in seeing how some emotions relate to memory and physiological processes. This second aspect of my research will be a laboratory study of around 50 students, conducted between June and September, 1986.

You will be awarded one credit point in Psych I for completing and returning these questionnaires to my pigeon hole on the second floor of the Physics Building. An envelope is provided for your privacy. Please return the questionnaires as soon as possible during the next fortnight or so.

In the second phase of my work, we would like some people who have completed these questionnaires to participate in a laboratory study examining the connections between emotion, memory and physiological processes. Of course, if you are selected, you will be awarded another credit point for the extra time involved (approximately one hour). Please indicate whether I may contact you concerning participating in the laboratory stage of my thesis research.

Yes  No

All information will remain strictly anonymous throughout this study. Students’ names are necessary in this initial stage, simply to allow us to contact some of you to ask that you participate in the subsequent laboratory phase. After allocating credit for return of this material, and prior to examining the replies, we will detach the sheet which bears your name and use a random numerical code system. In this way, the actual identity of respondents will not be known to me as I process the data. A research assistant, with no knowledge of the aims of the study or of your individual responses, will hold the names and corresponding code numbers. In setting up the laboratory research, I will ask this person to contact those who have been selected to participate further. She will then decipher the numerical code and mail my request letters. If you are asked to assist, you do not have to reveal your identity in the laboratory if you do not wish to do so.
We have adopted this sampling strategy for several reasons. Firstly, it permits complete objectivity in the second phase of the study - I will not know the results of your questionnaires when I meet you and conduct laboratory tests. Secondly, absolute anonymity allows you to answer the questions honestly. We would ask you to answer every question so that our findings have a valid and reliable foundation.

Please note that there are different instructions for some sections of this battery of questionnaires. Your answers should be given in accordance with the specific directions for each component.

Thank you.

Carol Hall.
Name (please print) ....................................... 
Postal address: (term) .................................... 

(vacation) ....................................... 

Student Number ................................. 
Tutorial time and tutor’s name: ..................... 
Age: .................................................. 
Are you right handed? Left handed? Ambidextrous (circle one) 
Do you have any left handed siblings or parents? Yes No 
If yes, please explain ................................
Do either of your parents suffer from any of the following medical conditions? 
Rheumatism Yes No 
Coronary Heart Disease Yes No 
High Blood Pressure Yes No 
Cancer Yes No 
If you have answered Yes to any of the above, please give brief details. 


THANK YOU!
Appendix A.1  Marlowe Crowne Social Desirability Scale  
(items marked MC)

Please read each statement and decide whether you feel IN GENERAL that it is mostly true of you, or mostly false. Please circle the appropriate letter (T-True, F-False) directly to the right of each statement. Answer 'True' to positively stated questions if they are true as often or more than stated. For example, answer 'True' to 'Occasionally, I play poker' if you play occasionally or more often.

<table>
<thead>
<tr>
<th>Statement</th>
<th>T</th>
<th>F</th>
<th>MC</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I find it hard to keep my mind on a task or job</td>
<td>T</td>
<td>F</td>
<td></td>
</tr>
<tr>
<td>2. I am sometimes irritated by people who ask favors of me</td>
<td></td>
<td></td>
<td>MC</td>
</tr>
<tr>
<td>3. I am happy most of the time</td>
<td>T</td>
<td>F</td>
<td></td>
</tr>
<tr>
<td>4. Before voting, I thoroughly investigate the qualifications of all the candidates</td>
<td>T</td>
<td>F</td>
<td>MC</td>
</tr>
<tr>
<td>5. I believe I am no more nervous than most others</td>
<td>T</td>
<td>F</td>
<td></td>
</tr>
<tr>
<td>6. I sometimes think when people have a misfortune they only got what they deserved</td>
<td>T</td>
<td>F</td>
<td>MC</td>
</tr>
<tr>
<td>7. I am more sensitive than most other people</td>
<td>T</td>
<td>F</td>
<td></td>
</tr>
<tr>
<td>8. I like to gossip at times</td>
<td>T</td>
<td>F</td>
<td>MC</td>
</tr>
<tr>
<td>9. On occasion I have had doubts about my ability to succeed in life</td>
<td>T</td>
<td>F</td>
<td>MC</td>
</tr>
<tr>
<td>10. There have been occasions when I took advantage of someone</td>
<td>T</td>
<td>F</td>
<td>MC</td>
</tr>
<tr>
<td>11. I am a highly-strung person</td>
<td>T</td>
<td>F</td>
<td></td>
</tr>
<tr>
<td>12. I have never intensely disliked anyone</td>
<td>T</td>
<td>F</td>
<td>MC</td>
</tr>
<tr>
<td>13. I cannot keep my mind on one thing</td>
<td>T</td>
<td>F</td>
<td></td>
</tr>
<tr>
<td>14. I never make a long trip without checking the safety of my car</td>
<td>T</td>
<td>F</td>
<td>MC</td>
</tr>
<tr>
<td>15. I have periods of such great restlessness that I cannot sit long in a chair</td>
<td>T</td>
<td>F</td>
<td></td>
</tr>
<tr>
<td>16. I am always courteous, even to people who are disagreeable</td>
<td>T</td>
<td>F</td>
<td>MC</td>
</tr>
<tr>
<td>17. On a few occasions I have given up doing something because I thought too little of my ability</td>
<td>T</td>
<td>F</td>
<td>MC</td>
</tr>
</tbody>
</table>
18 I am always careful about my manner of dress T F MC
19 At times I think I am no good at all T F
20 I have never felt that I was punished without cause T F MC
21 When I don't know something, I don't at all mind admitting it T F MC
22 I am usually calm and not easily upset T F
23 I never resent being asked to return a favor T F MC
24 I am not unusually self-conscious T F
25 I sometimes try to get even, rather than forgive and forget T F MC
26 If I could get into a movie without paying and be sure I was not seen, I would probably do it T F MC
27 I work under a great deal of tension T F
28 I have never deliberately said something that hurt someone's feelings T F MC
29 I can remember 'playing sick' to get out of something T F MC
30 I am inclined to take things hard T F
31 I sometimes feel resentful when I don't get my way T F MC
32 Life is a strain for me much of the time T F
33 No matter who I'm talking to, I'm always a good listener T F MC
34 I certainly feel useless at times T F
35 I always try to practice what I preach T F MC
36 There have been times when I was quite jealous of the good fortunes of others T F MC
37 I sometimes feel that I am about to go to pieces T F
38 I have never been irked when people expressed ideas very different from my own T F MC
39 My table manners at home are as good as when I eat in a restaurant T F MC
<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>40</td>
<td>There have been occasions when I felt like smashing things</td>
<td>T</td>
<td>F MC</td>
</tr>
<tr>
<td>41</td>
<td>I have sometimes felt that difficulties were piling up so high that I could not overcome them</td>
<td>T</td>
<td>F</td>
</tr>
<tr>
<td>42</td>
<td>I never hesitate to go out of my way to help someone in trouble</td>
<td>T</td>
<td>F MC</td>
</tr>
<tr>
<td>43</td>
<td>It is sometimes hard for me to go on with my work if I am not encouraged</td>
<td>T</td>
<td>F MC</td>
</tr>
<tr>
<td>44</td>
<td>At times I have really insisted on having things my own way</td>
<td>T</td>
<td>F MC</td>
</tr>
<tr>
<td>45</td>
<td>I feel anxiety about something or someone almost all the time</td>
<td>T</td>
<td>F</td>
</tr>
<tr>
<td>46</td>
<td>I’m always willing to admit it when I make a mistake</td>
<td>T</td>
<td>F MC</td>
</tr>
<tr>
<td>47</td>
<td>There have been times when I felt like rebelling against people in authority even though I knew they were right</td>
<td>T</td>
<td>F MC</td>
</tr>
<tr>
<td>48</td>
<td>I frequently find myself worrying about something</td>
<td>T</td>
<td>F</td>
</tr>
<tr>
<td>49</td>
<td>I have almost never felt the urge to tell someone off</td>
<td>T</td>
<td>F MC</td>
</tr>
<tr>
<td>50</td>
<td>I shrink from facing a crisis or difficulty</td>
<td>T</td>
<td>F</td>
</tr>
<tr>
<td>51</td>
<td>I don’t find it particularly difficult to get along with loud-mouthed, obnoxious people</td>
<td>T</td>
<td>F MC</td>
</tr>
<tr>
<td>52</td>
<td>I am certainly lacking in self-confidence</td>
<td>T</td>
<td>F</td>
</tr>
<tr>
<td>53</td>
<td>I would never think of letting someone else be punished for my wrong-doings</td>
<td>T</td>
<td>F MC</td>
</tr>
</tbody>
</table>
Appendix A.2 Taylor Manifest Anxiety Scale
(Bendig's short form) (items marked TA)

Please read each statement and decide whether you feel IN GENERAL that it is mostly true of you, or mostly false. Please circle the appropriate letter (T-True, F-False) directly to the right of each statement. Answer 'True' to positively stated questions if they are true as often or more than stated. For example, answer 'True' to 'Occasionally, I play poker' if you play occasionally or more often.

1. I find it hard to keep my mind on a task or job  
   T  F  TA

2. I am sometimes irritated by people who ask favors of me  
   T  F

3. I am happy most of the time  
   T  F  TA

4. Before voting, I thoroughly investigate the qualifications of all the candidates  
   T  F

5. I believe I am no more nervous than most others  
   T  F  TA

6. I sometimes think when people have a misfortune they only got what they deserved  
   T  F

7. I am more sensitive than most other people  
   T  F  TA

8. I like to gossip at times  
   T  F

9. On occasion I have had doubts about my ability to succeed in life  
   T  F

10. There have been occasions when I took advantage of someone  
    T  F

11. I am a highly-strung person  
    T  F  TA

12. I have never intensely disliked anyone  
    T  F

13. I cannot keep my mind on one thing  
    T  F  TA

14. I never make a long trip without checking the safety of my car  
    T  F

15. I have periods of such great restlessness that I cannot sit long in a chair  
    T  F  TA

16. I am always courteous, even to people who are disagreeable  
    T  F

17. On a few occasions I have given up doing something because I thought too little of my ability  
    T  F
18 I am always careful about my manner of dress  T  F
19 At times I think I am no good at all  T  F  TA
20 I have never felt that I was punished without cause  T  F
21 When I don't know something, I don't at all mind admitting it  T  F
22 I am usually calm and not easily upset  T  F  TA
23 I never resent being asked to return a favor  T  F
24 I am not unusually self-conscious  T  F  TA
25 I sometimes try to get even, rather than forgive and forget  T  F
26 If I could get into a movie without paying and be sure I was not seen, I would probably do it  T  F
27 I work under a great deal of tension  T  F  TA
28 I have never deliberately said something that hurt someone's feelings  T  F
29 I can remember 'playing sick' to get out of something  T  F
30 I am inclined to take things hard  T  F  TA
31 I sometimes feel resentful when I don't get my way  T  F
32 Life is a strain for me much of the time  T  F  TA
33 No matter who I'm talking to, I'm always a good listener  T  F
34 I certainly feel useless at times  T  F  TA
35 I always try to practice what I preach  T  F
36 There have been times when I was quite jealous of the good fortunes of others  T  F
37 I sometimes feel that I am about to go to pieces  T  F  TA
38 I have never been irked when people expressed ideas very different from my own  T  F
39 My table manners at home are as good as when I eat in a restaurant  T  F
40. There have been occasions when I felt like smashing things
41. I have sometimes felt that difficulties were piling up so high that I could not overcome them
42. I never hesitate to go out of my way to help someone in trouble
43. It is sometimes hard for me to go on with my work if I am not encouraged
44. At times I have really insisted on having things my own way
45. I feel anxiety about something or someone almost all the time
46. I'm always willing to admit it when I make a mistake
47. There have been times when I felt like rebelling against people in authority even though I knew they were right
48. I frequently find myself worrying about something
49. I have almost never felt the urge to tell someone off
50. I shrink from facing a crisis or difficulty
51. I don't find it particularly difficult to get along with loud-mouthed, obnoxious people
52. I am certainly lacking in self-confidence
53. I would never think of letting someone else be punished for my wrong-doings
Appendix A.3  State Personality Inventory
State Anger Scale (items marked SA)

A number of statements that people use to describe themselves are given below. Read each statement and then mark the appropriate space to indicate HOW YOU FEEL RIGHT NOW using the following scale.

1  2  3  4
not at all  sometimes  moderately  very much
so  so

There are no right or wrong answers. Do not spend too much time on any one statement but give the answer which seems to describe your PRESENT FEELINGS best.

1  I feel calm  1  2  3  4
2  I feel like exploring my environment  1  2  3  4
3  I am furious  1  2  3  4 SA
4  I am tense  1  2  3  4
5  I feel curious  1  2  3  4
6  I feel like banging on the table  1  2  3  4 SA
7  I feel at ease  1  2  3  4
8  I feel interested  1  2  3  4
9  I feel angry  1  2  3  4 SA
10 I am presently worrying over possible misfortunes  1  2  3  4
11 I feel inquisitive  1  2  3  4
12 I feel like yelling at somebody  1  2  3  4 SA
13 I feel nervous  1  2  3  4
14 I am in a questioning mood  1  2  3  4
15 I feel like breaking things  1  2  3  4 SA
16 I am jittery  1  2  3  4
17 I feel stimulated  1  2  3  4
18 I am mad  1  2  3  4 SA
19 I am relaxed  
20 I feel mentally active  
21 I feel irritated  
22 I am worried  
23 I feel bored  
24 I feel like hitting someone  
25 I feel steady  
26 I feel eager  
27 I am burned up  
28 I feel frightened  
29 I feel disinterested  
30 I feel like swearing
Appendix A.4  Trait Personality Inventory  
Trait Anger Scale (items marked TA)

A number of statements that people have used to describe themselves are given below. Read each statement and then mark the appropriate answer to indicate how you GENERALLY feel, using the following scale.

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>almost never</td>
<td>sometimes</td>
<td>often</td>
<td>almost always</td>
</tr>
</tbody>
</table>

There are no right or wrong answers. Do not spend too much time on any one statement, but give the answer which seems to describe how you GENERALLY feel.

31 I am a steady person
32 I feel like exploring my environment
33 I am quick-tempered
34 I feel satisfied with myself
35 I feel curious
36 I have a fiery temper
37 I feel nervous and restless
38 I feel interested
39 I am a hotheaded person
40 I wish I could be as happy as others seem to be
41 I feel inquisitive
42 I get angry when I'm slowed down by others mistakes
43 I feel like a failure
44 I feel eager
45 I feel annoyed when I am not given recognition for doing good work
46 I get in a state of tension or turmoil as I think over my recent concerns and interests
47 I am in a questioning mood
48 I fly off the handle
49 I feel secure
50 I feel stimulated
51 When I get mad, I say nasty things
52 I lack self-confidence
53 I feel disinterested
54 It makes me furious when I am criticized in front of others
55 I feel inadequate
56 I feel mentally active
57 When I get frustrated, I feel like hitting someone
58 I worry too much over something that really does not matter
59 I feel bored
60 I feel infuriated when I do a good job and get a poor evaluation
### Appendix A.5  Anger Expression Scale

Everyone feels angry or furious from time to time, but people differ in the ways that they react when they are angry. A number of statements are listed below which people have used to describe their reactions when they feel angry or furious. Read each statement and then circle the number to the right of the statement that indicates how often you generally react or behave in the manner described. There are no right of wrong answers. Do not spend too much time on any one statement.

<table>
<thead>
<tr>
<th>WHEN ANGRY OR FURIOUS ....</th>
<th>Almost Never</th>
<th>Sometimes</th>
<th>Often</th>
<th>Almost Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 I control my temper</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>2 I express my anger</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>3 I keep things in</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>4 I am patient with others</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>5 I pout or sulk</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>6 I withdraw from people</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>7 I make sarcastic remarks to others</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>8 I keep my cool</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>9 I do things like slam doors</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>10 I boil inside, but I don't show it</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>11 I control my behaviour</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>12 I argue with others</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>13 I tend to harbor grudges that I do not tell anyone about</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>14 I strike out at whatever infuriates me</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>15 I can stop myself from losing my temper</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>16 I am secretly quite critical of others</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Statement</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>---</td>
<td>--------------------------------------------------------------------------</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>17</td>
<td>I am angrier than I am willing to admit</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>I calm down faster than most other people</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>I say nasty things</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>I try to be tolerant and understanding</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>I am irritated a great deal more than people are aware of</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>I lose my temper</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>23</td>
<td>If someone annoys me, I am apt to tell him or her how I feel</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>I control my angry feelings</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Appendix A.6  Public and Private Self-Consciousness Scale  
(Fenigstein, Scheier and Buss, 1975)

Please read the statements below and decide for each statement how characteristic or uncharacteristic it is of you. Indicate your answer by circling the appropriate number on the scale.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Extremely Uncharacteristic</th>
<th>Extremely Characteristic</th>
</tr>
</thead>
<tbody>
<tr>
<td>1  I’m always trying to figure myself out</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>2  I’m concerned about my style of doing things</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>3  Generally, I’m not very aware of myself</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>4  It takes me time to overcome my shyness in new situations</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>5  I reflect about myself a lot</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>6  I’m concerned about the way I present myself</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>7  I’m often the subject of my own fantasies</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>8  I have trouble working when someone is watching me</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>9  I never scrutinize myself</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>10 I get embarrassed easily</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>11 I’m self-conscious about the way I look</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>12 I don’t find it hard to talk to strangers</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>13 I’m generally attentive to my inner feelings</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>14 I usually worry about making a good impression</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>15 I’m constantly examining my motives</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>16</td>
<td>I feel anxious when I speak in front of a group</td>
<td>0</td>
</tr>
<tr>
<td>17</td>
<td>One of the last things I do before I leave my house is look in the mirror</td>
<td>0</td>
</tr>
<tr>
<td>18</td>
<td>I sometimes have the feeling that I'm off somewhere watching myself</td>
<td>0</td>
</tr>
<tr>
<td>19</td>
<td>I'm concerned about what other people think of me</td>
<td>0</td>
</tr>
<tr>
<td>20</td>
<td>I'm alert to changes in my mood</td>
<td>0</td>
</tr>
<tr>
<td>21</td>
<td>I'm usually aware of my appearance</td>
<td>0</td>
</tr>
<tr>
<td>22</td>
<td>I'm aware of the way my mind works when I work through a problem</td>
<td>0</td>
</tr>
<tr>
<td>23</td>
<td>Large groups make me nervous</td>
<td>0</td>
</tr>
</tbody>
</table>
APPENDIX B. PARTICIPATION REQUEST

Dear Student,

Thank you for completing my battery of questionnaires earlier this year. The Department has, as promised, given you one credit point for your time. I am really pleased to see that you indicated you were interested in taking part in the second phase of my research, the laboratory study of emotion and memory recall.

So that I can organize this next stage, may I have a telephone number so I can ring you to make arrangements. If you are not on the phone, please give a postal address where I can contact you. Space is provided for these details on the attached information sheet. As you know, we are using a coding system so that I personally do not know your names. Do you wish to remain anonymous throughout, or are you happy for me to use your name when I contact you? Even if I know your identity, total confidentiality is assured. If you do not want me to know who you are that is OK, but how shall I address you? Shall I just ring or write to 'The First Year Psychology student' or 'participant no ...'? Please indicate your wishes regarding anonymity on the attached form.

In my initial outline of the study I indicated that laboratory testing would take about an hour. Having run some preliminary trials, it is now clear that it will be closer to two hours, as preparation time is necessary to allow people to become familiar with the equipment before testing. Consequently, you will earn two credit points for involvement in this second part of my research.

Due to technical delays testing has not been able to commence until now, but at last we are ready to run. Physiological data will be collected from now until late October. We must both be able to rely on each other in organizing the lab study; you need to be sure of earning credit points, and I must know that I will definitely have the subjects I require. Therefore, if you are not prepared to participate, please let me know immediately so that I can try to replace you in the study.

As we must fit in with both your schedule and my lectures and clinical work, could you give me an approximate idea of your regular time commitments on the attached sheet. I will test during the evenings and at the weekends as well as during week-days, so it may suit you to come outside the normal work-week. I have attached a time-table so that you can note periods when you normally have two hours of free time. To indicate when you are usually free, BLOCK OUT THE TIMES WHEN YOU ARE DEFINITELY NOT AVAILABLE. A mutually suitable time will be negotiated between us by phone or letter.
Kindly return the information sheet to my pigeon-hole on the second floor of the Physics Building within the next few days, so that I can proceed with my research plans. Thank you very much for your cooperation and I do hope you will agree to be a subject!

Carol Hall
Code number in the experiment ........

May I use your name in our contacts? YES NO

Phone number ............

Address (if not on the phone) ...........................................

If you do not wish me to be aware of your name, who shall I ask for on the phone or in addressing my letter?

..........................................................

Please indicate times when you are usually free by BLOCKING OUT PERIODS WHEN YOU ARE DEFINITELY NOT AVAILABLE for testing.

<table>
<thead>
<tr>
<th>MON</th>
<th>TUES</th>
<th>WED</th>
<th>THURS</th>
<th>FRI</th>
<th>SAT</th>
<th>SUN</th>
</tr>
</thead>
<tbody>
<tr>
<td>9am</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10am</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11am</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12n</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1pm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2pm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3pm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4pm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5pm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6pm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7pm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8pm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9pm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

I DO/DO NOT smoke. If so, how many cigarettes daily?........
Dear Student,

Thank you for completing my questionnaires. The Department has now awarded you one credit point for your time. I am really pleased that you volunteered for the laboratory phase of my research. I have received positive responses from virtually all First Year students.

In my research, I am interested in testing particular groups of people who showed specific emotional response patterns on the questionnaires. Unfortunately, your reply indicated that you do not fall into any of the groups I have to test in the laboratory. There is still quite a good chance that some people who I ask to come in for testing, will change their minds at the last minute. If this occurs I will contact the next person on the list based on the particular response characteristics I am evaluating. Therefore, if some people withdraw from the study, I may contact you asking if you are still interested. Naturally, I will understand if you have already obtained the necessary credit points and thus not be available to participate.

In respect to finding another opportunity to earn your credit points, I know that there are a number of other researchers who will be needing volunteers during the next few months. I am sure that you will not have difficulty in finding a way of earning the points you need for the year.

Once again, thank you for your assistance with my research. It is really great to know that we have such an enthusiastic First Year group in 1986.

Thank you for your assistance.

Carol Hall
I am investigating how readily people recall personal experiences from their childhood, and looking at the different types of experiences people remember before about 14 years of age. During this session, you will be asked to recall childhood memories which are associated with three particular types of emotion (I will tell you what sort of emotion to recall as we go through the procedure). We are also interested in recording physiological responses that accompany the recall of childhood memories, so we are monitoring several sorts of arousal through electrodes which will pick up how your body is responding to the recall tasks. There is nothing to be concerned about - I will show you the equipment now.

At the beginning of each of the three recall periods I will tell you what type of memory to recall. Then just let your mind wander back and when an appropriate memory comes to mind, just say a couple of key words that characterize that particular experience, situation or event. (I'll be noting down these key words so that I can get you to do some ratings after the session) Then let that thought go and let your mind wander back again until another memory comes to mind and give me a couple of key words about that experience, and so on. Keep doing this until I tell you that specific recall session is over. I will tell you when to start recalling particular types of memories and when to stop.

Keep your comments about each memory to a couple of key words - for example, if you remember that your cat was run over, then just say 'cat dead' etc. We want you to keep your comments brief for several reasons. Firstly, I don't want you to spend too much time on any one incident. Secondly, you might remember a really personal or embarrassing experience, so you don't have to reveal any specific details if you keep the comment brief and general. Thirdly, the physiological equipment will pick up the slight movements that occur when you speak and we don't want that to occur for very long.

After a settling in period of around 10 minutes we will start the experiment. After each of the three conditions, I will come into the room and get you to do a couple of ratings for each memory. So make sure that the couple of words you use to describe each incident will remind you of what you were recalling from childhood. I'll also get you to do a mood rating scale like this. Can you do this one for me now? Before we start, could you also sign this 'informed consent' letter, which is simply a formality which the University requires for laboratory experiments.
I will be next-door during the majority of the procedure and will communicate with you by intercom. This is because I have to constantly monitor the physiological recording equipment. This microphone here comes through to me next-door, so when you want to speak to me, I will hear you. I'll use the mike to let you know when each recall period begins and ends and when I'm coming in to talk to you for a few minutes.

Movements, even relatively small ones, will be detected by the equipment so try to remain as still as possible during the recording periods. I will tell you when we are not monitoring, so that you can wriggle and scratch during those times if you need to.

I can't tell you anything more about the experiment yet as that could influence how you react. After we are finished I can tell you a bit about what we are doing, but I will explain it fully in a letter which I will send all subjects after everyone has been tested.

Do you have any questions? OK. Let's start.

Baseline: 'Now just sit there and relax for four minutes'.

Recall:

For the next four minutes I would like you to let your mind wander back to the experiences you had up to around 14 years of age. I want you to focus on experiences which, at that time, made you ANGRY/ANXIOUS/HAPPY. That is experiences, events or situations during which you felt angry/anxious (nervous or worried)/happy, at the time the event took place.'
RESEARCH CONSENT FORM

The nature of this study has been fully explained to me. I am aware it involves the recall of personal memories from childhood which are associated with different types of emotion, and the concurrent monitoring of physiological changes in bodily state. I declare that I have freely chosen to participate in this study and that I know I may terminate my involvement at any time during the procedure.

I understand that the experimenter has made every effort to guard against any ill effects to participants, and that such occurrences are highly unlikely. I will not hold the experimenter, the Australian National University or any of its staff responsible for any consequences which might arise from my taking part in this research.

Signed:

Date:

Witness:

Date:
APPENDIX F  MOOD RATING SCALE

Please indicate how you are feeling right now, at this moment, by circling the appropriate number on these scales.

<table>
<thead>
<tr>
<th></th>
<th>Not at All</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>Extremely</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relaxed</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anxious</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sad</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Happy</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fearful/Scared</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Angry</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
APPENDIX G  DATA SHEET FOR RECORDING RECALL DATA

<table>
<thead>
<tr>
<th>Key Words</th>
<th>Intensity</th>
<th>Age</th>
<th>Original</th>
<th>Current</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
I would like you to complete the following rating about the extent to which you felt emotionally involved while you recalled those events.

Please rate the INTENSITY OF YOUR EMOTIONAL INVOLVEMENT over the past few minutes as you recalled these memories. Use this visual analogue scale to rate the INTENSITY of EMOTIONAL INVOLVEMENT during this recall period.

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>NOT AT ALL INVOLVED EMOTIONALLY</td>
<td>EXTREMELY INVOLVED EMOTIONALLY</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
APPENDIX I POST RECALL INTERVIEW

1. Please estimate, as closely as you can, how old were you when each incident occurred?

2. Please rate the intensity of emotion you felt AT THE TIME each experience occurred. That is, how ... were you at the time that experience took place?

   
   1 2 3 4 5 6 7
   MILDLY EXTREMELY

3. How intense is that original emotion when you think about the experience right now, at the present time?

   
   0 1 2 3 4 5 6 7
   NOT AT ALL EXTREMELY