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## Testing the Matching Hypothesis : Implementing a Minimal Stress Intervention by Matching Writing Task to Emotional Coping Style

Pamela D. McNeill  
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**Testing the Matching Hypothesis:  
Implementing a Minimal Stress Intervention  
by Matching Writing Task to Emotional Coping Style**

by

Pamela D. McNeill

Supervisor: Dr. Susan Gee

A thesis submitted as partial fulfilment for the degree of Bachelor of Arts

(Psychology) Honours at Edith Cowan University

Faculty of Community Services, Education and Social Sciences

30<sup>th</sup> October 1998

### **Abstract**

The theory of inhibition and psychosomatic disease supports the concept that failure to express emotion is psychologically and physically stressful, and associated with long-term health problems. One aspect of this study was to investigate the discrepancy hypothesis proposing that specific emotional coping styles elicit patterns of discrepant self-report and physiological responses. The major focus of the study tested whether matching therapeutic writing tasks to specific emotional coping styles would significantly decrease stress and somatic symptoms, and whether mismatching such writing tasks to emotional coping styles would not decrease stress and somatic symptoms. Undergraduate students were identified as having an emotional coping style of either expression or repression. Within each expressor and repressor group, participants were randomly assigned to 'profound' or 'distractor' writing tasks. This served to both match and mismatch writing tasks to emotional coping styles. Pre-test and post-test measures of stress and somatic symptoms determined the effects of a two week writing intervention period. Data was analysed through a series of 2 x 2 x 2 (Time x Emotion Group x Intervention) split plot analysis of variance (SPANOVA) tests. The pattern of results did not support the discrepancy hypothesis, as repressors were slightly higher on all measures than expressors. Results of the matching hypothesis revealed reductions in stress over time that were not related to the writing tasks. Findings suggested influences of the Hawthorne effect and a placebo effect, whereby empathic acknowledgement and self-disclosure of a senior peer may have led to cognitive and emotional reappraisal, thereby leading to changes in stress related behaviour. Possible avenues for future research and cost effective interventions for universities are discussed.

Author : Pamela D. McNeill

Supervisor : Dr. Susan Gee

Submitted : October, 1998

### **Declaration**

I certify that this thesis does not, to the best of my knowledge and belief:

- (i) incorporate without acknowledgement any material previously submitted for a degree or diploma in any institution of higher education;
- (ii) contain any material previously published or written by another person except where due reference is made in the text; or
- (iii) contain any defamatory material.

Signature ..



Date

30<sup>th</sup> October, 1998

## Acknowledgments

This Thesis is Dedicated to

Mr. Karl Sturtridge and Dr. Susan Gee

A project such as this does not come to fruition because of the efforts of one person. It is a reflection of the direct and indirect efforts of many people. As an ‘expressor’, I acknowledge such efforts.

I dedicate this thesis to Karl, with my deepest love and thanks for his unconditional belief in me, encouragement, support, and unwavering demonstrations of pure love (the cooking was great too!).

I also dedicate this thesis to my supervisor, Dr. Susan Gee. This is with my heartfelt thanks for her generosity of spirit, enduring support, encouragement, patience, time, and efforts that were well above and beyond the call of duty. Her belief that I was capable of conducting this research created a learning experience that was challenging and characterised by exemplary supervision, commitment, much laughter, and friendship.

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**Testing the Matching Hypothesis:  
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by Matching Writing Task to Emotional Coping Style**

**Introduction**

The concept that personality factors play a mediating role between everyday stress and its influence on psychological and physical health has gained strong empirical support over time (Grossarth-Maticek & Eysenck, 1990; Jemmott & Locke, 1984; Pennebaker & Beall, 1986; Selye, 1976; Smyth, 1998). Evidence has suggested that when individuals experience stressful or distressing situations, there is a basic tendency to cope with the related emotions by either expressing or repressing them (Pennebaker, 1993b). The tendency to express or repress emotions can be viewed as an individual's emotional coping style, and as a mediating factor between stress and the enhancement or reduction of psychological and physical health (Pennebaker, Hughes, & O'Heeron, 1987).

In order to examine the relationship between stress, emotional coping styles, and health, there is a need to explore the fundamental parameters that surround the different elements involved. Examination of the parameters will establish a sound basis for discussion of the research and experimental findings directly pertaining to the area of interest. The culmination of such findings will provide the foundation for discussion of the present study.

Over the past two decades, an expanding body of medical and psychological research has discovered relationships between elements concerning stress, emotional coping styles of expression or repression, and mental and physical health (Lazarus, 1993; Pennebaker & Beall, 1986; Traue & Pennebaker, 1993b). Relationships such as these have been viewed as important due to theoretical and practical implications for the areas of personal relationships, personality, psychotherapy (Dindia & Allen, 1992), psychological well-being, and physical health (Greenberg & Stone, 1992; Kaiser, Hinton, Krohn, Stewart, & Burton, 1995; Pennebaker & Beall, 1986; Pennebaker, et al., 1990).

Although research pertaining to these relationships has been prolific (Traue & Pennebaker, 1993b), it has been somewhat hindered by the lack of a universally accepted definition of stress (Baum, 1990; Lazarus, 1993). The lack of an accepted stress construct has resulted in stimulus, response, or relational definitions being utilised in research (Lazarus & Folkman, 1984). This has led to problems with measurement (Selye, 1976), conflicting findings, and tenuous outcome projections (Baum, 1990; Lazarus, 1993).

### ***Definitions of Stress - Stimulus, Response or Relational?***

Perceptions and usage of the term 'stress' have undergone changes over time (Selye, 1976). In the 14<sup>th</sup> century, stress was perceived as hardship or adversity, and in the 17<sup>th</sup> and early 19<sup>th</sup> centuries, the term was used in a physical science context (Lazarus & Folkman, 1984). From a physical science perspective, stress referred to the relationship between an external and internal force and the area over which the force acted upon (Lazarus & Folkman, 1984). Psychological and medical perceptions of stress as a basic element to mental and physical ill health arose in the 19<sup>th</sup> century, however the terminology remained chaotic (Lazarus & Folkman, 1984).

From a psychological stance, “stress was, for a long time, implicit as an organizing framework for thinking about psychopathology” (Lazarus & Folkman, 1984, p. 4). Breuer and Freud (1895/1974) believed that the psychopathology of hysteria could be traced to repressed memories of significant experiences. They proposed that when an experience provoking a strong emotional reaction was coupled with an inability to express such emotion, the symptoms of hysteria were formed. Further, whilst the memory of the experience may remain repressed, the emotion or affect related to the memory experience existed in the consciousness as anxiety. The concept of catharsis, or talking cure, developed by Breuer (Breuer & Freud, 1895/1974) was viewed as bringing the repressed memories into consciousness and linking them to the anxiety, thus releasing the associated emotions and resolving the anxiety.

However, Freud used the term anxiety rather than stress (Lazarus & Folkman, 1984), and related anxiety to the repression of unacceptable thoughts, impulses, memories, and emotions (Morea, 1990). The influence of Freud, and his placement of anxiety as central to psychopathology, led to an overlap between anxiety and stress concepts (Lazarus & Folkman, 1984). The overlap of anxiety and stress had considerable impact on future empirical research because the development and publication of various anxiety scales has led to both concepts being measured based on the anxiety construct (Lazarus & Folkman, 1984).

Traditional behaviorist psychology viewed stress as a stimulus, and definitions included environmental events that acted upon the individual and drives such as hunger or sex that arose within the individual (Lazarus & Folkman, 1984). Although such stimuli were presumed to be normatively stressful, the definition did not

account for individual differences in how stimuli were experienced, evaluated, or coped with (Lazarus, 1993).

Defining stress as an individual response arose from biological and medical bases whereby stress was viewed as a psychological and/or physiological state as a reaction to noxious agents (Lazarus, 1993). The concept of stress as a psychophysiological response can be formally traced to a theory by Hippocrates, whereby disease was viewed as involving the two vital elements of suffering (pathos), and the toil or fight the body undergoes to restore itself to normal (ponos) (Selye, 1976).

Although there was an early notion within the medical domain that stress related only to nervous mental strain (Selye, 1976), this changed from the late 1920s. Around this time, arguments included that external stress could effect emotion and impact on the body by creating a homeostatic disturbance (Bloom, 1992; Lazarus & Folkman, 1984), that protective reactions to external stress had physiological and psychological elements, and that stressful life events could play a role in the aetiology of disease (Bloom, 1992).

As a way of explaining disease processes relating to stress responses, Hans Selye developed an important theory of stress in the late 1920's. Selye (1976) viewed stress as a 'single stereotyped response to damage' within the body (p. 35). Selye coined the term 'stressors', and discovered that causative agents such as heat, cold, toxins, viruses, pain, and so on prompted the body to mobilise its resources. The resource mobilisation was viewed as resulting in biological stress that was observable as changes in physical and chemical composition and structure. Selye viewed the physical, chemical, and structural changes in two ways; as a sign of organ damage, and / or as adaptive reactions arising from the body's defence against stress.

Selye (1976) broadened the theoretical scope to propose that the basis of stress could be conceptualised as a physiological response or adaptation to any circumstance, activity, or emotion experienced. Selye suggested that although stress may be viewed as a negative state, some stress, which he named *eustress*, is positive and feels good. Activities equating to *eustress* may include competing in a favourite sport, working hard on an enjoyable project, or perhaps engaging in a passionate interlude. Although *eustress* was viewed as causing less damage than *distress*, Selye proposed that the way individuals subjectively experienced their stress determined how successful adaptation to change would be.

Arising from the research and objective measurable indices developed by Selye (1976), an operational definition of stress was formed. Selye defined stress as “the nonspecific response of the body to any demand” (p. 1) and “the state manifested by a specific syndrome which consists of all the nonspecifically-induced changes within a biologic system” (p. 64). Selye’s definitions reflected the view of a general stress reaction involving every organ and chemical constituent in the body. To account for the nonspecific changes that occurred with continued exposure to a stressor, Selye developed the theory of a general adaptation syndrome (G.A.S.).

Selye (1976, p. 56) hypothesised the stress process as involving three stages

- (1) the alarm stage where acute manifestation of stress takes place and the organism biologically mobilises its resources for ‘fight or flight’;
- (2) the resistance stage where the nervous system and endocrine or hormonal system attempt to cope with the stress and show elevated physiological responses;
- (3) the exhaustion stage where the body’s resources may be overwhelmed



by persistent stress and become depleted of energy, resulting in complete loss of resistance or organism breakdown.

In addition, where tissues are directly affected by stress, a local adaptation syndrome (L.A.S.) can develop. L.A.S. results in chemical 'alarm signals' being sent by the stressed tissues to the coordination centres in the nervous system and then to the endocrine system. Adaptive hormones are then produced to combat wear and tear on the body (Selye, 1976).

The relationship between G.A.S. and L.A.S. was highlighted by the concept of adaptation energy or "that which is consumed during continued adaptive work" (Selye, 1976, p. 82). Adaptation energy was viewed as representing the internal resources available from which individuals could draw to adapt to the stressors of life. Importantly, adaptation energy was deemed finite and determined by factors such as genetics, previously conditioned responses, and past experiences.

Research by Selye (1976) found that repeated exposure to stressors led to changes in endocrine reactions. During the initial alarm phase, the adrenals and other endocrine glands secreted large amounts of hormones. If exposure to the stressor continued for a prolonged time or was repeatedly presented, the resistance phase was entered, evidenced by escalating hormone secretion. Selye suggested that during the alarm and resistance phases, high levels of adrenocorticotrophic hormone (ACTH), which stimulates the adrenal glands to release hormones necessary for saline and fluid balance, were released to maintain optimal blood glucose levels necessary for energy and tissue repair. However, high ACTH levels suppressed immune system functioning which resulted in higher vulnerability to infection. If the stressor was intense and prolonged, the exhaustion phase was entered. Selye also

observed that exposure to stress weakened resistance to later stressors and decreased tolerance for new stressors.

Selye (1976) recognised that the very nature of life implies unavoidable stressors and stress, and suggested that the goal was to moderate the wear and tear from stress, not to eliminate it. Selye also recognised that psychological stressors such as emotional conflicts, grief, or tragedy could be as important, if not more important than physical stressors such as heat, toxins, or viruses. The relationship between mind, emotion, and disease was attributed to “our defective bodily or mental reactions to the stressors encountered in daily life” (Selye, 1976, p. 84). In order to moderate such reactions, Selye viewed the individual’s responses to stress as vitally important. He asserted that the way one experiences and responds to stress, and the voluntary choice of behaviour applied were key factors to healthy moderation and adaptation to the stress of life.

In essence, according to Selye (1976), stress is a response or state of being that can manifest by measurable changes in the chemicals and organs of the body. The process involves the direct effect of the stressor upon the body, internal responses which stimulate tissue defense or help to destroy damaging substances, and internal responses which cause tissue surrender by inhibiting unnecessary or excessive defense. Selye indicated that resistance and adaptation depend on a proper balance of all three processes. Selye believed there was no single cause of disease, however he distinguished between direct pathogens (agents themselves that cause damage) and indirect pathogens (agents that are not damaging in themselves but through the defence responses they elicit). The influence of indirect pathogens causing an excessive adaptive response was viewed as leading to stress related diseases such as

high blood pressure, heart disease, gastrointestinal disorders, headaches, and cancer (Selye, 1976).

The emphasis that Selye (1976) placed on external and internal stressors, subjective experiences of stress, and voluntary choice of behaviour, suggested consideration of individual differences in antecedent events, responses, and coping styles. Although Lazarus (1993) argued that Selye viewed stress only as a response, the theory and writings of Selye appear to reveal a much broader view and an early awareness of a person-environment interaction relating to disease processes.

The emphasis on stress theory and research shifted with the advent of World War 11 and the Korean War due to concerns about the effects of stress on soldiers during combat (Lazarus & Folkman, 1984). The concerns centred on whether stress increased vulnerability to injury, death, or ineffective performance. Research was then directed toward psychological as well as physiological effects of continual exposure to stressful situations (Lazarus & Folkman, 1984).

Following the interest in war related stress effects, an emphasis began to emerge pertaining to how individuals coped with the stress of everyday environments (Lazarus & Folkman, 1984). A focus toward stress related person-environment interactions from a psychological perspective gained prevalence due to the cognitive mediational work of Lazarus and Folkman (1984) and Lazarus (1993).

According to Lazarus's (1993) cognitive mediational framework, individuals undergo a continuous process of appraisal or evaluation of the significance of events/stressors and of the implications to their personal well-being. Appraisal prompts emotion which results from the perceived personal significance of the event (Lazarus, 1993). Psychological stress was viewed as an individual's reaction to personal harms, threats, challenges, and benefits that arose from the person-

environment relationship. Continual appraisal was viewed as mediating between environmental stressors, emotion, and coping mechanisms that may be employed (Lazarus & Folkman, 1984).

In essence, if environmental stressors resulted in appraisals that the event exceeded the individual's resources, then emotional reactivity would occur. If inadequate coping mechanisms were employed to deal with the emotion, then the potential for stress related illness was increased (Lazarus, 1993). In view of individual differences that could occur at each step, there would appear to be great scope for variability within the interactions between the stressor stimulus, the response, and the coping processes used to meet the environmental demands.

As a consequence of individual differences and the scope for such variability, the question of whether stress is either a stimulus or a response becomes circular in nature. It would seem that stress is a stimulus and a response, and it is relational. Therefore, from a person-environment interaction perspective, the preferred operational definition of stress is that "psychological stress is a particular relationship between the person and the environment that is appraised by the person as taxing or exceeding his or her resources and endangering his or her well-being" (Lazarus & Folkman, 1984, p. 19).

Given the stress definition by Lazarus and Folkman (1984), and the view that stress related illness may result from emotion arising from appraisal and the use of inadequate emotional coping mechanisms (Lazarus & Folkman, 1984), it would seem prudent to explore the role emotions have, to examine emotional coping styles, how such coping styles may be formed, and research into the specific ways they can influence the relationship between stress and health.

### ***The Role of Emotions***

Emotions can provide quality, intensity and meaning to life (Jourard, 1974). Emotions *per se* are not concrete entities, and can be viewed as abstract labels attached to the process of experiencing or remembering an event that stimulates feeling, and an expressive action (Pierce, Nichols, & DuBrin, 1983). Emotion and cognition are viewed as having a bidirectional relationship because cognitive appraisals of the meaning of events may lead to emotion, which can then interfere with subsequent thought (Lazarus, 1991).

The view of a bidirectional relationship between emotion and cognition (Lazarus, 1991) lends support for the idea that emotions are experienced by most people as a psychological state, however, they are also accompanied by a physical state (Thompson, 1988). For example, a stimulus appraised as a threat may lead to fear, which is experienced as a unique emotional feeling and accompanied by a pounding heart. The way individuals then deal with the emotions is in part reflected by their predominant emotional coping style.

### ***Emotional Coping Styles***

The concept of coping with stress related emotion can be defined as constantly changing cognitions and behaviours in an effort to successfully manage demands that are appraised as exceeding one's resources (Lazarus & Folkman, 1984). Two primary coping strategies proposed by Lazarus and Folkman (1984) are problem-focused coping, whereby active problem-solving strategies are employed to change the source of stress; and emotion-focused coping, which involves managing or decreasing the emotional distress associated with the situation. Although there are many variations on problem-focused and emotion-focused coping, two variations of

interest are behavioral/mental disengagement, and focusing on and venting of emotions (Carver, Sheier, & Weintraub, 1989).

Behavioral/mental disengagement involves engaging in alternative activities as a way of distraction from the source of the stress. This strategy can be highly adaptive, however it has also been viewed as having the potential to hinder more adaptive coping. Focusing on and venting of emotions involves actively focusing on the stress and expressing the associated feelings in some way. This coping style has been viewed as both a functional response to distress if it aids moving forward, and a dysfunctional strategy because extended use and the resultant salience of the distress may increase the emotion, thus hindering employment of active coping strategies (Carver, et al., 1989).

Given that repressors have been viewed as actively attempting to avoid experiencing, thinking about, and feeling emotions related to distressing situations, and expressors have been viewed as tending to engage in active release of emotions (Jourard, 1974), there would seem to be close associations between the coping style of behavioral/mental disengagement and repressors, and the coping style of focusing on and venting of emotion and expressors. Therefore, the emotional coping styles of expression and repression may be examined with these parameters forming the basis of their defining features.

### ***Expression and Repression as Emotional Coping Styles***

According to Jourard (1974), when an individual is initially provoked to emotional arousal, there may be three alternative responses: immediate uncontrolled emotional expression and release, suppression of emotional behaviour, or repression of emotions.

Emotional expression is an aspect of communication (Jourard, 1974) and forms a complex link between personal dispositions, cultural norms and situational factors (Thompson, 1988). Immediate uncontrolled emotional expression may provide an immediate release of tension, however, it may also be viewed as an immature response, morally and normatively inappropriate, or as an indication that the person is out of touch with reality (Jourard, 1974). Indications of a healthy personality include the capacity to experience a broad emotional range and the ability to choose appropriate expression or control of such emotion (Jourard, 1974).

From another viewpoint, a healthy personality includes the capacity to fully engage in and complete the appropriate action sequence related to the emotion in question (Pierce, et al., 1983). For instance, if a loved one dies suddenly and a full process of appropriate grieving is experienced to the point where acceptance and re-engagement in life takes place, the action sequence could be said to have been completed. This is deemed to provide maintenance of optimal psychological and physiological balance, together with satisfaction of basic needs (Jourard, 1974).

In support of the benefits of expression as an emotional coping style, an expanding body of evidence has suggested that expression of distressing emotions is a significant contributing factor to improved psychological well-being and physical health (Grossarth-Maticek & Eysenck, 1990; Jemmott & Locke, 1984; Kaiser, et al., 1995; Pennebaker & Beall, 1986; Pennebaker, et al., 1990).

Suppression of emotional behaviour can reflect a mature ability to tolerate tension and to postpone immediate responses in order to think, reason, and plan. If balanced with appropriate expression of emotion, suppression can be a valuable element to coping. However, continual or prolonged emotional suppression may lead to heightened autonomic activity and an interference with rational activity, reasoning,

perception, and skill efficiency (Jourard, 1974). If suppression becomes an habitual method of coping with emotion, the tendency toward repression may result.

Repression of emotion denotes avoidance of experiencing certain emotions or denying the existence of the emotional experience (Jourard, 1974). As a psychoanalytic concept, repression is a defense mechanism whereby unacceptable thoughts, impulses, memories, and emotions are repressed as a way of avoiding internal psychic conflicts (Morea, 1990). As a way of avoiding the pain of feeling the emotion, repression may also represent a blocked action sequence (Pierce, et al., 1983). Although defenses may be perceived as negative coping strategies, they are adaptive and protective mechanisms that individuals adopt as part of their conceptual system about the self and others (Harrison, 1970).

With repression, the psychological and physical experiences of emotion may be disconnected whereby there is no subjective feeling of emotion but there is a physiological response to the stimuli (Mahl, 1971). As Breuer and Freud (1895/1974) indicated, although memories of the emotion may be repressed, they do not disappear. They may be replaced with a process of active immobility (Mahl, 1971), a tendency to display extremely defensive reactions, and reports of low distress coupled with high physiological responses to stressors (Thompson, 1988).

The use of repression as an emotional coping style may appear defensive, however, an alternative explanation has been that repression is actually impression management by distress-prone individuals who seek to provide socially desirable self-reports (Kohlmann, 1993; Weinberger & Davidson, 1994).

Weinberger and Davidson (1994) investigated the concept of repression as impression management using variables of emotional expression and restraint with 30 repressors and 30 self-identified impression managers. Males and females were



included in the study, which found that repressors inhibited their emotions in a significantly different manner from those who monitored and managed their self-presentations. Individuals who were identified as impression managers appeared to do so to avoid disapproval from others. Repressors were viewed as having difficulty with self-disclosure, stemming from defenses against awareness of emotions that were not compatible with their self-concepts, and deficits in their capacity for self-disclosure. These findings supported the idea that those who repress emotional expression are a discrete group and not simply well-adjusted individuals who seek to maintain an impression of experiencing little distress.

Another condition that is related to repression but somewhat different is that of alexithymia (Myers, 1995; Nemiah, 1996). Alexithymia is defined as difficulty in verbally expressing one's emotions (Buck, 1993) and in experiencing, describing, recognising, or differentiating feelings (Myers, 1995; Nemiah, 1996). Alexithymia and repression are viewed as related constructs in that both involve an underlying lack of emotional expression, and both have been associated with psychosomatic illnesses (Buck, 1993). However, they are also viewed as different constructs because alexithymia is deemed to reflect an inability to express feelings whereas repression may reflect an unwillingness to communicate feelings (Myers, 1995).

In view of the different aspects involved in utilising expression and repression as coping styles, the question is raised as to how individuals arrive at adopting these styles as predominant ways of dealing with their emotions. An attempt to answer the question requires examination of how expression and repression may be formed.

### ***The Formation of Expression and Repression as Coping Styles***

Attempts to discover the underlying aetiology of individual differences in emotional coping styles led to evidence reported by Traue and Pennebaker (1993a).

Evidence indicated that newborns who were more expressive may have an innate resistance to stress. Such newborns were found to be less irritable, had weaker physiological responses to aversive stressors, lower average heart rate values, faster emotional reaction to poking, higher scanning frequency, spent longer focusing on the face of the experimenter, had more specific imitation of expressive behaviour, and had facial expressions that could be more easily identified than less expressive infants (Traue & Pennebaker, 1993a). The more expressive infants also tended to have more interactive parental and socialisation experiences, were more popular at pre-school age, and had an ability to defend themselves without reverting to overtly aggressive acts (Traue & Pennebaker, 1993a).

In contrast, infants who were more inhibited or emotionally repressed were found to be hypersensitive to pain and novel stimuli, and it was suggested that this may lead to generally higher autonomic and central nervous system arousal (Pennebaker, 1993a). Children identified as inhibited have shown physiological signs of higher resting heart rates, and higher cortisol and urinary norepinephrine levels. These children also exhibited timid and quiet behaviour plus a tendency not to initiate interactions with others (Traue & Pennebaker, 1993a).

Given the more interactive parental and social experiences of innately more expressive infants, it makes intuitive sense to propose that innately more emotionally repressed infants would be exposed to different parental behaviour and social experiences. Pierce, et al. (1983) viewed parental and social influences as a key factor in repression of emotion. They posited that early infant behaviour could arouse emotions in parents that led to either nurturant or punitive actions. The infant quickly learns which kinds of emotional expression will lead to satisfaction of needs and which will not. If an infant who has an innate tendency toward less emotional

expression has a primary caregiver who is uncomfortable with and estranged from his or her own emotions, it is possible that unconscious conditioning could occur through punishment of infant expression and rewarding of less expressive infant behaviour (Pierce, et al., 1983). Therefore, in considering the reasoning of Traue and Pennebaker (1993a), Pennebaker (1993a), and Pierce, et al. (1983), it may be that an early innate tendency toward expression or repression of emotion could be parentally and socially reinforced to become an established style of interacting with others and coping with the later stress of life.

However, Traue and Pennebaker (1993a), Pennebaker (1993a), and Pierce, et al. (1983) did not account for the impact that different combinations of expression and repression styles between parents and infants may have, or the influence of expression styles of other social contacts. In addition, no consideration was given to gender differences and socialisation processes. As Malatesta and Culver (1993) suggested, although gender differences in infant expressivity are few, the facial structure of a lower brow line in male infants may make them appear less social or more guarded than female infants. Given culturally determined gender appropriate 'display rules', it is feasible that gender could thus influence socialisation processes.

The issue of associating gender differences in expression with older individuals prompted a meta-analysis of 205 studies involving 23,702 participants to assess whether there were sex differences in self-disclosure (Dindia & Allen, 1992). The studies encompassed publications between 1958 and 1989, and findings were that women disclosed marginally more than men, however several moderating variables existed (Dindia & Allen, 1992).

Moderating variables were that women disclosed more than men when the target was a woman, a stranger, a same sex partner, a man, and those with whom there was

an ongoing relationship such as friends, parents and spouses. Although significant, the sex differences were small, with a 10 percent increase in self-disclosure by females in comparison to males (Dindia & Allen, 1992).

Gender differences pertaining to coping strategies employed during stress were found by Ptacek, Smith, and Zanas (1992). Evidence suggested that during times of stress, females tended to use more emotion-focused coping and seeking of support whereas males tended to use more problem-focused coping aimed at actively solving the problem (Lazarus & Folkman, 1984).

Gender differences notwithstanding, the findings of differences in infant expressiveness and physiological responses, as well as subsequent parental and socialisation experiences of pre-school age children (Traue & Pennebaker, 1993a), support a notion of innate, cultural and social influences occurring in the formation of emotional coping styles (Pierce, et al., 1983). This notion was formalised by Buck (1993) in his proposal of a developmental-interactionist theory that was deemed to account for the relationship between emotional communication and physical illness.

### ***Developmental-Interactionist Theory***

Broadly described, the developmental-interactionist theory defines cognition as knowledge, and emotion as a readout of motivational systems (Buck, 1993).

Although viewed as two separate entities, “emotion is seen to be a kind of cognition, involving particular sources of knowledge” (Buck, 1993, p. 33). Three distinct kinds of emotion were proposed by Buck (1993). Emotion I was described as “the fight or flight response – involving the autonomic, endocrine, and immune systems” (p. 49); Emotion II encompasses “the displays and expressive behaviors of others” (p. 33); and Emotion III involves “the subjective experience of feelings and desires” (p. 35).

Buck (1993) also proposed that the developmental-interactionist theory involves individual bioregulation (biological regulation) through emotional education, which involves the developmental process of learning about one's own and others emotions and desires. Emotional education depends on spontaneous emotional communication. Emotional communication occurs in a social context, may develop through "social biofeedback or via imitation and modeling" (p. 36), and by necessity involves a certain degree of emotional expressiveness. It is through emotional education and communication that emotional competence is developed. Emotional competence is defined as the ability to cope with one's emotions and desires in a way that is both appropriate and satisfactory, and was hypothesised by Buck as the interaction between Emotions I, II and III. Buck viewed successful bioregulation as occurring through an optimal degree of emotional expression resulting from an appropriate and satisfying interaction of emotional education, communication, and competence. As Buck stated "it is possible that much of the stress and increased susceptibility to physical illness associated with a lack of expression is due to the consequent lack of authentic spontaneous emotional communication with others and the bioregulation that such communication engenders" (p. 49).

To summarise the process, emotional education and communication are necessary for emotional competence, which is viewed as an interaction between Emotions I, II and III. As a result of such development and interaction, plus an optimal degree of emotional expression, successful bioregulation is attained. Successful bioregulation leads to maintenance of psychological and physical health and well-being (Buck, 1993). Given that emotional coping styles have been viewed as stable across time (Dindia & Allen, 1992; Myers, 1995), and evidence of coping styles having innate

(Traue & Pennebaker, 1993a), cultural and social influences (Pierce, et al., 1983), the developmental-interactionist theory by Buck (1993) would appear to provide a way of viewing the emotional coping style-stress-health relationship systematically.

A systematic relationship may be that if there is an innate tendency to repress emotion, and spontaneous emotional communication within a social context is lacking, then the resultant inadequate emotional competence may lead to ineffective or destructive ways of coping with everyday stress. Also, the inability to openly express emotion may lead to physiological responses such as Emotion 1 activation. If repression of emotion is a predominantly used emotional coping style, and such styles are stable across time, then continual activation of autonomic, endocrine and immune systems may lead to stress-related illness.

The theory proposed by Buck (1993) supported a widely held belief that repression of emotion plays a major role in numerous stress related psychosomatic disorders, and that the combination of chronic emotional inhibition and stressful life circumstances is a potentially toxic partnership (Pierce, et al., 1983; Pennebaker, 1993a). Interest in the emotional coping styles of expression and repression, and stress related psychosomatic disorders has been steadily increasing over time (Greenberg & Stone, 1992; Pennebaker, 1993a, 1993b; Pennebaker & Beall, 1986; Pennebaker, et al., 1987). The advent of findings of differences between emotional and physiological responses to stress led to the formulation by Lazarus (cited in Kohlmann, 1993) of the Discrepancy Hypothesis.

The discrepancy hypothesis provided an important early link between differences in coping styles and emotion. It formed the basis from which future researchers could progress in strengthening the concept of interactive processes occurring

between emotional, psychological, and physiological dimensions to stress-related psychosomatic disorders.

### ***The Discrepancy Hypothesis***

Although Lazarus (1993) proposed that coping is a process rather than an emotional style, his early work on coping included the formulation of a discrepancy hypothesis, which was based on the idea that an individual could show subjective and objective discrepancies between emotional, physiological, and behavioural responses to distress. It was believed that the discrepant responses within the same individual indicated a particular pattern of coping behaviour from which psychological processes could be understood (Kohlmann, 1993). For instance, a person showing a discrepancy between a self-report of low anxiety and a physiological measurement of high responsiveness, revealed information about a different coping pattern from a person reporting high anxiety with concordant or low physiological responsiveness (Kohlmann, 1993).

Early investigation of the discrepancy hypothesis and its association with coping styles was conducted using a construct of repression-sensitization (Kohlmann, 1993). The repression-sensitization (R-S) construct hypothesised those individuals with an emotional repression orientation attempted to avoid perceiving emotionally significant stimuli as a defensive response. In contrast, those with a sensitization orientation increased vigilance to emotionally significant stimuli. Repressors were deemed to verbally report low anxiety whilst showing high physiological stress. Sensitizers were deemed to verbally report high anxiety and show low physiological stress. Both orientations were viewed as an attempt to cope with and reduce anxiety by way of avoidance of, or intensified attention to emotionally arousing stimuli (Kohlmann, 1993).

The R-S construct led to development of a Repression-Sensitization scale which was comprised of Minnesota Multiphasic Personality Inventory (MMPI) items (Kohlmann, 1993). The R-S scale was used to test the discrepancy hypothesis of differences between subjective and objective measures occurring within the same individual in response to distress. However, there was some confusion about what the scale was measuring, as the MMPI was originally developed to assess psychopathology (Davison & Neale, 1998) and the R-S scale was deemed to indicate coping styles through identifying differing patterns of anxiety responses to distress. The R-S scale was also criticised because it was found to correlate highly with anxiety scales that were also used to measure distress. This was viewed as confounding both constructs because both measures were assumed to be tapping into negative affectivity (Watson & Clark, 1984).

To overcome the unidimensionality of repression-sensitization and anxiety, an influential paper was published in which research was conducted using multiple variables to separate out low anxiety and repression, and high anxiety and sensitization (Weinberger, Schwartz, & Davidson, 1979). Weinberger, et al. (1979) tested a group of adults who were separated into four groups of low anxiety-high defensiveness (repressors), low anxiety-low defensiveness (low anxious), high anxiety-low defensiveness (sensitizers), and high anxiety-high defensiveness (defensive high anxious).

It was found that when under stressful conditions of freely associating to sentences with neutral, sexual, and aggressive content, compared to the other groups, repressors did typically report low anxiety levels whilst measuring high in the physiological reactivity indices of heart rate, number of spontaneous changes in skin resistance, and frontal muscular tension. The findings by Weinberger, et al.



(1979) helped to establish evidence that when repressors are under stressful conditions, they will self-report low anxiety but will be highly physiologically reactive.

However, in the study by Weinberger, et al. (1979), there also appeared to be confusion regarding measurement and the terminology applied. For example, the subjective measure of the discrepancy hypothesis was termed as anxiety, whereas the physiological aspect was seen as both a stress-reaction and as anxiety. Anxiety and defensiveness were viewed as measuring responses to stressful situations. In addition, the instruments used to measure responses to stressful situations were anxiety, defensiveness and social desirability tendency scales, not stress measures.

Further, because the discrepancy hypothesis was such a vital breakthrough in establishing a link between psychological and physical differences in relation to coping behaviour, and because Weinberger, et al. (1979) conducted one of the first studies supporting the hypothesis, a precedent was established for most research on repression and stress to be based on measures of trait anxiety and/or defensiveness (Myers & Vetere, 1997), thus furthering the anxiety/stress overlap previously established.

Although there appeared to be basic limitations to the study by Weinberger, et al. (1979), the finding of discrepancies between subjective and objective measures with repressors greatly added to the body of knowledge surrounding the area of emotional coping, stress, and health. It also provided a catalyst for the research that followed, which has replicated and established the concept as robust (Myers & Vetere, 1997).

Such research has been prolific and has expanded to examine specific ways in which emotional coping styles can influence the relationship between stress and

psychosomatic disorders. Through an evolving process, influences can be seen of early scientific pioneers such as Helen Flanders Dunbar and other Freudian influenced thinkers whose premise was that certain emotions were associated with specific disorders, and that the repression of strong emotions appeared to present a health risk (Pennebaker & Traue, 1993). The culmination of the preceding influences has led to systematic research into associations between expression and repression of emotion, and dimensions underlying specific stress related psychosomatic disorders.

### ***Research into Expression, Repression and Stress Related Psychosomatic Disorders***

Systematic research began with emotions and specific disorders, and was influenced by the failure of traditional risk factors such as smoking, hypertension (elevated blood pressure), and high serum cholesterol levels to consistently predict disease (Matthews, 1982). Consequently, scientists began to examine physiological links to psychosocial dimensions associated with disease processes.

Examination included how physiological responses were associated with stress and emotional coping styles, and whether there were associations between these and personality types A, B, C, cardiovascular disease, cancer (Grossarth-Maticek & Eysenck, 1990; Kneier & Temoshok, 1984; Thoresen & Powell, 1992; van der Ploeg, et al., 1989), asthma (Pennebaker & Traue, 1993), infectious disease (Esterling, et al., 1990), and the immune system (Jemmott & Locke, 1984). Because the studies investigating these areas provided the foundation for subsequent theoretical and practical advances, there is a necessity to briefly consider each area and the pertinent findings.

***Personality Types A, B and C***

***Personality Type A.*** Investigations pertaining to personality types have portrayed individuals with a Type A personality as being vulnerable to criticism, relying excessively on the approval of others for their sense of self-worth, prone to feeling a sense of urgency, hostility, competitiveness, aggressiveness, and anger (Lyness, 1993), and having suppressed negative emotions (Matthews, 1982). They have been found to show high physiological reactivity and considered to have an increased risk of coronary heart disease (Lyness, 1993; Matthews, 1982; Thoresen & Powell, 1992).

***Personality Type B.*** Individuals deemed to have a personality Type B have been defined as more relaxed, easygoing (Lyness, 1993), placid, socially sensitive (Buck, 1993), and found to have lower physiological reactivity and less risk of coronary heart disease than those with a Type A personality (Lyness, 1993). However, studies also found that although Type B behaviour appeared expressive and adaptive, there was evidence of nervous and inhibited characteristics to the behaviour (Pennebaker & Traue, 1993).

***Personality Type C.*** Individuals with a Type C personality have been defined as being compliant, appeasing, conforming, unassertive, selfless, passive, and anxious to please and avoid conflict. They have been viewed as having an inability to cope with interpersonal stress and as suppressing emotional responses (particularly anger) (Grossarth-Maticek & Eysenck, 1990). It would appear that people with this personality type are aware of their negative feelings but they suppress them behind a facade of 'pathological niceness'. In addition, it has been proposed that the Type C behaviour pattern may result in a vulnerability to contracting some cancers (Buck, 1993, p. 46).

### *Cardiovascular Disease*

Psychophysiological research investigating the relationship between expression and repression of emotion and coronary heart disease has found contradictory directions of association (Matthews, 1982). Some studies have shown emotional expression to result in decreases in blood pressure (B.P.) and cardiac reactivity whereas other studies have shown increases with expression (Lyness, 1993; Vitaliano, Russo, Bailey, Young, & McCann, 1993).

In an attempt to reconcile inconsistent findings, Goldstein, Edelberg, Meier, and Davis (1988) studied people who experienced and either expressed or repressed their anger. Findings were that coping with anger by repressing the emotion was associated with increased B.P., whereas expressing anger was associated with lower B.P. Interestingly, participants who had grown up in a family where anger was not expressed showed higher systolic B.P. readings than offspring of more expressive families. Contrary findings by Vitaliano, et al. (1993) showed expressed emotion to be a factor in elevated cardiovascular reactivity, however this was with older male caregivers and only in those who were already hypertensive.

In examining whether displacing emotional expression onto another target could achieve health benefits, research indicated that when expression of aggression was directed specifically to the source of the aggression, B.P. was reduced to the greatest extent. Although displacement of aggression onto another target also lowered B.P., the reduction occurred only if there was little guilt associated with the displacement (Traue & Pennebaker, 1993a).

Engebretson, Matthews, and Sheier (1989) extended the concept of anger expression through an innovative study. They tested anger expression and cardiovascular reactivity by matching an all male sample to their preferred or

nonpreferred anger expression styles. The preferred mode of anger expression was assessed via a self-report questionnaire. Two preferences of letting anger-out and holding anger-in were identified, and participants worked on a task with either a pleasant confederate or with an annoying confederate who harassed them. Following the task, participants wrote a negative or positive evaluation of the confederate. A preferred anger-out style was deemed to be associated with a preferred negative evaluation, whilst an anger-in style was associated with a preferred positive evaluation. Intermittent B.P. and continuous heart rate measures were taken throughout the task time and during a 15 minute resting period.

Findings indicated that when no harassment took place, preferred anger expression styles were not determinants of B.P. or heart rate values. However, when groups were harassed, those who acted in a way that was consistent with their preferred expression style (e.g. anger-out and negative evaluation; anger-in and positive evaluation) experienced significant reductions in B.P. across all tasks. Those who acted in a manner that was opposite to their preferred style (anger-out and positive evaluation; anger-in and negative evaluation) showed no reductions in B.P. Anger-out participants who wrote a negative evaluation of an annoying confederate showed elevated heart rates during the harassment and after writing the evaluation. This suggested that participants may have had negative cognitive ruminations that continued even after the anger had been outwardly expressed. Of concern was the unexpected finding that regardless of the preferred anger expression style, all participants who had worked with an annoying and harassing confederate continued to show elevated B.P. readings up to 25 minutes after completion of the task (Engelbreton, et al., 1989).

Findings from the study by Engebretson, et al. (1989) highlighted the value and potential health benefits of acting in a manner that is consistent with one's preferred expression style. The continuation of heart rate elevation after using the preferred expression style and encountering harassment suggested that continuing to have negative cognitions about another person may be an important factor in physiological responses which may lead to a subsequent impact on health. The extended elevated B.P. readings suggested that regardless of one's preferred expression style, there may be potential cardiovascular implications for individuals who are constantly exposed to others or situations that are anger provoking.

The lack of adaptive physiological reduction found by Engebretson, et al., (1989) was supported by Kaiser, et al. (1995) in a study examining the psychophysiology of emotional repression and recovery time following acute psychological stress. To identify measures of the tendency to inhibit expression of one's feelings, Kaiser, et al. (1995) used a measure known as the Emotion Control Questionnaire (ECQ) developed by Roger and Nesselrover (1987). The ECQ and the revised version known as the ECQ2 (Roger & Najarian, 1989) encompasses four sub-scales related to emotional control.

Findings indicated that when faced with an unexpected stressful task of preparing a speech for immediate delivery, those identified as emotional repressors were the most physiologically aroused. Following release from the task and a subsequent relaxation activity, repressors showed delayed physiological recovery evidenced by slow muscular relaxation. These findings suggested that emotional repression may have a physiological cost that lasts beyond the antecedent event.

### ***Cancer***

Investigations into emotional expression and cancer demonstrated that suppression of anger or the general non-expression of emotions could be core features in the initiation or progression of cancer (van der Ploeg, et al., 1989). Also, individuals suffering malignant melanoma showed a significant association with emotional repression (Kneier & Temoshok, 1984). Those with a combination of high current anxiety and a typical coping style of repressing negative thoughts were found to have the most negative prognosis (Temoshok, 1993).

### ***Asthma***

Individuals suffering from asthma have shown deficits in emotional expression, and it has been suggested that children may develop asthma attacks as an indirect way of expressing emotion about familial conflict. In this view, family conflict produces emotional responses in the child that cannot be expressed. An asthma attack ensues, and attention is then focused on the asthma and the child, which temporarily redirects the conflict and reduces tension within the family (Pennebaker & Traue, 1993). However, a review by Florin, et al. (1993) found no consistent pattern of emotional expression deficits in children with asthma when compared to controls.

### ***Infectious Disease and Immunological Functioning***

An expanding body of research has found associations between immunological functioning, stress, and/or repression of emotions (Jemmott & Locke, 1984; O'leary, 1990). Specifically, emotions evoked by prolonged stressful life changes were associated with immunological depression (Palmbad, 1981). Academic examination stress was associated with lower secretory immunoglobulin A (S-IgA), which provides a first line of defense against infection (Jemmott & Magloire, 1988).

Stressful daily events were associated with increased cortisol secretion (a hormone involved in the metabolism of fats, carbohydrates, proteins, and sodium potassium), and although subjectively perceived stress did not increase cortisol reactivity, minor daily events and mood fluctuations were associated with increased adrenocortical activity (Ader & Cohen, 1993; van Eck, Berkhof, Nicolson, & Sulon, 1996).

Repressors and defensive high-anxious participants were found to have significantly lower monocyte counts (monocytes are scavenger cells that clear tissue spaces of foreign material), elevated eosinophil counts (eosinophils play a role in allergic reactions), elevated serum glucose levels (glucose is a form of sugar and a major source of energy for cells), as well as self-reported reactions to medications (Ader & Cohen, 1993; Jamner, Schwartz, & Leigh, 1988).

Comparison of emotional coping styles using the repressor-sensitizer construct showed repressors to have high Epstein-Barr Virus (EBV) antibody titres (EBV is a herpes-like virus that can infect lymph nodes and cause glandular fever), whereas sensitizers had low titres. However, sensitizers who repressed their disclosure had antibody titre values that were as high as the values of repressors (Dunn, 1996; Esterling, Antoni, Kumar, & Schneiderman, 1990). Longitudinal research found human immunodeficiency virus (HIV) infection to progress more rapidly in gay men who concealed their homosexual identity than amongst those who did not (Cole, Kemeny, Taylor, Visscher, & Fahey, 1996).

### ***Summary***

In summary, examination of the fundamental parameters surrounding the relationship between emotional coping styles, stress, and mental and physical health has revealed a longstanding, diverse, and evolving history. Conclusive findings have been somewhat hindered by imprecise definitions of stress as being a stimulus or a



response (Lazarus, 1993), and an overlap between anxiety and stress constructs.

Later interest in psychological dimensions to stress prompted a relational view that takes the person-environment interaction into account (Lazarus & Folkman, 1984).

The role of emotion has been seen to have a bidirectional relationship with cognition, whereby cognitive appraisals provide subjective meaning to experiences, which then influences emotion, which can then influence further thoughts (Lazarus, 1991). Stress is deemed a result of situations that are appraised as exceeding the coping resources of the individual (Lazarus & Folkman, 1984).

Coping resources available to individuals include predominant emotional coping styles. The two coping styles of interest are those of emotional expression and repression, and these have been viewed as being formed through innate, parental, socialisation (Traue & Pennebaker, 1993a), and developmental influences (Buck, 1993). Evidence has also suggested that expression and repression of emotion have psychological and physiological implications for enhancement or reduction in health (Pierce, et al., 1983; Pennebaker, 1993a).

The discrepancy hypothesis provided an important way of linking coping styles to emotion by establishing that discrepancies between reported emotion and physiological measures could occur within the same individual (Kohlmann, 1993). The discrepancy hypothesis was supported by Weinberger, et al. (1979) through the use of a repression-sensitization construct applied to self-reports of stress. Although the instruments used to measure repression, sensitization, and stress were questionable, the findings were of enormous benefit in providing a catalyst for systematic research into expression, repression and stress related psychosomatic disorders.

Systematic research discovered associations between expression and repression of emotion, and psychological and physiological dimensions underlying specific emotions and stress related disorders (Cole, et al., 1996; Engebretson, et al., 1989; Grossarth-Maticek & Eysenck, 1990; Kneier & Temoshok, 1984; Thoresen & Powell, 1992; van der Ploeg, et al., 1989; Pennebaker & Traue, 1993; Esterling, et al., 1990; Jemmott & Locke, 1984).

In essence, the preceding evidence is strongly suggestive of a relationship between emotional coping styles, emotions, psychological and physiological dimensions, stress, and disease. There has been strong support for the role of emotional expression in mediating between stress and ill health, and for emotional repression to have particularly deleterious effects on health and well-being.

Given the strong basis from which further research could progress, the next step was to explore effective ways of ameliorating the potential adverse health effects associated with repression of emotion. In doing so, the theory of behavioral inhibition and psychosomatic disease was developed by James Pennebaker and his colleagues (Pennebaker & Beall, 1986).

### ***Theory of Behavioral Inhibition and Psychosomatic Disease***

The notion that deleterious psychological and physiological effects can result from repressing or holding back strong emotions has led to a theory of behavioral inhibition and psychosomatic disease (Pennebaker & Beall, 1986). Through an extension of the general adaptation syndrome developed by Selye (1976), the theory of behavioural inhibition and psychosomatic disease suggests that repression or inhibition of significant personal information involves actively *not* thinking about emotion, and that the active process is associated with greater physiological work (Pennebaker, et al., 1987).

The inhibition or repression of thoughts and feelings is not an easy task and attempts may result in an increase rather than a decrease in the physiological effort required (Pennebaker, 1993a). For instance, Wegner (cited in Pennebaker, 1993a) found that students who were asked not to think of a white bear for five minutes, tended to think about a white bear almost as often as the students who were asked to actively think of the bear. When repression is of emotionally laden thoughts and situations, cognitive processes can be hindered (Pennebaker, 1993a), the action sequence interrupted (Pierce, et al., 1983), and the effort and physiological effect increased (Pennebaker, et al., 1987).

Over time, the continual increased physiological effort required when emotion, thoughts or behaviour are inhibited places cumulative stress and wear and tear on the body (Pennebaker & Beall, 1986). The resultant accumulated physiological wear and tear adversely effects physiological functioning, leading to the development of stress-related diseases (Selye, 1976). Whilst the theory of inhibition and psychosomatic disease does not propose that it can cure pre-existing or chronic health problems, it is based in the concept that expressing emotions connected to traumatic and distressing experiences could prevent future health disorders (Greenberg & Stone, 1992).

In view of such a concept, a seemingly natural response to stress and subsequent adverse associated thoughts and emotions would be to confide in others (Pennebaker, 1993a). Those within the therapeutic community support this idea and agree that emotional expression is beneficial for many individuals (Pennebaker & O'Heeron, 1984).

Results of a study investigating the variables of sudden death of a spouse, increased health problems of the surviving spouse, and confiding in friends, indicated

that fewer health problems were reported when the survivor decreased private rumination and confided in friends over the death. This led to a conclusion that the act of confiding can play a key role in coping ability and health processes (Pennebaker & O'Heeron, 1984).

However, confiding in friends can have social implications if the disclosure is stressful for the listener, and can lead to withdrawal of support and subsequent social isolation (Pennebaker, 1993a). Therefore, it would seem that individuals may be socially conditioned toward repression of thoughts and emotions, and may need to find other strategies to help discharge stress related emotion.

In examining specific strategies related to expression and repression of significant thoughts and emotions, James Pennebaker and his colleagues have conducted an evolving series of studies. They have avoided the influence of social support by instigating two experimental disclosure paradigms. One paradigm involves participants talking into a microphone or to a silent, unseen 'confessor' about traumatic and trivial topics, and measuring immediate psychophysiological effects. The second paradigm involves participants writing about either their most traumatic life experience or superficial topics for 15-20 minutes per day, on 3-4 consecutive days, with changes in long term health and immune function being measured (Pennebaker, 1993b). The research conducted utilising the two paradigms has been predominantly directed toward the effects of repression in individuals who have suffered major and severe traumas in the past, and who have not disclosed or confronted the trauma due to fear of embarrassment or punishment (Pennebaker, et al., 1987).

***Paradigm One – Verbal Expression and Repression.***

In two controlled experiments investigating verbal expression, Pennebaker, et al. (1987) examined high and low disclosure levels and the short-term autonomic correlates of disclosing personally experienced, traumatic or trivial information. Disclosure levels of high and low were determined by degree of disclosure and proclivity to disclose very personal and traumatic information. High disclosers could be equated with expressors in that they were viewed as more practiced and comfortable in thinking about and expressing disturbing emotions but more uncomfortable with trivial distractor experiences. In contrast, low disclosers could be equated with repressors, in that they were viewed as being more practiced and comfortable with trivial distractor topics rather than distressing emotions.

In experiment one, all 24 participants talked into a tape recorder about a personally experienced traumatic event and then about their plans for the day (trivial information). Physiological measures of skin conductance and heart rate were measured before, during, and after participants talked into the tape recorder. At the end of the experiment, participants rated the stress level experienced when disclosing both topics (Pennebaker, et al., 1987).

Findings confirmed that high disclosers had lower skin conductance levels (SCL's) (indicating greater comfort) when talking about traumatic events, and higher SCL's when talking about trivial daily plans (indicating greater discomfort). Low disclosers showed an opposite pattern with higher SCL's when talking about traumatic events (indicating greater discomfort) and lower SCL's when talking about trivial daily plans (indicating greater comfort). The rationale for these findings was that because high disclosers characteristically think and talk about more emotionally profound events than trivial events, the act of dealing with trivial events required

more physiological work. Conversely, because low disclosers characteristically talked and thought more about trivial events, the act of dealing with traumatic emotional expression was reflected by increased physiological levels. By their own admission, low disclosers depersonalised their discussions. Interestingly, regardless of whether they were high or low disclosers, all participants evidenced a reduction in systolic B.P. to below baseline levels immediately after talking about the traumatic experience (Pennebaker, et al., 1987).

In experiment two, the conditions of speaking to a silent, unseen 'confessor', as well as having participants simply think about a traumatic and a trivial experience were added. These were added to assess physiological responses when talking to another without the concern of effects on the listener, and to examine the effects of thinking about events. Thinking about events was equated to rumination, which was viewed as reliving the experience without altering its outcome (Pennebaker & O'Heeron, 1984). Half the participants alternated between talking into a tape recorder and thinking about a traumatic experience and their plans for the day. The other half of participants spoke to a silent, unseen 'confessor', thought about a traumatic experience and about their plans for the day (Pennebaker, et al., 1987).

Experiment two replicated the previous findings that when high disclosers spoke or thought about traumatic events, their SCL's were lower than when focusing on trivial events. Low disclosers again showed an opposite pattern. The effects were greater when participants talked into the tape recorder than to the 'confessor'. (Pennebaker, et al., 1987).

In addition, a significant influencing variable was found pertaining to physiological levels and speech characteristics. Of influence was whether participants disclosed information whilst alone or to an anonymous confessor.

Overall, when disclosure was to another person, there appeared to be a holding back of affect in that participants cried less and had less of a waver in their voice when expressing events. The inhibition was reflected by low SCL's in high disclosers when talking about traumatic events when alone (indicating comfort) and high SCL's when talking to a confessor (indicating discomfort). All cardiovascular measures in both studies showed higher physiological reactivity during the talk-traumatic than the talk-trivial conditions (Pennebaker, et al., 1987).

***Paradigm two - Written Expression and Repression.***

The use of writing as a method of cathartic expression and as a therapeutic tool is a well established concept (Riordan, 1996). The concept has been traced as far back as the 18<sup>th</sup> century when Benjamin Rush discovered that patients who wrote about their symptoms experienced tension reduction. However the systematic investigation of its benefits has been a fairly recent occurrence (Riordan, 1996). It has been proposed that the shift from talking to writing creates a second-order change in the dynamics of communication by creating a different context and further reframing opportunities. The shift has been deemed to provide the potential for changes in perceptions, expectations, and behaviour (Riordan, 1996).

In a series of studies investigating written expression and repression, Pennebaker and his colleagues tested physiological and health effects. To study such effects, Pennebaker and Beall (1986) used four different randomly assigned writing conditions: trauma-emotion involved writing about feelings associated with one or more life traumas; trauma-fact involved writing about only the facts surrounding traumatic events; trauma-combination involved writing about both feelings and facts surrounding traumas; and the control condition involved writing about preassigned trivial topics. Participants wrote for 15 minutes each evening for four consecutive

nights. Prior to the study, participants completed a battery of questionnaires which included a social anxiety scale, a social desirability scale, a general physical symptoms inventory, and a questionnaire tapping health related behaviours. Prior to and following each writing session, participants underwent measurement of B.P., heart rate, self-reported moods, and physical symptoms. Four months after the study, questionnaires pertaining to health and general views about the study were completed.

Findings were that relative to the other groups, those in the trauma-fact and the control-trivial conditions showed similar results to each other on the majority of physiological, health, and self-report measures. That is, there were no adverse short term effects or any long term positive benefits. Those in the trauma-emotion and trauma-combination conditions also showed similar results to each other. These groups experienced higher physiological reactivity in the form of elevated B.P. and more negative affect immediately after writing about the traumatic events (Pennebaker & Beall, 1986). However, despite these initial and brief negative effects, those who expressed events that were more personal and stressful showed the greatest reductions in skin conductance reactivity, reported greater long-term positive affect, improvement in health, less number of days of illness, and significant decreases in visits to a health centre in the six months following the study (Pennebaker & Beall, 1986).

Pennebaker, Kiecolt-Glaser, and Glaser (1988) conducted research on the effects of written disclosure on the immune system, health visits, and perceptions of distress. They found that disclosure of highly personal and upsetting experiences had positive effects on the blastogenic response of T-lymphocytes to two mitogens (T-lymphocytes are cells that manufacture natural chemicals involved in immune



reactions, and mitogens are chemical substances that can induce proliferation of T-lymphocytes), autonomic response levels, health centre visits, and the subjective distress experienced by participants (Ader & Cohen, 1993; Dunn, 1996).

A study measuring physiological responses to stress used an intervention involving both the verbal and written emotional disclosure paradigms. Participants were randomly assigned to verbal/stressful, written/stressful, or control conditions. The verbal intervention was found to significantly lower EBV antibody titres over a four week period. Individuals in the verbal/stressful condition showed significantly lower antibody titre values than those in the written/stressful condition, who had significantly lower titre values than those in the control condition (Esterling, et al., 1994).

Further, evidence relating to immune system functioning and emotional expression revealed significantly greater enhancement in Natural Killer (NK) cytotoxic activity (deemed important for the control of cancerous cells) in participants who verbally expressed an intimate and troubling event and had high cynical hostility, relative to participants who verbally expressed their emotions and had low hostility. No such enhancement was found for participants in a non-disclosure control condition (Christensen, et al., 1996; Ader & Cohen, 1993).

In a study assessing more specific events, Pennebaker, Colder, and Sharpe (1990) randomly assigned first semester college students to either an experimental writing group or a control writing group. The experimental condition involved participants writing about their very deepest thoughts and emotions about going to college. The control condition involved detailed descriptions of what participants had done since waking that morning, without mentioning any emotions, feelings, or opinions.

All participants wrote in a laboratory environment over three consecutive days and were tested across four time waves that began in the first week of classes and ended in the final week of semester. Prior to the study, all participants completed questionnaires comprising a state measure of negative affectivity, a self-esteem scale and a self-concealment scale. After the final writing session, participants completed questionnaires that measured mood and general attitudes to the study. Health Centre records for physician visits following the study were assessed (Pennebaker, et al., 1990).

Findings were that relative to participants in the control group, those in the experimental group who wrote about their deepest feelings showed significant reductions in the number of visits to the health centre over a four to five month period. However, the differences between the groups decreased as the months following the study increased. Whilst experimental participants showed long term health benefits, they also showed lower short term psychological adjustment pertaining to homesickness and general negative affect. There were no wave effects, indicating that the time of semester did not effect the benefits of disclosure. The absence of wave effects also suggested that students may experience comparable stress levels throughout the entire semester (Pennebaker, et al., 1990).

The majority of experimental participants spontaneously reported that writing had provided a greater understanding of their thoughts, moods, and behaviour. This suggested that insight rather than catharsis was the agent of change. It was concluded that the writing technique provided a form of preventive psychotherapy that was “simple, inexpensive, and free of potentially negative social feedback” (Pennebaker, et al., 1990, p. 536).

When Greenberg and Stone (1992) compared the effects of revealing previously disclosed traumas, previously undisclosed traumas, or trivial events, results failed to replicate the previous overall findings of mood and health improvements associated with writing about past trauma. The null findings prompted a detailed examination of the severity of the trauma disclosed, which revealed that regardless of the disclosure history, those who wrote about the most severe traumas reported fewer physical symptoms in the six months post testing.

Thus, substantial evidence was found that verbal and written expression of emotion was associated with reductions of skin conductance, beneficial long-term affect, positive health gains (Pennebaker & Beall, 1986; Pennebaker, et al., 1988; Pennebaker, et al., 1987; Pennebaker, et al., 1990; Greenberg & Stone, 1992), improvement with infectious EBV (Esterling, et al., 1994), and enhancement of immune system functioning (Christensen, et al., 1996).

Through the different methodologies utilised, evidence emerged that expression can provide health benefits with ongoing daily stressors as well as long term previously inhibited traumatic experiences (Pennebaker, et al., 1990). Also highlighted was the importance of emphasising the emotional and personal components of expression to gain insight and understanding of stress related emotions. In addition, findings indicated that expression need not be verbal to be effective (Pennebaker, et al., 1990), and that the writing paradigm may provide a unique avenue of emotional expression when verbal interaction is neither desirable nor viable (Smyth, 1998).

In the continuing search for understanding of the components involved in beneficial health effects of expression and deleterious effects of repression, Pennebaker (1993b) questioned why such simple paradigms were so powerful in

producing positive clinical effects. Pennebaker (1993b) indicated it wasn't because individuals were prompted to engage in healthier behaviours or led healthier lifestyles generally. Nor was it a function of the different kinds of traumas that were disclosed or because trauma related memories were changed conceptually.

Extensive exploration of previous findings led Pennebaker (1993b) to conclude that compared to individuals whose health did not improve, those who benefited from emotional expression had the following attributes. From an emotional perspective, they expressed significantly more negative emotions such as anxiety and sadness, and expressed fewer positive emotion words. From a cognitive perspective, as the writing sessions progressed, the essays evolved from the use of fewer to greater words denoting understanding, realisation, and reasoning. Overall, those who improved showed greater organisation in the content of their writing, a greater degree of acceptance of the experience, and future optimism.

In support of the conclusions by Pennebaker (1993b), a research synthesis review conducted by Smyth (1998) examined all randomised controlled studies that involved the written emotional expression manipulation developed by Pennebaker (Pennebaker & Beall, 1986). Additional criteria required for inclusion in the synthesis involved variants on the original task, measurement of mental, physical or general functioning health outcomes, statistical information enabling calculation of effect size, and experimental participants who wrote about traumatic events together with control participants who wrote about neutral events.

Given this criterion, 13 studies were included in the review. The review evaluated the overall significance and effect size of the writing task relative to the potential moderating variables of participant characteristics, writing dose, essay content instructions, outcome type, and publication status (Smyth, 1998).

Results indicated that “written emotional expression produces significant health benefits in healthy participants” (Smyth, 1998, p. 179) as measured by reported health, psychological well-being, physiological functioning, and general functioning (Smyth, 1998). Effect sizes differed across outcome types, with psychological well-being and physiological functioning having the highest effect sizes. Psychological well-being changes were tentatively attributed to cognitive shifts pertaining to the trauma following writing, and physiological functioning improvements were deemed to provide support for the biological benefits of writing.

Student samples showed significantly greater effects for psychological well-being outcomes than non-student samples. It was found that sex of the participant also mediated effect size, with writing about trauma being more effective for males than females. Writing about current trauma resulted in superior improvement than writing about past trauma, and the longer the time course for the writing task, the greater the effect (Smyth, 1998). Finally, Smyth (1998) recommended that in view of the positive mental and health implications for the writing task, it would be prudent to investigate this paradigm further as a potential intervention.

### ***Summary***

In summary, it can be seen that investigation into the effects of stress, emotional coping styles, and mental and physical health has endured a long and evolving history. That history has required changes in perception and terminology as time periods, theoretical orientations and measurement indices have progressed. From viewing stress as a stimulus or a response, the widely accepted definition is based in a person-environment relationship (Lazarus & Folkman, 1984; Selye, 1976).

The concept of emotional coping styles has gained credence over time and a large body of evidence supports its influence as a mediating variable between stress and

health (Jourard, 1974; Mathews, 1988; Pennebaker & Beall, 1986; Smyth, 1990). It has been shown that formulation of such coping styles includes innate (Traue & Pennebaker, 1993a), parental, social, and cultural influences (Pierce, et al., 1983). Interest in expression and repression and their association with specific disease processes led to the discrepancy hypothesis (Kohlmann, 1993), and the theory of inhibition and psychosomatic disease (Pennebaker & Beall, 1986).

These two theories have furthered the stress/anxiety overlap that was established earlier (Lazarus & Folkman, 1984), and much of the investigation into the emotional coping styles of expression and repression, verbal and writing paradigms, and health outcomes have continued the use of the construct (Christensen, et al., 1996; Pennebaker & Beall, 1986; Pennebaker, et al., 1990).

In addition, the measurement of anxiety and stress has been through multiple indirect measures such as negative mood scales (Greenberg & Stone, 1992), rationality /emotional defensiveness scales, coping inventories (Kaiser, et al., 1995), social desirability scales (Pennebaker & Beall, 1986), and self concealment scales (Pennebaker, et al., 1990).

Despite the use of such varied measures, and confusion over the definitions of stress and anxiety, there has been significant and wide ranging evidence that repression of emotion is detrimental to well-being, and that expression of distressing emotion leads to long term psychological and physical health gains, particularly when tested using the writing paradigm (Smyth, 1998).

It is suggested that an important missing link throughout the research has been the evaluation of individual differences in emotional coping styles, and the impact that the writing paradigm may have on stress and physical health when these are accounted for. It is further suggested that rather than emotional expression of

distressing experiences *per se* being a predictor of improved psychological and physical health, it is the degree of matching between an individual's predominant emotional coping style and the expression that provides a mediation of healthy outcomes. This idea was partially supported by Engebretson, et al. (1989) with the testing of a matching hypothesis based on preferred versus non-preferred anger expression styles. As previously reported, findings indicated that when typical anger styles were matched to expression, decreased physical reactivity occurred.

### ***The Present Study***

One aspect of this study will test the discrepancy hypothesis. The discrepancy hypothesis proposes that sensitizers generally report high anxiety and show low physiological values, due to an openness to experiencing emotions. Conversely, repressors report low anxiety and show high physiological values, due to using defensive inhibition of emotions (Kohlmann, 1993). This study will test whether such discrepancies are demonstrated with the use of self-report measures of psychological signs and somatic symptoms of stress. In addition, this study seeks to provide preliminary evidence of the reliability and validity of two new stress scales deemed to measure signs and symptoms of stress. The main focus of the study will be to utilise the emotional writing paradigm to test and extend previous associated research by testing the hypothesis of matching coping styles with expression styles.

Previous findings have indicated that improved health benefits can be gained through written emotional expression about the ongoing daily stressors experienced by students at university (Pennebaker, et al., 1990), and that student samples showed greater positive psychological well-being outcomes than non student samples (Smyth, 1998).

Therefore, given the naturally occurring stressful environment the first year at university may present, the matching hypothesis will be tested within this environment by implementing a minimal stress intervention that matches and mismatches the emotional coping styles of expression and repression to emotional and distractor writing tasks.

This study represents the first known research to test the matching hypothesis. It is also the first known study to use direct, multi-measure state stress and somatic symptom scales as outcome measures. As one of the stress scales, and the somatic symptoms scale have been published but not previously established as reliable and valid measures, the present study will enable reliability and factor analyses to establish internal consistency, validity, and factor structure of the scales. The study also extends previous research that tested within the artificial conditions of a laboratory, by having participants implement the interventions in real world situations.

In testing the discrepancy hypothesis, it is predicted that expressors (equating to sensitizers) will show pre-intervention levels of high stress and low somatic symptoms, whereas repressors will report low stress levels and high somatic symptoms. In testing the matching hypothesis, it is predicted that when the emotional coping style of expression is matched to a writing task aiding discharge of 'profound' stress related emotions, and when those with a coping style of repression are matched to a distractor writing task that allows avoidance of an emotional focus, a significant decrease in stress levels and somatic symptoms will occur. It is further hypothesised that when mismatched, with expressors writing about distractor topics and repressors writing about profound emotions, levels of stress and somatic symptoms will not decrease.



## Method

### *Research Design*

This study employed a 2 x 2 x 2 design (Time x Emotion Group x Intervention). Participants were initially screened and categorised into one of two emotion styles, that of expressing emotion (expressors) or repressing emotion (repressors). Within each emotion style group, participants were randomly assigned to one of two interventions; a 'profound' emotion writing condition or a 'distractor' writing condition. All participants completed three pre-test self-report stress scales. Following a two week writing intervention period, participants completed the same three scales as post-test measures. Pre-test vs post-test equalling time scores on each scale represented the dependent variables. The data was analysed using a series of three 2 x 2 x 2 split plot analyses of variance, with emotion style (expressor, repressor) and writing intervention (profound, distractor) as between-subject variables and time (pre-test, post-test) as a within-subjects variable. Participants also completed a study feedback checklist as a way of assessing participants' overall response to the questionnaires, interventions and the study *per se*. The feedback checklist provided qualitative data from which a content analysis was performed.

### **Participants**

Participants comprised male and female first year psychology students attending day and evening classes at Edith Cowan University. Due to the study requiring personal emotional disclosure, and evidence from previous research of short-term adverse mood effects following such disclosure (Pennebaker & Beall, 1986), a detailed verbal explanation of participation requirements preceded the request for

volunteers. To avoid a possibility of undue acquiescence by first year students, emphasis was placed on the voluntary nature of participation, the freedom to withdraw at any time, that participation was in no way associated with course requirement or grading, and that no remuneration would be given. Students were alerted to the possibility of short-term adverse mood effects when writing about emotionally meaningful events (Pennebaker & Beall, 1986).

An assurance of total anonymity was given, and was provided by the use of a numbering system which matched pre-test, intervention, and post-test data. Students were also verbally advised that all details would be confidential, held securely, and that an honours thesis is a published document. To ensure informed consent, students who agreed to participate received an information sheet outlining the purpose of the study and participation requirements. This sheet also contained contact telephone numbers for the principal researcher, the research supervisor, and university counselling services (see Appendix A for information sheet).

In an effort to obtain equal group  $n$  and adequate statistical power (Tabachnick & Fidell, 1996), no upper limit was imposed on the number of participants recruited. Two hundred and thirty (230) students formally consented to take part in the study (see Appendix B for consent form). Participants were assigned to 'expressor' and 'repressor' groups on the basis of scores on the Emotional Inhibition sub-scale of the Emotion Control Questionnaire (ECQ 2) (Roger & Najarian, 1989) (see Appendix C for Emotional Inhibition sub-scale). Participants were randomly assigned to either 'profound' writing or 'distractor' writing groups, thus forming both matched and mismatched conditions within each emotion style group.

One hundred and eleven (111) participants did not attend the classes in which the post-test was administered. Thus at completion of the study, data from 119

participants was obtained. Two cases were deleted due to incomplete post-test questionnaire responses, leaving a final sample of 117 participants comprising 12 males and 94 females, with a mean age of 26.4 years;  $SD = 10.33$  (demographic data was missing for 11 cases).

## Materials

### *ECQ2*

***Identifying emotion styles of expression or repression.*** The Emotional Inhibition sub-scale of the ECQ 2 (Roger & Najarian, 1989) was utilised to identify participants as either ‘expressors’ or ‘repressors’. The original ECQ and the revised ECQ 2 scales were developed through research investigating individual differences in stress responses. The ECQ construct of emotion control was defined as “the tendency to inhibit the expression of emotional responses” (Roger & Najarian, 1989, p. 845). The inhibition of expression was deemed to potentially predispose individuals to stress-related illness due to delayed recovery from autonomic arousal. Development and revision of the ECQ yielded four distinct scale factors labelled as Rehearsal, Emotional Inhibition, Aggression Control, and Benign Control (Roger & Najarian, 1989). The Emotional Inhibition subscale used in the present study was comprised of 14 forced-choice, true/false items such as “When someone upsets me, I try to hide my feelings” and “I don’t feel embarrassed about expressing my feelings” (reverse scored item). The placement of reverse score items was altered to avoid a response bias, thus the reverse score statements were placed as items 2, 5, 6, 8, 12 and 14 (see Appendix C for the reverse scored items). [For the purposes of this study, the Emotional Inhibition sub-scale was assigned the title Situation Checklist].

## ***ECQ2***

***Reliability and validity.*** Undergraduate university students were the norm group used to standardise the full 56-item ECQ 2 scale measuring the Rehearsal, Emotional Inhibition, Aggression Control, and Benign Control dimensions of emotional control. The ECQ 2 Emotional Inhibition sub-scale has demonstrated internal consistency with a Kuder-Richardson (KR-20) reliability alpha of 0.77 and a test-retest alpha of 0.79. Concurrent validity for the sub-scale was established through inverse correlations with the extraversion component of the Eysenck Personality Questionnaire, the verbal hostility component in the Buss-Durkee Hostility Inventory, and the interpersonal component measuring social skill of the Paulhus Spheres-of-Control Questionnaire (Roger & Najarian, 1989).

## ***Measures of State Stress***

Measures of state stress were utilised from three sources. Two sources measured stress related mood and behavioural indicators (the ICS and Signs of Stress scales) and one measured stress related somatic symptoms (Somatic Symptoms scale). In an attempt to avoid a response bias occurring across the questionnaire sets, for the purposes of this study, the Index of Clinical Stress (ICS) was placed first, the Somatic Symptoms scale was placed second, and the Signs of Stress scale was placed third in each questionnaire set (see Appendix D for the ICS, Appendix E for the Somatic Symptoms scale, and Appendix F for the Signs of Stress scale).

***The ICS*** is a unidimensional measure of perceived state stress and was designed to be well suited to measurement of stress in research settings (Abell, 1991). The ICS was designed to measure the magnitude of difficulties that are experienced with personal stress and to reflect individuals' perceptions associated with subjective stress. The items have been viewed as "general indicators of affective states

associated with the experience of stress ... without the problems associated with life events indices” (Fischer & Corcoran, 1994, p. 281). The ICS is a 25 item scale whereby responses are indicated on a seven point scale ranging from (1) = ‘none of the time’; (2) = ‘very rarely’; (3) = ‘a little of the time’; (4) = ‘some of the time’; (5) = ‘a good part of the time’; (6) = ‘most of the time’; and (7) = ‘all of the time’. The ICS includes items such as “I feel extremely tense” and “I feel like my life is going very smoothly” (reverse scored item). The placement of reverse score items was rearranged to avoid a response bias, thus the reverse scored statements were placed as items 5, 10, 14, and 20. [For the purposes of this study, the ICS was assigned the title Stress Questionnaire Part A].

***ICS reliability and validity.*** The norm group used to standardise the ICS originated from patients and family members recruited at a family practice residency program in a southern American community medical centre. The ICS has previously demonstrated excellent reliability, with internal consistency showing an alpha of .96. Construct validity has been established through correlation in the predicted direction with the Generalized Contentment Scale and the Index of Family Relations (Fischer & Corcoran, 1994).

***Somatic symptoms and signs of stress scales.*** The Somatic Symptom and Signs of Stress scales used in this study originated from a Symptoms of Stress scale that comprised four separate sub-scales labelled muscles, organs, mood, and behaviour (Ritchie, Browne & Norfor, 1987). The original scale was developed explicitly for populations experiencing stress, and included in a training manual for community educators and health professionals. Participants taking part in such training programs used the scale as a self-assessment measure to gauge the level of progress

in stress reduction due to stress management interventions employed (Ritchie, et al., 1987).

*The somatic symptoms scale* utilised the muscles and organs sub-scale items, and was formatted as a single 19 item scale. There were no reverse score rating scale items in the scale, and to maintain consistency the response format was aligned to be identical to the ICS seven point scale. One item was reworded to aid in semantic consistency, with the essential nature of the statement remaining unchanged. Thus, the statement “I develop nervous twitches” was altered to “I have nervous twitches”. Examples of other scale items include, “I clench my jaw or grind my teeth” and “I need to urinate often”. [For the purposes of this study, the Somatic Symptoms scale was assigned the title Stress Questionnaire Part B].

*The signs of stress scale* utilised the mood and behaviour sub-scale items from the original Symptoms of Stress measure by Ritchie, et al. (1987), and was formatted as a single 18 item scale. There were no reverse score rating scale items, and to maintain consistency, the response format was aligned to be identical to the ICS seven point scale. Although some items were reworded to aid in semantic consistency, the essential nature of the statements remained unchanged. For example, “I become depressed” was altered to “I am feeling depressed”, and “I use more drugs, alcohol” was altered to “I am having more alcohol and other drugs than usual”. [For the purposes of this study, the Signs of Stress scale was assigned the title Stress Questionnaire Part C].

*Somatic symptoms and signs of stress scale reliability and validity.* Although the training manual that includes the four Symptoms of Stress sub-scales has been widely distributed by the New South Wales Department of Health, reliability and validity have not previously been established (J. Ritchie, personal communication,

March 16, 1998). This study sought to establish preliminary reliability and validity for the sub-scales as two separate measures of somatic symptoms and signs of stress. The internal consistency of both scales showed Cronbach's alpha values of .89.

***Study feedback checklist.*** To gain response information on the different components involved in the study, participants were asked to complete a Study Feedback Checklist. The checklist provided information on whether the questionnaires had adequately covered the stress experience; the number of writing sessions participants had performed; whether instructions had been followed accurately; and whether the writing sessions were helpful, too time consuming, easy and/or difficult to do. Participants were also asked to rate how stressful they had found the writing sessions; whether they had recently used writing as a way of releasing emotions; and if they would continue to use writing as a way of reducing stress. Finally, there was provision for further comments to be included (see Appendix G for Study Feedback Checklist).

***Intervention packages.*** Participants received intervention packages containing an information sheet, consent form, and a numbered questionnaire booklet set comprising a Situation Checklist and pre-test Stress Questionnaires Part A, B, and C. The package also included an instruction sheet detailing either a 'profound' or a 'distractor' writing intervention (see Appendix H.1 and H.2 for Instruction Sheets); a numbered compliance sheet for the dates of each writing session to be entered (see Appendix I for Compliance Sheet); and a three page, lined double-sided writing booklet (see Appendix J for example of the Writing Booklet Sheet). A sealed envelope inside the package contained a matching numbered post-test questionnaire booklet set comprising the post-test Stress Questionnaires Part A, B, and C, and a

study feedback checklist. On the outside of the sealed envelope was a printed label with the instruction “Please bring this unopened envelope to the debriefing session in class on 6/5/98”. The numbering system enabled participant response anonymity whilst allowing identification of the ‘profound’ and ‘distractor’ interventions by using even numbers to denote ‘profound’ and odd numbers to denote ‘distractor’ interventions.

### **Procedure**

Participants were recruited for the study during day and evening class times in week eight of semester. A research assistant randomly distributed the profound and distractor intervention packages to students, which is how the groups were allocated. Attached to the outside of each package was an information sheet, a consent form and a numbered pre-test questionnaire booklet.

The initial recruitment phase included personal introductions of the researcher and research assistant, and empathic acknowledgment of the impact that the first year at university could have on one’s life and stress levels. Following this, participants received a verbal explanation of the study, participation rights and requirements, plus details pertaining to the contents of the intervention package (see Participant section for details). Students agreeing to take part in the study were asked to read the information sheet and to sign the consent form. Participants then completed the Situation Checklist (Emotional Inhibition sub-scale screening measure) and the pre-test stress questionnaires Part A, B, and C (ICS, Somatic Symptoms and Signs of Stress scales). Upon completion, the consent forms, Emotional Inhibition sub-scale, and pre-test questionnaires were collected.

Participants were asked to open their intervention package later (preferably when alone), and not to reveal the nature of their writing intervention to other participants



until after the two week intervention period. Some participants had the profound writing intervention, whilst others had the distractor writing intervention.

Participants were requested to bring their intervention packages back to the same class time in week ten.

During class time in week ten, participants were asked to open the sealed envelope in the intervention package and to complete the numbered post-test stress questionnaires plus the study feedback sheet. Also, participants were given the option of returning their numbered writing booklets. This served as a compliance check pertaining to whether or not intervention instructions had been followed accurately.

Participants who had taken part in the study, but did not have their packages, were asked to complete an unnumbered post-test questionnaire set comprising the stress questionnaires and study feedback checklist, and to write a (real or alias) name and contact telephone number on the first questionnaire. This enabled the researcher to contact participants, gain their code numbers, and match pre-test questionnaires to the post-test questionnaires, writing booklet, and feedback checklist. All participants were asked to write their age and sex on the first post-test questionnaire. Following receipt of completed materials, a debriefing session was held. During the debriefing session, participants received details of the hypotheses, aims, and each intervention involved in the study. Responses to the questionnaires, the different interventions, and the study as a whole were elicited. Participants were thanked for taking part in the study.

## Results

The results are reported in six sections which include assessment of the psychometric properties of the Somatic Symptom and Signs of Stress scales, data file preparation, data screening, main analyses pertaining to the 'matching hypothesis', power analysis, and a content analysis relevant to the Study Feedback Checklist.

### *Assessment of the Psychometric Properties of the Somatic Symptoms and Signs of Stress Scales*

The original scale containing the Somatic Symptoms and Signs of Stress items was widely distributed by the New South Wales Department of Health. However, there has been no previous research assessment of the psychometric properties of the scale (J. Ritchie, personal communication, March 16, 1998). This study sought to assess internal consistency and validity for the sub-scales as two separate measures of somatic symptoms and signs of stress. Assessment was through reliability analyses, bivariate correlations, and principle components analysis.

Reliability analyses were performed on the pre-test scores of the 19 item Somatic Symptoms and the 18 item Signs of Stress scales. The Somatic Symptoms scale yielded a Cronbach's alpha of .8891 and the Signs of Stress scale yielded a Cronbach's alpha of .8899. All corrected item total correlations were above .30 and no item deletion was indicated to produce higher alpha values.

To establish concurrent validity, bivariate correlations were performed to investigate the relationships between the well-established ICS and Somatic Symptoms scale, and the ICS and Signs of Stress scale. There was a moderately positive significant relationship between the ICS and Somatic Symptoms scale,  $r(112) = .49, p < .01$ , and a strong positive significant relationship between the ICS and Signs of Stress scale,  $r(112) = .79, p < .01$ .

A principal components analysis was performed on the Somatic Symptoms and Signs of Stress items to determine scale structure. Examination of the correlation matrix showed a number of correlations to exceed .3, thus rendering the matrix suitable for factor analysis (Tabachnick & Fidell, 1996). The Bartlett Test of Sphericity was significant at .000 and the KMO measure of sampling adequacy was greater than .6, with the value being .775. The scree plot indicated the emergence of two dominant factors. The first factor showed an eigenvalue of 10.52 and the second factor showed an eigenvalue of 3.50. The two factors cumulatively accounted for 37.9 percent of the total variance.

Following the finding of two dominant factors, a further principal components analyses was performed requesting a varimax rotation (see Appendix K.1 and Appendix K.2 for Unsuppressed Factor Loadings and Communalities for Somatic Symptoms and Signs of Stress items respectively). Varimax rotation revealed that items loading on factor one were predominantly somatic symptoms and items loading on factor two were predominantly signs of stress. Thus, two conceptually separate dimensions emerged which confirmed and supported the use of the Somatic Symptoms and Signs of Stress scales.

After suppression, although the items from the Somatic Symptoms scale predominantly loaded on factor one, items five ('I stutter and stammer when I speak') and eleven ('I perspire easily') showed dual loadings. Although loading on both factors, the loadings for items five and eleven were appropriately higher on factor one. However, Somatic Symptom items seven ('I develop headaches or eye tension') and eight ('I experience low back pain') both loaded above .3 only on factor two with Signs of Stress items. Both items showed low communalities, indicating there was low variance in the variable accounted for by the factors.

The loadings from the Signs of Stress scale showed items three ('I am worrying excessively') and sixteen ('I am having minor accidents / making more mistakes') to have dual loadings, with the higher loadings appropriately being on factor two. However, items one ('I feel nervous, anxious, ill at ease'), two ('I feel keyed up, over excited'), and fifteen ('I am suffering from insomnia') loaded on both factors. Although there were small differences between each pair of values, they were all higher on factor one. It makes conceptual sense that these items could relate more to the experience of somatic symptoms rather than signs of stress. Item number eighteen ('I am having more alcohol and other drugs than usual') did not load on either factor and showed a very low communality value.

In essence, items from the Somatic Symptoms and Signs of Stress scales showed a factor structure that was predominantly two-dimensional. Each scale was characterised by high inter-item reliabilities and positive significant correlations of appropriate strength with the ICS. The Somatic Symptoms and Signs of Stress scales both appear to have good face and content validity. Given the positive correlations with the ICS, it would seem that the scales also have convergent construct validity relating to 'state' stress (de Vaus, 1995; Cohen, Swerdlik & Phillips, 1996).

### ***Data File Preparation***

Prior to any analyses being performed, the data file required preparatory action involving the coding of responses to the Emotional Inhibition screening measure, modification of missing values and range type responses, reverse-scoring of ICS items and calculation of totals according to the formula advocated by Fischer and Corcoran (1994), and summing of scores on the Somatic Symptoms and Signs of Stress scale items.

The Emotional Inhibition sub-scale was used to identify participants as either 'expressors' or 'repressors'. After assigning values of (1) for True and (0) for False and reverse scoring items 2, 5, 6, 8, 12, and 14, the scores were summed to give a total ranging from 0 - 14. Scores from zero to six were considered representative of emotional expression and scores from seven to thirteen were considered representative of emotional repression (no scores of 14 were obtained).

The data set contained five missing values. A conservative measure of means substitution was employed whereby the means were calculated from the available data and substituted for the missing values (Tabachnick & Fidell, 1996).

The data set contained eleven values that had been scored in a range format (e.g. 3-4; 6-7) rather than as a single score. The values were entered as representing the mid-point of the range (e.g. 3-4 was entered as 3.5; 6-7 was entered as 6.5).

The ICS required reverse-scoring of items 5, 10, 14, and 20, summing of these and the remaining scores, subtracting the number of completed items, multiplying this figure by 100, and dividing by the number of items completed multiplied by 6. Higher scores indicated greater magnitude or severity of stress (Fischer & Corcoran, 1994). The Somatic Symptoms and Signs of Stress scales required summing of scores. The totals on the ICS, Somatic Symptoms and Signs of Stress scales represented the three dependent variables.

### ***Data Screening***

Prior to any analyses being performed, the data was screened for accuracy and univariate and multivariate outliers. The outliers and multivariate analysis assumptions of normality, homogeneity of variance, homogeneity of covariance and sphericity were tested using SPSS 7.5 for Windows. Variables were examined by the total sample and by cell.

Two univariate outliers were identified by Z scores greater than 3.29 ( $p < .001$ ). One case in the expressor-profound group showed an extreme score on the post-test Signs of Stress dependent variable. Following data examination, and as recommended by Tabachnick and Fidell (1996), the case was retained and the score value was modified to one score larger than the next most extreme score to reduce the impact on the distribution. One case in the repressor-profound group, showed extreme scores on the pre-test Somatic Symptoms and pre-test Signs of Stress dependent variables. As this case was also identified as a multivariate outlier by a Mahalanobis distance greater than 22.458 ( $p < .001$ ), it was deleted from the analysis (Tabachnick & Fidell, 1996). One case in the repressor-profound group, and one case in the expressor-profound group, were also identified as multivariate outliers using the Mahalanobis distance criteria. These cases showed an unusual pattern of scores and were therefore deleted from the analysis (Tabachnick & Fidell, 1996). The remaining total sample was 114, and cell sizes and the associated demographic data of age and sex are shown in Table 1.

Table 1

*Cell Sizes, Age and Sex for the Total Sample*

Cell	<i>n</i>	Age <i>M</i>	<i>SD</i>	Males	Females	Missing Values
Repressor-Distractor	26	26.10	11.37	7	18	1
Expressor-Distractor	40	29.30	11.07	2	35	3
Expressor-Profound	30	23.60	6.85	1	24	5
Repressor-Profound	18	24.10	11.09	2	14	2

To reduce ambiguity of results due to unequal cell sizes, consideration was given to equalising the cells through random deletion of cases from cells with larger numbers. However, as the emotion style groups were formed during the initial and non-experimental phase of the study, the sample sizes reflected true differences in the numbers of different kinds of participants. Tabachnick and Fidell (1996) cautioned that under these circumstances, “to artificially equalize the  $n$  is to distort the differences and lose generalizability” (p. 48). Therefore, the cell sizes were not equalised for analysis.

The assumption of normality was found to be violated, as demonstrated by a significant Kolmogorov-Smirnov Lilliefors Significance Correction on the pre-test Somatic Symptoms and Signs of Stress variables, and the post-test ICS and Somatic Symptoms variables. Although inspection of the statistics, histograms, and stem-and-leaf plots indicated some positive skewness plus some positive or negative kurtosis across all variables, Stevens (1996) indicated that skewness and kurtosis have only minor effects on power and significance levels. Further, bivariate correlation scatterplots of all variable pairs were approximately elliptical, which indicated satisfactory bivariate normality, linearity and homoscedasticity (Stevens, 1996). Bock (cited in Stevens, 1996, p. 243) stated that ‘for moderately non-normal distributions, the approximation [to normality] is good with as few as 10 to 20 observations.’

Therefore, because the deviations were not deemed severe enough to warrant variable transformation, and as the analysis of variance is considered a robust statistical procedure with relatively minor effects resulting from the normality violation (Shavelson, 1988; Tabachnick & Fidell, 1996; Howell, 1997), the data was left in an untransformed state to retain interpretation and meaningfulness.

The decision to retain unequal cell sizes and untransformed data was supported by satisfactory assumptions of homogeneity of variance and covariance for all groups. Levene's Test of Equality of Error Variances showed probability values greater than .05, and Box's Test of Equality of Covariance Matrices showed probability values greater than .001. Although the analysis did not produce Mauchly's sphericity significance values, this assumption was deemed satisfactory as sphericity is viewed as a more general condition related to symmetry of the covariance matrix (Howell, 1997).

### ***Main Analyses Testing the Matching Hypothesis***

Prior to any analyses testing the matching hypothesis, consideration was given to the use of Multivariate Analysis of Variance (MANOVA) because the study employed multiple dependent variables. However, MANOVA measures several dependent variables at the same time instead of one at a time (Howell, 1997; Tabachnick & Fidell, 1996). As this study sought to measure the dependent variables as discrete variables, MANOVA was not deemed suitable. Thus, the dependent variables were analysed using a series of split plot analysis of variance (SPANOVA) tests.

With an alpha level set at .05, all data was analysed using SPSS 7.5 for Windows, General Linear Model. Three 2 x 2 x 2 (time x emotion group x intervention) SPANOVA tests were performed on the ICS, Somatic Symptoms and Signs of Stress dependent variables separately.

***For the ICS***, there was a significant main effect of time,  $F(1, 110) = 6.89, p = .01, \eta^2 = .06$ , with a significant reduction in stress from pre-test to post-test measurement (see Table 2). There were no other significant main effects or



interactions. The ICS descriptive statistics are shown in Table 2 and all ICS ANOVA results are shown in Table 3.

Table 2

*Descriptive Statistics for the ICS for All Participants*

Condition	<i>n</i>	Pre-test		Post-test	
		<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Repressor-Distractor	26	37.38	14.56	35.64	16.66
Expressor-Distractor	40	33.74	16.81	31.80	17.00
Expressor-Profound	30	37.16	15.71	34.11	13.46
Repressor-Profound	18	36.93	13.59	33.96	13.82
TOTAL	114	35.98	15.44	33.62	15.44

Table 3

*ANOVA Results for the ICS for All Participants*

Main Effects and Interactions	<i>F</i>	<i>df</i>	<i>p</i>	$\eta^2$
Time	6.89	(1,110)	.010 *	.059
Time x Expression Style	0.01	(1,110)	.938	.000
Time x Writing Intervention	0.40	(1,110)	.531	.004
Time x Expression Style x Writing Intervention	0.00	(1,110)	.975	.000
Expression Style	0.38	(1,110)	.541	.003
Writing Intervention	0.97	(1,110)	.757	.001
Expression Style x Writing Intervention	0.46	(1,110)	.498	.004

\*  $p < .05$ .

*For the somatic symptoms*, there were no significant main effects or interactions, with no significant reductions in somatic symptoms from pre-test to post-test measurement. However, there was a trend toward a time x writing intervention interaction,  $F(1,110) = 3.47, p = .07, \eta^2 = .03$  (see Table 5). The Somatic Symptoms descriptive statistics are shown in Table 4 and all Somatic Symptoms ANOVA results are shown in Table 5.

Table 4

*Descriptive Statistics for Somatic Symptoms for All Participants*

Condition	n	Pre-test		Post-test	
		M	SD	M	SD
Repressor-Distractor	26	48.96	17.67	45.96	16.02
Expressor-Distractor	40	44.08	15.05	42.29	14.08
Expressor-Profound	30	51.00	15.92	52.57	15.45
Repressor-Profound	18	46.67	13.20	46.83	13.21
TOTAL	114	47.42	15.70	46.55	15.13

Table 5

*ANOVA Results for Somatic Symptoms for All Participants*

Main Effects and Interactions	<i>F</i>	<i>df</i>	<i>p</i>	$\eta^2$
Time	0.76	(1,110)	.385	.007
Time x Expression Style	0.56	(1,110)	.457	.005
Time x Writing Intervention	3.47	(1,110)	.065	.031
Time x Expression Style x Writing Intervention	0.00	(1,110)	.957	.000
Expression Style	0.02	(1,110)	.895	.000
Writing Intervention	1.93	(1,110)	.167	.017
Expression Style x Writing Intervention	2.69	(1,110)	.104	.024

\* &lt; .05.

*For the signs of stress* there was a significant main effect of time,  $F(1, 110) = 7.32, p = .01, \eta^2 = .06$ , with a significant reduction in stress from pre-test to post-test measurement (see Table 6). There were no other significant main effects or interactions. The Signs of Stress descriptive statistics are shown in Table 6 and all Signs of Stress ANOVA results are shown in Table 7.

Table 6

*Descriptive Statistics for Signs of Stress for All Participants*

Condition	<i>n</i>	Pre-test		Post-test	
		<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Repressor-Distractor	26	54.40	16.27	48.73	14.55
Expressor-Distractor	40	46.21	15.01	44.16	16.71
Expressor-Profound	30	51.97	14.11	51.18	13.41
Repressor-Profound	18	52.04	14.63	50.72	12.34
TOTAL	114	50.51	15.19	48.09	14.88

Table 7

*ANOVA Results for Signs of Stress for All Participants*

Main Effects and Interactions	<i>F</i>	<i>df</i>	<i>p</i>	$\eta^2$
Time	7.32	(1,110)	.008 *	.062
Time x Expression Style	1.31	(1,110)	.254	.012
Time x Writing Intervention	2.39	(1,110)	.125	.021
Time x Expression Style x Writing Intervention	0.73	(1,110)	.395	.007
Expression Style	1.26	(1,110)	.265	.011
Writing Intervention	1.26	(1,110)	.264	.011
Expression Style x Writing Intervention	1.42	(1,110)	.236	.013

\*  $p < .05$ .

An additional question in the present study was to investigate the discrepancy hypothesis, which predicted that the repressors would show high stress on the Somatic Symptoms scale, but low stress on the ICS and Signs of Stress scales. It was predicted that expressors would show the opposite pattern. The pattern of results did not show this, with the repressors rating themselves slightly higher on the ICS ( $M = 37.20$ ,  $SD = 14.01$ ), the Signs of Stress ( $M = 53.44$ ,  $SD = 15.49$ ), and the Somatic Symptoms scale ( $M = 48.02$ ,  $SD = 15.86$ ) than the expressors did on the ICS ( $M = 35.21$ ,  $SD = 16.32$ ), the Signs of Stress ( $M = 48.67$ ,  $SD = 14.81$ ), and the Somatic Symptoms scale ( $M = 47.04$ ,  $SD = 15.70$ ).

Because some participants did not complete any writing sessions, and formed a naturally occurring non-random control group, this allowed testing of the question as to whether the significant time differences for the total sample were directly influenced by those who had completed the writing sessions. Therefore, three  $2 \times 2 \times 2$  SPANOVA tests were performed for participants who had completed one or more writing sessions, and three  $2 \times 2 \times 2$  SPANOVA tests were performed for those who had not performed any writing sessions.

### ***Participants Who Performed One or More Writing Sessions***

*For ICS*, there was a significant main effect of time,  $F(1, 62) = 4.17$ ,  $p = .05$ ,  $\eta^2 = .06$ , with a significant reduction in stress from pre-test to post-test measurement (see Table 8). There were no other significant main effects or interactions. However, there was a trend toward a significant interaction of time  $\times$  writing intervention for ICS,  $F(1, 62) = 3.76$ ,  $p = .06$ ,  $\eta^2 = .06$  (see Table 9). The ICS descriptive statistics are shown in Table 8 and all ICS ANOVA results are shown in Table 9.

Table 8

*Descriptive Statistics for ICS for Participants who Performed the Writing Tasks*

Condition	<i>n</i>	Pre-test		Post-test	
		<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Repressor-Distractor	15	38.71	16.33	40.49	17.86
Expressor-Distractor	23	33.07	17.02	31.04	16.10
Expressor-Profound	16	44.45	16.66	38.04	14.35
Repressor-Profound	12	39.17	14.22	35.78	15.46
TOTAL	66	38.22	16.52	35.75	16.08

Table 9

*Anova Results for ICS for Participants who Performed the Writing Tasks*

Main Effects and Interactions	<i>F</i>	<i>df</i>	<i>p</i>	$\eta^2$
Time	4.17	(1,62)	.046 *	.063
Time x Expression Style	1.92	(1,62)	.171	.030
Time x Writing Intervention	3.76	(1,62)	.057	.057
Time x Expression Style x Writing Intervention	0.03	(1,62)	.873	.000
Expression Style	0.23	(1,62)	.630	.004
Writing Intervention	0.82	(1,62)	.369	.013
Expression Style x Writing Intervention	2.11	(1,62)	.152	.033

\*  $p < .05$ .

*For somatic symptoms*, there were no significant within-subjects main effects or significant interactions. There were no significant between-subjects main effects. However there was a significant interaction of expression style by writing intervention,  $F(1, 62) = 4.78, p = .03, \eta^2 = .07$ . Post hoc comparisons conducted using Tukey's HSD pairwise comparisons, showed no significant differences between any of the groups. The Somatic Symptoms descriptive statistics are shown in Table 10 and all Somatic Symptoms ANOVA results are shown in Table 11 (see Appendix L for Tukey's HSD pairwise comparisons).

Table 10

*Descriptive Statistics for Somatic Symptoms for Participants who Performed the Writing Sessions*

Condition	<i>n</i>	Pre-test		Post-test	
		<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Repressor-Distractor	15	53.07	19.05	50.73	17.12
Expressor-Distractor	23	42.67	16.45	41.35	14.63
Expressor-Profound	16	53.63	15.25	54.25	14.77
Repressor-Profound	12	46.50	15.32	47.00	15.48
TOTAL	66	48.39	16.95	47.64	15.92

Table 11

***ANOVA Results for Somatic Symptoms for Participants who Performed the Writing Sessions***

<b>Main Effects and Interactions</b>	<b><i>F</i></b>	<b><i>df</i></b>	<b><i>p</i></b>	<b><math>\eta^2</math></b>
Time	0.35	(1,62)	.558	.006
Time x Expression Style	0.07	(1,62)	.793	.001
Time x Writing Intervention	1.24	(1,62)	.270	.020
Time x Expression Style x Writing Intervention	0.04	(1,62)	.838	.001
Expression Style	0.12	(1,62)	.731	.002
Writing Intervention	0.75	(1,62)	.389	.012
Expression Style x Writing Intervention	4.78	(1,62)	.033 *	.072

\*  $p < .05$ .

***For the signs of stress***, there was a significant main effect of time,  $F(1,62) = 4.68, p = .03, \eta^2 = .07$ , with a significant reduction in stress from pre-test to post-test measurement (see Table 12). There were no other significant main effects or interactions. However, there was a trend toward an interaction of expression style x writing intervention for Signs of Stress,  $F(1,62) = 3.44, p = .07, \eta^2 = .05$  (see Table 13). The Signs of Stress descriptive statistics are shown in Table 12 and all Signs of Stress ANOVA results are shown in Table 13.



Table 12

***Descriptive Statistics for Signs of Stress for Participants who Performed the Writing Sessions***

Condition	n	Pre-test		Post-test	
		M	SD	M	SD
Repressor-Distractor	15	56.57	19.42	52.93	15.67
Expressor-Distractor	23	45.41	14.84	43.26	15.45
Expressor-Profound	16	56.88	13.29	54.46	15.23
Repressor-Profound	12	53.31	16.38	51.17	13.13
TOTAL	66	52.16	16.38	49.61	15.47

Table 13

***ANOVA Results for the Signs of Stress for Participants who Performed the Writing Sessions***

Main Effects and Interactions	F	df	p	$\eta^2$
Time	4.68	(1,62)	.034 *	.070
Time x Expression Style	0.06	(1,62)	.801	.001
Time x Writing Intervention	0.07	(1,62)	.798	.001
Time x Expression Style x Writing Intervention	0.14	(1,62)	.715	.002
Expression Style	0.87	(1,62)	.354	.014
Writing Intervention	1.39	(1,62)	.242	.022
Expression Style x Writing Intervention	3.44	(1,62)	.069	.053

\*  $p < .05$ .

***Participants Who Did Not Perform Any Writing Sessions***

Three 2 x 2 x 2 SPANOVA tests were performed on participants who had not performed any writing sessions. For the ICS, there was a significant main effect of time,  $F(1,42) = 6.61, p = .01, \eta^2 = .14$ , with significant reductions in stress from pre-test to post-test measurement (see Table 14). The ICS descriptive statistics are shown in Table 14 and all ICS significance values are shown in Table 15.

Table 14

***Descriptive Statistics for ICS for Participants who did not perform any Writing Sessions***

Condition	n	Pre-test		Post-test	
		M	SD	M	SD
Repressor-Distractor	11	35.58	12.25	29.03	12.81
Expressor-Distractor	16	34.13	17.42	30.96	17.51
Expressor-Profound	13	29.56	9.47	29.13	11.52
Repressor-Profound	6	32.44	12.14	30.33	9.98
TOTAL	46	32.96	13.43	29.90	13.63

\*  $p < .05$

Table 15

*Anova Results for ICS for Participants who did not perform any Writing Sessions*

<b>Main Effects and Interactions</b>	<b><i>F</i></b>	<b><i>df</i></b>	<b><i>p</i></b>	<b><math>\eta^2</math></b>
Time	6.61	(1,42)	.014 *	.136
Time x Expression Style	1.12	(1,42)	.295	.026
Time x Writing Intervention	2.26	(1,42)	.140	.051
Time x Expression Style x Writing Intervention	0.13	(1,42)	.723	.003
Expression Style	0.05	(1,42)	.831	.001
Writing Intervention	0.24	(1,42)	.628	.006
Expression Style x Writing Intervention	0.07	(1,42)	.788	.002

\*  $p < .05$ .

*For somatic symptoms*, there were no significant main effects or interactions. The Somatic Symptoms descriptive statistics are shown in Table 16 and all Somatic Symptoms ANOVA results are shown in Table 17.

Table 16

*Descriptive Statistics for Somatic Symptoms for Participants who did not perform any Writing Sessions*

Condition	n	Pre-test		Post-test	
		M	SD	M	SD
Repressor-Distractor	11	43.36	14.58	39.45	12.26
Expressor-Distractor	16	45.76	13.55	43.31	14.06
Expressor-Profound	13	48.31	17.35	49.54	16.66
Repressor-Profound	06	47.00	8.69	46.50	8.14
TOTAL	46	46.07	14.06	44.57	13.97

Table 17

*ANOVA Results for Somatic Symptoms for Participants who did not perform any Writing Sessions*

Main Effects and Interactions	F	df	p	$\eta^2$
Time	0.84	(1,42)	.362	.020
Time x Expression Style	0.28	(1,42)	.602	.007
Time x Writing Intervention	1.35	(1,42)	.252	.031
Time x Expression Style x Writing Intervention	0.00	(1,42)	.966	.000
Expression Style	0.40	(1,42)	.533	.009
Writing Intervention	1.33	(1,42)	.255	.031
Expression Style x Writing Intervention	0.01	(1,42)	.911	.000

\*  $p < .05$ .

*For signs of stress*, there was a significant main effect of time,  $F(1, 42) = 4.32$ ,  $p = .04$ ,  $\eta^2 = .09$ , with significant reductions in stress from pre-test to post-test measurement (see Table 18). There were no other significant main effects or interactions for Signs of Stress. The Signs of Stress descriptive statistics are shown in Table 18 and all Signs of Stress significance values are shown in Table 19.

Table 18

*Descriptive Statistics for Signs of Stress for Participants who did not perform any Writing Sessions*

Condition	<i>n</i>	Pre-test		Post-test	
		<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Repressor-Distractor	11	51.45	10.82	43.00	11.07
Expressor-Distractor	16	47.42	16.14	45.81	19.22
Expressor-Profound	13	47.08	13.56	46.00	9.11
Repressor-Profound	6	49.50	11.22	49.83	11.69
TOTAL	46	48.56	13.38	45.72	13.85

Table 19

***ANOVA Results for Signs of Stress for Participants who did not perform any Writing Sessions***

<b>Main Effects and Interactions</b>	<b><i>F</i></b>	<b><i>df</i></b>	<b><i>p</i></b>	<b><math>\eta^2</math></b>
Time	4.33	(1,42)	.044 *	.093
Time x Expression Style	1.09	(1,42)	.302	.025
Time x Writing Intervention	3.22	(1,42)	.080	.071
Time x Expression Style x Writing Intervention	2.52	(1,42)	.120	.057
Expression Style	0.20	(1,42)	.659	.005
Writing Intervention	0.08	(1,42)	.780	.002
Expression Style x Writing Intervention	0.09	(1,42)	.766	.002

\*  $p < .05$ .

***Power Analysis***

Prior to power analysis, as a simple test of the matching hypothesis that allowed a power calculation, the pre-post matched and mismatched conditions were compared within each dependent variable. To enable such comparison, the means for all conditions within each dependent variable were compressed to represent single mean values for the matched expressor-profound and repressor-distractor and the mismatched expressor-distractor and repressor-profound groups. Independent  $t$  tests were performed which indicated that for the ICS, there was no significant difference between the groups,  $t(112) = .10, p > .05$ . The means were 2.44 ( $SD = 10.44$ ) for the

matched group and 2.26 ( $SD = 8.27$ ) for the mismatched group. For Somatic Symptoms, results indicated no significant difference between the groups,  $t(112) = -.37, p > .05$ . The means were .55 ( $SD = 9.79$ ) for the matched group and 1.18 ( $SD = 8.27$ ) for the mismatched group. For Signs of Stress, results indicated no significant difference between the groups,  $t(112) = .70, p > .05$ . The means were 3.06 ( $SD = 10.42$ ) for the matched group and 1.81 ( $SD = 8.25$ ) for the mismatched group.

To assess whether the sample size was adequate to detect an effect, a power analysis was conducted. Using a harmonic mean of 56.98245 to account for unequal sample sizes of 56 and 58, power was assessed at .77 for a medium effect size of .50 (Howell, 1997). This was only slightly less than the .80 level of power recommended by Cohen (1992). This indicated that had there been a medium effect size, there would have been a 77 percent chance of detecting it. With recommendations of sample sizes of 126 (Howell, 1997) or 128 (Cohen, 1992) needed to detect a medium effect size, indications were that the initial sample size of 230 would have provided an adequate sample to detect a medium effect size.

### ***Qualitative Data***

In order to gain detailed insight into participatory characteristics, a content analysis was performed on the Study Feedback Checklist. Content analysis revealed that 98.2% of participants responded to the Feedback Checklist. Of those who responded, 58.9% performed one or more writing sessions and 41.1% completed only the pre-test and post-test questionnaires.

The majority of participants (91.7%) indicated that the questionnaires had covered their experiences related to stress. Participants who indicated that this had not been the case (8.3%), stated additional experiences of “a ‘roller coaster’ movement in mental states between positive rational, negative rational, positive emotional and negative emotional”; “throwing up”; “what makes you not feel stressed”; “teeth-chattering, legs trembling”; “I just feel like crying”; “should have left a space for self-report of experiences when stressed”; and “calm”.

The majority of participants (95.2%) had followed the writing instructions, and had found the sessions helpful (62.5%), easy to do (91.5%), and not too time consuming (59.3%). A slight majority of participants had not previously used writing as a way of reducing stress (51.4%), although many had utilised writing as an emotional release (48.6%). The majority of participants (69.9%) stated they would continue to use writing as a way of reducing stress. A summary of the content analysis is shown in Table 20.

Participants were asked to rate how stressful the writing sessions had been to perform. A five point scale with a range from 1 (stress reducing) to 5 (stress producing) was provided for responses. Sixty seven participants responded to the question (58.8% of all participants). The results indicated that the two greatest proportions of participants experienced the writing sessions as mildly stress reducing and mildly stress producing to perform. Responses to the scale are shown in Table 21.



Table 20

*Summary of Participatory Characteristics Derived from the Study Feedback**Checklist*

	<u>n</u>	Proportion of Total Participants %	Yes %	No %
Number of Writing Sessions Performed	112	98.20		
- None	46	41.10		
- One to Two	29	25.90		
- Three or more	37	33.00		
Questionnaire Covered the Stress Experience	109	95.60	91.70	8.30
Writing Instructions were Followed	63	55.30	95.20	4.80
Writing Sessions :				
- Helpful	56	49.10	62.50	37.50
- Easy	59	51.80	91.50	8.50
- Difficult	50	43.90	14.00	86.00
- Too Time Consuming	54	47.40	40.70	59.30
Prior Use of Writing To Relieve Emotion	109	95.60	48.60	51.40
Would Continue Use of Writing	93	81.60	69.90	30.10

Table 21

*Responses to Writing Session Stress Rating Scale*

	1	2	2.5	3	4	5
Writing Stress Rating	11.9%	31.3%	3.0%	43.3%	10.4%	0%

***Thematic Content Analysis.*** A thematic content analysis was also performed on comments submitted by participants. The inter-rater reliability scores obtained for the content analysis were 100% and 97% respectively. The content analysis demonstrated that the most common themes to emerge for not performing any writing sessions, or for not performing more writing sessions were, being too busy, too stressed, not stressed, and forgot. Three participants indicated that the writing sessions had caused them to feel worse, and three participants specifically commented that the writing sessions had caused them to feel better. A summary of the most commonly emerging themes is shown in Table 22.

Table 22

*Summary of Thematic Content on Participant Responses and Reflections on the Writing Sessions*

	Writing Sessions Performed	Expressor Profound	Repressor Distractor	Expressor Distractor	Repressor Profound
Too Busy	0	7	2	6	2
	1-2	1	1	3	-
	3+	1	-	1	-
Too Stressed	0	-	1	-	-
	1-2	-	-	3	-
	3+	-	1	-	-
Not Stressed	0	6	5	3	3
	1-2	3	2	4	3
	3+	-	-	-	-
Forgot	0	2	2	10	4
	1-2	-	1	-	1
	3+	-	-	-	-
Felt Better/Worse after Writing	0	-	-	-	-
	1-2	-	1 (w)	-	-
	3+	2 (w)	1 (b)	2 (b)	-

**Note.** Dashes indicate no responses  
(w) denotes feeling worse after writing  
(b) denotes feeling better after writing

## Discussion

The present study tested the discrepancy hypothesis using the ICS and Signs of Stress scales and the Somatic Symptoms scale to assess whether prior to the intervention, expressors would report higher levels of stress and lower somatic symptom levels, and whether repressors would report lower stress and higher somatic symptoms. This study also extended previous research by testing the matching hypothesis. The matching hypothesis was tested using a writing paradigm developed by James Pennebaker (Pennebaker & Beall, 1986) to explore the effects of matching and mismatching individuals' emotional coping styles of expression and repression to profound emotional and distractor writing tasks.

It was hypothesised that when expressors were matched to the profound writing task and repressors were matched to the distractor writing task, significant decreases in stress and somatic symptom levels would result. It was further hypothesised that when expressors were mismatched to the distractor writing task, and repressors to the profound writing task, stress and somatic symptom levels would not significantly decrease. Findings indicated that the discrepancy hypothesis and the matching hypothesis were not supported based on measures taken from the ICS, Signs of Stress, and Somatic Symptoms scales.

### *The Discrepancy Hypothesis*

In testing the discrepancy hypothesis, the pattern of results across the ICS, Signs of Stress, and Somatic Symptoms scales showed repressors to be slightly higher than expressors on all measures. Therefore, the discrepancy hypothesis was not supported. As Kohlmann (1993) indicated, the discrepancy hypothesis was based on a repression-sensitization construct that deemed repressors to defensively deny their

feelings of anxiety on a subjective level, but to experience greater reactivity on a physiological level. On the other hand, sensitizers do not block their feelings and will express anxiety, which consequently lessens physiological reactivity.

The results do not support Weinberger, et al. (1979) who confirmed the discrepancy hypothesis by using self-report scales of trait anxiety, defensiveness, and social desirability as subjective measures, and the physiological indices of heart rate, skin resistance changes, and muscular tension as objective measures of responses to stressful situations. This may indicate that the construct of repression-sensitization is more sensitive to anxiety measures than to the stress measures used in the present study.

The pattern of results may also indicate that although expressors and sensitizers seem similar, in that they both form an opposite pole to that of repressors, the construct of expressors may be quite different to that of sensitizers. The findings may also reflect differences in definitions of stress, with Weinberger, et al. (1979) viewing stress as a stimulus, and this study viewing stress as the result of relational appraisals (Lazarus & Folkman, 1984). As the present study used self-report measures of somatic symptoms to reflect physiological indices, the results may provide evidence that self-report and objective measures of physiological stress do not equate to each other. Also, given the stress scales used in this study, it may be that stress and anxiety cannot be viewed as measuring the same responses in terms of the meaning held by the individual.

Importantly, in identifying expressors and repressors, the present study used a median split definition. Allen and Kadden (1995) indicated that separating groups at the median often results in participants who differ only slightly being assigned to

opposing groups. This can diminish observed interaction effects between the client variable in question and the intervention, through only having extreme high or low levels of the participant characteristic available for a true effect.

It is possible that the present study suffered somewhat from this effect, as expressors were assigned through attaining scores ranging from zero to six, and repressors were assigned through scores ranging from seven to thirteen. This method was used to ensure adequate  $n$  across the four conditions to enable the matching hypothesis to be tested. However, it may have led to expressors inadvertently being assigned to the repressor group, which could have resulted in diminished numbers of true expressors and repressors being available for observations of interactive effects.

### ***The Matching Hypothesis***

In testing the matching hypothesis, there was a significant reduction in stress levels over time as measured by both the ICS and the Signs of Stress scales. These findings occurred for the total sample, for those who performed one or more writing sessions, and for those who did not perform any writing sessions. There were no significant interactive effects between emotional coping style and writing task for any of the three groups. There were no significant somatic symptom reductions over time for any of the three groups, and no significant interactions for the total sample or for those who had not performed any writing sessions.

For the group comprising participants who had performed the writing sessions, there was a significant emotional coping style by writing task interaction. Post hoc comparisons failed to show any significant differences, thereby indicating that the effects were widely diffused across all conditions.

The findings of this study partially support Weinberger and Schwartz (1990) who found no significant differences between repressors and controls on self-reports of physical symptoms such as colds, sore throat, digestive upset, ear complaints, skin irritation, or muscular pain. However, with an overall finding in previous research that “written emotional expression produces significant health benefits in healthy participants” (Smyth, 1998, p. 179), the present results do not support the notion of relationships between emotional expression, repression, health, and efficacious effects of the writing paradigm that formed the base from which the matching hypothesis was conceived.

Whilst the concept of matching emotional coping styles to writing tasks to reduce stress seems intuitively sound, in this study, matching did not make a significant difference to levels of stress and somatic symptoms. The finding of reductions in stress, irregardless of whether or not participants had performed any writing tasks, raises a major question. That is, what caused participants’ stress levels to reduce over the two week period? Given that at the pre-test time, students had recently returned to university from a semester break, it would seem reasonable to assume that stress levels would not have been excessively high. Further, at the time of the post-test, two weeks later, students were under academic pressure to complete pieces of assessment every week. In short, their workload was increasing steadily, and logically, so too were their stress levels.

In considering timing effects, the study was designed specifically to take advantage of the presumed gradual rise in stress that was believed would occur at the time. The design also took into consideration a necessary balance needed to ensure

that students were experiencing enough pressure for stress to emerge, but that participating in the study would in no way hinder their academic progress. This was not viewed as a problem due to evidence from Pennebaker, et al. (1990) confirming that differences in findings were not related to the time in semester that testing took place.

Although there were similarities between this study and previous studies, such as the use of a writing paradigm, a focus on expression and repression, and measures of health outcomes, there were also differences in the writing content, duration of the intervention (Greenberg & Stone, 1992; Pennebaker & Beall, 1986; Pennebaker, et al., 1988) and the health outcome measures used (Christensen, et al., 1996; Esterling, et al., 1994; Greenberg & Stone, 1992; Pennebaker & Beall, 1986; Pennebaker, et al., 1990; Pennebaker, et al., 1988). Where previous studies used written expression of traumatic events (Christensen, et al., 1994; Greenberg & Stone, 1992; Pennebaker & Beall, 1986; Pennebaker, et al., 1988), this study followed the example of Esterling, et al. (1994) and Pennebaker, et al. (1990) of using expression of stress related emotions.

The primary differences in the present study were the use of measures directly relating to psychological and somatic state stress, the longer intervention time period, plus the matching and mismatching of emotional coping styles to the writing tasks. Given that none of the aforementioned studies used a stress measure to determine stress related emotions, or tested a matching hypothesis, it is not unreasonable to find conflicting results.

The notion of tailoring interventions specifically to the needs of the individual has been widely endorsed (Miller & Hester, 1995). The concept of matching hypotheses



is important if those within treatment fields are to discover variables that reliably predict which interventions are best suited to particular personality styles or subtypes (Monti, Rohsenow, Colby, & Abrams, 1995).

One treatment area with a particular interest in matching clients to the most optimal interventions is that of the alcohol treatment field. However, results in this area have been equivocal (Miller, et al., 1995). Whilst some clients have benefited from client-treatment matching, others have gained less from treatment deemed effective for their subtype and gained more from mismatched treatment (Allen & Kadden, 1995).

More recent attempts at matching differ from earlier efforts as they now tend to be scientifically grounded rather than simply conceived through serendipity. Researchers today tend to hypothesise matching effects and variables in a systematic and theoretically based manner before proceeding to careful design of the study (Allen & Kadden, 1995).

Design of the present study adhered to stringent, systematic, and theoretically based steps, and the finding of reductions in stress for the group as a whole, and for those who did and did not perform any writing tasks, presents a challenging result. One explanation for the results may be that of the Hawthorne effect (Babbie, 1998). The Hawthorne effect was so named after a study was conducted on working conditions and productivity in Hawthorne, Illinois.

Researchers found that as working conditions were gradually improved, so did productivity. However, in an attempt to substantiate the findings, some of the improvements in working conditions were purposely diminished. The result was that productivity again improved. The conclusion reached was that workers were

responding to the attention they were receiving rather than to any changes in working conditions (Babbie, 1998). Therefore, it is feasible that participants in the present study were positively responding to the interest being shown in them with respect to their stress levels and well-being.

A different effect also warranting consideration is that of the placebo effect, in which improvement in psychological or physical conditions is attributable to expectations of improvement rather than to specific treatment ingredients (Davison & Neale, 1998). This has been seen to occur in medical settings whereby patients may be prescribed biologically ineffective medication (a placebo) but feel better because they expect to do so (Feldman, 1995).

The reasoning accompanying the Hawthorne and placebo effects is important, and warrants pause for reflection. In this study, students in their first semester of university were approached by a researcher who imparted three key pieces of information. First, there was explicit empathic acknowledgment of how stressful that particular time and situation could be. Second, there was open self-disclosure on the part of the researcher about having experienced a similar situation. Third, students were presented with implicit 'living proof' that no matter how stressful the first semester could be, it was possible to survive the experience and progress to higher levels of study.

The Hawthorne effect may have been in operation due to the attention being given to students through the empathic acknowledgement of their situation. The self-disclosure of having experienced a similar situation may have lessened the psychological gap between researcher and students, and produced an additive effect

to the attention. The elements of empathic acknowledgement and self-disclosure are aligned with the ideas of Jourard (1971) who found that in psychological research, if an experimenter initially reduces psychological distance by self-disclosing, participants will also be more willing to self-disclose.

The third implicit piece of information may have created a placebo type effect in the following way. Meeting a student who had not only experienced a similar situation, but had survived the stress to progress to Honours level, could have led to cognitive reappraisals of a more positive and efficacious nature. This may have progressed to an attitude of 'if someone else can do it, so can I', and more positive expectancies of their own abilities.

In support of the notion of the value of cognitive reappraisal, Murray, Lamnin, and Carver (1989) used written expression of feelings about both stressful life events and trivial topics as a therapeutic intervention, and compared it to brief psychotherapy. Findings were that resolution of distress was more prevalent with psychotherapy than with writing. With psychotherapy, individuals showed greater self-esteem, adaptive and cognitive changes than with written expression. The pertinent findings were that although some adaptive changes could occur through writing about stressful events, the key element to emotional resolution is cognitive reappraisal.

Because cognitive appraisals are deemed to have a bidirectional relationship to emotion (Lazarus, 1991), the reappraisals may have led to thoughts which influenced emotion, which then influenced further thoughts and behaviour. In addition, it is possible that bringing a focus to participant stress increased its salience, which then raised awareness and prompted the use of natural stress reducing coping strategies.

In summary, it is feasible that at the pre-test session, students were experiencing stress, and that the reductions in stress over time were the result of a combination of the Hawthorne effect, a placebo effect, and a therapeutic alliance with the researcher. This may have led to cognitive and emotional reframing which culminated in more adaptive use of natural stress reducing behaviour.

In examining further variables that may have contributed to the stress reductions, it was noted that at the recruitment pre-test session, students were openly receptive to participating in the study, and this was confirmed by an initial sample of 230 students. Following the two week intervention period, there was evidence that participation had been given serious consideration and that perceptions about the interventions and the study in general were positive. The value of gaining qualitative data through inclusion of a feedback checklist became evident.

The qualitative data revealed that 98.2 percent of participants took the time to complete the feedback checklist, together with writing comments about the study and the effects of the writing tasks. A content analysis showed that the majority of participants had performed one or more writing sessions. Also, positive comments were given such as “good work, thanks for doing this study”; “my writing was interesting in that it took my focus away from what was stressful onto something trivial. It helped”; “great project, more needs to be done in this area”; and “I am feeling very, very unstressed these days, ta muchly!”

The comments above provided a valuable assessment of the general attitude toward the study and the interventions. Slightly less positive comments added a balanced assessment and revealed remarks such as “I didn’t like the question of how

I had to write without using emotion words. It was too difficult”; “I thought it was a little general”; “after writing essays the last thing I want to do is more writing!”; and “writing felt like more of a task. Perhaps being able to express emotions, rather than distracting would help reduce the stress”. These latter comments were indicative of some of the reasons cited for not performing the writing tasks, however the major themes that emerged were those of not feeling stressed, feeling too stressed to write, being too busy, and forgetting about performing the task.

Encouragingly, nearly 70 percent of participants who had performed the writing tasks indicated they would continue to use writing as a way of reducing stress. Three participants specifically commented on feeling better as a result of performing the writing tasks, however, three participants commented on feeling worse. This latter finding would seem to confirm the adverse mood effects found after writing by Pennebaker and Beall (1986). Such effects were confirmed as being brief in duration and as resulting in more positive long-term affect.

### ***Measurement Instruments***

As a result of the findings of this study, concerns have been raised pertaining to definitions of stress and the measures commonly used to reflect stress related responses. A review of the literature methodology was conducted pertaining to emotional coping styles of expression and repression, and their relationship to stress and mental and physical health. The review indicated that from the time of testing the discrepancy hypothesis, the terminology of anxiety and stress have been used and measured as interchangeable constructs (Kohlmann, 1993).

When Weinberger, et al. (1979) tested the discrepancy hypothesis, they used self-report scales of trait anxiety, defensiveness, and social desirability as subjective

measures, and physiological indices of heart rate, skin resistance changes, and frontal muscular tension as objective measures of responses to stressful situations.

Following this, since publication of the study by Weinberger, et al. (1979), it has become customary for researchers to use measures of trait anxiety and defensiveness to operationalise the construct of repression and to test its effect on stressful situations (Myers & Vetere, 1997).

This custom has progressed to include research that has tested the writing paradigm used in relation to the theory of inhibition and psychosomatic disease (Pennebaker & Beall, 1986). In addition, much of the research used batteries of tests measuring different aspects of psychological and health variables. For example, studies have included the state-trait anxiety inventory, a behavioral health inventory (Christensen, et al., 1996), negative mood scale, physical symptom scale (Greenberg & Stone, 1992), emotional control questionnaire, rationality/emotional defensiveness scale, personality questionnaire, coping inventory, state-trait anger inventory (Kaiser, et al., 1995), cognitive and social anxiety questionnaires, social desirability, general physical symptom inventory, health related questionnaire (Pennebaker and Beall, 1986), and state measures of negative affect, self-esteem, and self-concealment (Pennebaker, et al., 1990) as outcome measures.

The present study sought to address the issue of conflicting measures previously used to investigate the relationship between emotional coping styles, and the signs and symptoms of stress. To do so, great care was taken to locate culturally appropriate and direct measures of the constructs of interest. Attempts to locate such measures led to the use of the Emotion Inhibition subscale of the Emotional Control Questionnaire 2 (Roger & Najarian, 1989) to enable identification of expressors and repressors. The ECQ 2 is deemed capable of measuring individual differences in

stress responses through a construct tapping the “tendency to inhibit the expression of emotional responses” (Roger & Najarian, 1989, p. 845).

The search for psychologically and physiologically based measures of stress led to the discovery of a paucity of available stress scales. This was taken to reflect the evidence previously cited of the use of multiple indices to measure stress related responses. Because this study demanded the use of a state measure of stress, the search resulted in psychological signs of stress being measured through the Index of Clinical Stress, which is a unidimensional measure of perceived state stress and deemed well suited to stress measurement in research settings (Abell, 1991). Because the ICS is more relevant for clinical thresholds of stress, a second more general stress scale was utilised (Ritchie, et al., 1987). The Signs of Stress scale forms a mood and behaviour component to a published but unvalidated scale that has been used specifically in training individuals to reduce stress (Ritchie, et al., 1987). The second component to the Signs of Stress scale is the Somatic Symptoms scale, which was used to reflect physiological stress in the present study.

This study sought to establish preliminary reliability and validity for these two subscales as separate measures of psychological and somatic stress respectively. Reliability analyses confirmed internal consistency and validity for the scales, and although further analysis is needed, a principle components analysis showed tentative support for a two factor structure.

Due to the unavailability of the use of objective physiological measurement, all measures used were self-report indices. Although the use of self-report scales has been criticised (Kohlmann, 1993), it has also been viewed as a practical way of gaining participant information (Lazarus & Folkman, 1984). In addition, the use of

the same method of measurement for all variables used in the present study has been seen as an effective way of avoiding the problem of multiple method variance overlap (Lazarus & Folkman, 1984).

### ***Strengths of the Study***

The present study began from a base of testing whether self-report measures would capture the discrepancy hypothesis of discrepant psychological and physiological responses to stress. This study represented the first known research to test the matching hypothesis by implementing a minimal stress intervention that matched and mismatched emotional coping styles to therapeutic writing tasks. It was also the first known study to use direct multi-measure self-report indices of state stress in an attempt to maintain construct purity across all measures. With a dearth of such measures, the study established preliminary reliability and validity for two new state stress scales.

In doing so, the present study has utilised established theoretical and practical bases to draw together many related concepts. In an attempt to extend the boundaries of the previous research, it has addressed perceived limitations of prior studies by specifically defining stress and using measures that are applicable to the definition. It has applied stringent consideration to each aspect of the design, and the implications to students and their well-being. An attempt has been made to actively aid students in reducing their stress by implementing the interventions within a real world situation.

### ***Limitations of the Study***

The present study was limited due to an inability to measure physiological responses using an objective method, and this may have compromised findings related to the discrepancy hypothesis. Although this study acquired a quasi control



group through participants who did not perform any writing tasks, ideally, sample numbers would have been of a magnitude to enable an independently recruited control group. In addition, although the sample in this study was larger than most utilised in previous research in the area (Esterling, et al., 1994; Greenberg & Stone, 1992; Pennebaker & Beall, 1986; Pennebaker, et al., 1988), it required a median split to distinguish expressors from repressors. This may have undermined the basis from which all other findings emerged.

Although control groups are desirable additions to therapeutic research, there is an ethical dimension to denying individuals treatment that is regarded as helpful in some way. A compromise in overcoming such an issue may be to have a wait list control, whereby individuals are randomly allocated to either an intervention group or a wait list. In this way, all interested individuals eventually have the opportunity of receiving treatment.

### ***Future Directions***

In view of the differences in stress definitions, and the confusion surrounding the stress/anxiety construct and measurement, it is deemed important that future research engage in thorough and systematic investigation of these areas to separate the concepts and develop reliable and valid stress measures. This study sought to begin the process by establishing evidence of two scales that measure psychological and somatic dimensions to stress. These areas are of importance because of the potential ramifications for the body of research that follows. If the basic premise is incorrect, future research based on that premise becomes of questionable significance.

In addition, the construct of expression and repression as predominant emotional coping styles warrants further investigation and definition to clarify the characteristics involved in each style. It may only be through clear identification of

the variables involved that effective interventions can be applied. It would appear that longstanding influences have established continuing unquestioned ideas. The influences are seen as being psychodynamic notions of anxiety, defenses, and repression; stress definitions of stress as a stimulus or a response; and the subsequent conceptual overlap that has ensued. As Miller, et al. (1995) stated “the negative correlation between scientific evidence and application in standard practice remains striking .... such a gap between science and practice will not be reduced without some disciplined and demanding changes” (p. 33).

Finally, in the search for inexpensive and effective interventions to aid in the reduction of everyday stress, the present study would appear to have unexpectedly discovered a way of achieving this. The present study found reductions in stress levels at a time when stress should have been increasing, and which were not related to the assigned writing interventions. It may be that the simple act of empathic acknowledgement and self-disclosure by a senior peer provided the catalyst for changes in appraisals, emotions, and stress related behaviour.

In view of these findings, it is proposed that a simple and cost effective program that universities could employ would be for senior peers engaged in helping orientations to adopt a mentoring role to undergraduate students. In this way, senior students would gain practical experience in helping skills, and undergraduates would receive supportive and potentially stress reducing benefits. Future research examining this possibility may find confirmatory evidence to support its use in aiding students to reduce their stress.

### ***Conclusion***

Through critical analysis of the research pertaining to the emotional coping styles of expression and repression, stress related health and well-being, and the influences

of a therapeutic writing paradigm, this study firstly tested the discrepancy hypothesis of initial high stress-low physiological reactivity in expressors and low stress-high physiological reactivity in repressors. However, it was not supported. This was viewed as indicating that the original repressor-sensitizer construct upon which the discrepancy hypothesis was based may not equate to the expressor-repressor construct used in this study. It was also seen as reflecting an inability of the self-report Somatic Symptoms scale to be equated to objective physiological measures.

Secondly, and most importantly, this study tested the matching hypothesis by implementing a minimal stress intervention that matched and mismatched emotional coping styles to writing tasks. The matching hypothesis of reductions in stress when emotional coping styles were matched to writing interventions, and a lack of stress reductions when coping styles and writing interventions were mismatched, was not supported. However, findings revealed stress reductions to have occurred over time that were not related to the writing interventions. Plausible interpretations were that empathic acknowledgement and self-disclosure of a senior peer may have been a catalyst for cognitive and emotional reframing, thereby leading to changes in stress related behaviour.

This study highlighted the need for future systematic investigation and clarification of anxiety, stress, expression and repression constructs, and the measures used, as a way of breaking the theoretical spell cast by historical and longstanding influences. The concept of undergraduate student mentoring by senior peers engaged in helping orientations may provide a simple and effective way of reducing the stress that university life can hold, thereby leading to long-term positive health benefits.

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Appendix A

**INFORMATION SHEET**

**HONOURS RESEARCH PROJECT**

Dear Participant,

My Honours research will be investigating stress-related emotion, physical symptoms, and how different activities may affect these.

Participation in the study is voluntary and is in no way connected to your course or grades. Strict anonymity is assured, and you are free to withdraw at any time. You will not be paid for participation.

Please be aware that your name will not be on any of the questionnaires or study information that you give to me. The consent form with your signature will be kept separate from all other information. I will be writing reports and other publications from this study, however no participants will be identifiable.

If you would like to take part in this study, would you please complete and sign the consent form and fill in the brief questionnaires attached.

Once these have been completed, please see your package containing

- Instruction sheet
- Writing booklet - to be used on at least 3 writing sessions over the next 2 week period
- Compliance sheet - on which you will enter the dates of each writing session
- Sealed envelope containing final questionnaires - to be brought unopened to class two weeks from today.

Very occasionally, people have found that with the writing activity they initially feel slightly more stressed. However, this has been for a very brief time and followed by feeling much better.

If you experience any such concerns, please contact an appropriate agency or the ECU student counselling service on 9 400 5560. If you have any further questions about the study, please contact Pamela McNeill or Dr. Susan Gee on 9 400 5526.

Thank you very much for taking part in this research.

## Appendix B

**Consent Form**

I (the participant) have been verbally informed and have read the information sheet provided about relevant aspects of the research project. Any questions I have asked have been answered to my satisfaction. I agree to participate in this study, realising I may withdraw at any time and strict confidentiality and anonymity will be upheld. I agree that the research data gathered for this study may be published provided I am not identifiable.

Signature : .....

Date : .....

Sex : .....

Age : .....

Pamela McNeill  
Researcher

20<sup>th</sup> April, 1998

## Appendix C

**ECQ 2 Emotional Inhibition Sub-scale**

**Instructions:** Please indicate how you feel about each item by circling *either* 'True' or 'False'. If you feel that an item is neither entirely true nor false, please choose the alternative that is *most* like you. If you haven't been in the situation described, please say how you feel you would behave in that situation.

- |   |      |       |
|---|------|-------|
| (1) When someone upsets me, I try to hide my feelings.                                  | True | False |
| (2) When something upsets me I prefer to talk to someone about it than bottle it up.    | True | False |
| (3) I find it difficult to comfort people who have been upset.                          | True | False |
| (4) People find it difficult to tell whether I'm excited about something or not.        | True | False |
| (5) If I get angry or upset I usually say how I feel.                                   | True | False |
| (6) I can't help showing how I feel, even when it isn't appropriate to do so.           | True | False |
| (7) If I receive bad news in front of others I usually try to hide how I feel.          | True | False |
| (8) Sometimes I just can't control my feelings.   | True | False |
| (9) I think people show their feelings too easily.                                      | True | False |
| (10) I seldom show how I feel about things.   | True | False |
| (11) I usually manage to remain outwardly calm, even though I may be churned up inside. | True | False |
| (12) I don't feel embarrassed about expressing my feelings.                             | True | False |
| (13) Expressing my feelings makes me feel very vulnerable and anxious.                  | True | False |
| (14) If I'm pleasantly surprised, I show immediately how pleased I am.                  | True | False |

Source: Roger, D., & Najarian, B. (1989). The construction and validation of a new scale for measuring emotion control. Personality & Individual Differences, 10(8), 845-853.

## Appendix D

Age :  
Sex :**STRESS QUESTIONNAIRE****Part A**

**Instructions:** This questionnaire is designed to measure the way you feel about the amount of personal stress that you experience. It is not a test, so there are no right or wrong answers. Answer each item as carefully and as accurately as you can by placing a number beside each one as follows.

---

1 = None of the time    2 = Very rarely    3 = A little of the time    4 = Some of the time  
5 = A good part of the time    6 = Most of the time    7 = All of the time

---

1. \_\_\_\_\_ I feel extremely tense.
2. \_\_\_\_\_ I feel very jittery
3. \_\_\_\_\_ I feel like I want to scream.
4. \_\_\_\_\_ I feel overwhelmed.
5. \_\_\_\_\_ I feel very relaxed.
6. \_\_\_\_\_ I feel so anxious I want to cry.
7. \_\_\_\_\_ I feel so stressed that I'd like to hit something.
8. \_\_\_\_\_ I feel like I am stretched to the breaking point.
9. \_\_\_\_\_ It is very hard for me to relax.
10. \_\_\_\_\_ I feel very calm and peaceful.
11. \_\_\_\_\_ I feel an enormous sense of pressure on me.
12. \_\_\_\_\_ I feel very panicked.
13. \_\_\_\_\_ I feel like I am on the verge of a total collapse.
14. \_\_\_\_\_ It is very easy for me to fall asleep at night.
15. \_\_\_\_\_ I feel that I am losing control of my life.
16. \_\_\_\_\_ I feel that I am near a breaking point.
17. \_\_\_\_\_ I feel wound up like a coiled spring.
18. \_\_\_\_\_ I feel that I can't keep up with all the demands on me.
19. \_\_\_\_\_ I feel very much behind in my work.
20. \_\_\_\_\_ I feel like my life is going very smoothly.
21. \_\_\_\_\_ I feel tense and angry with those around me.
22. \_\_\_\_\_ I feel I must race from one task to the next.
23. \_\_\_\_\_ I feel that I just can't keep up with everything.
24. \_\_\_\_\_ I feel as tight as a drum.
25. \_\_\_\_\_ I feel very much on edge.

Source: Fischer, J., & Corcoran, K. (1994). Measures for clinical practice. A sourcebook (2<sup>nd</sup> ed.). New York: The Free Press.

## Appendix E

**STRESS QUESTIONNAIRE****Part B**

**Instructions:** Please read each item and write in the number that best reflects your physical state at the present time

---

1 = None of the time   2 = Very rarely   3 = A little of the time   4 = Some of the time  
5 = A good part of the time   6 = Most of the time   7 = All of the time

---

- \_\_\_\_\_ My hands and fingers tremble
- \_\_\_\_\_ I have nervous twitches
- \_\_\_\_\_ I can't sit or stand still
- \_\_\_\_\_ My muscles become tense and stiff
- \_\_\_\_\_ I stutter and stammer when I speak
- \_\_\_\_\_ I clench my jaw or grind my teeth
- \_\_\_\_\_ I develop headaches or eye tension
- \_\_\_\_\_ I experience low back pain
- \_\_\_\_\_ I feel my heart pounding
- \_\_\_\_\_ I breathe rapidly
- \_\_\_\_\_ My stomach becomes upset
- \_\_\_\_\_ I perspire easily
- \_\_\_\_\_ I feel lightheaded or faint
- \_\_\_\_\_ My mouth and throat become dry
- \_\_\_\_\_ I experience cold hands or feet
- \_\_\_\_\_ I need to urinate often
- \_\_\_\_\_ I have diarrhoea or constipation
- \_\_\_\_\_ My face feels flushed
- \_\_\_\_\_ My blood pressure is high

Source: Ritchie, J., Browne, W., & Norfor, J. (1987). Teaching people to unwind. Relaxation and stress management techniques. Greenwich, NSW: Health Media & Education Centre, Department of Health, NSW.

Appendix F

**STRESS QUESTIONNAIRE**

**Part C**

**Instructions:** Please read each item and write in the number that best reflects how life is for you at the present time

---

1 = None of the time   2 = Very rarely   3 = A little of the time   4 = Some of the time  
5 = A good part of the time   6 = Most of the time   7 = All of the time

---

- \_\_\_\_\_ I feel nervous, anxious, ill at ease
- \_\_\_\_\_ I feel keyed up, over excited
- \_\_\_\_\_ I am worrying excessively
- \_\_\_\_\_ I am confused or forgetful
- \_\_\_\_\_ I am having difficulty concentrating
- \_\_\_\_\_ I feel generally irritable
- \_\_\_\_\_ I am feeling depressed
- \_\_\_\_\_ I feel bored or apathetic
- \_\_\_\_\_ I am short tempered with others
- \_\_\_\_\_ I am withdrawn
- \_\_\_\_\_ I am achieving less than normal
- \_\_\_\_\_ My appetite has changed markedly
- \_\_\_\_\_ My sex drive is increased / reduced
- \_\_\_\_\_ I am sleeping too long, staying in bed
- \_\_\_\_\_ I am suffering from insomnia
- \_\_\_\_\_ I am having minor accidents / making more mistakes
- \_\_\_\_\_ I am feeling the need to increase my medication
- \_\_\_\_\_ I am having more alcohol and other drugs than usual

Source: Ritchie, J., Browne, W., & Norfor, J. (1987). Teaching people to unwind. Relaxation and stress management techniques. Greenwich, NSW: Health Media & Education Centre, Department of Health, NSW.



Appendix G

**STUDY FEEDBACK CHECKLIST**

Dear Participant,

Now that you have completed the study, I would be very interested in your feedback about the different components involved. Would you be kind enough to fill in the checklist below so that I can evaluate what you liked and didn't like.

Please Circle Your Response

1. Did you think that the questionnaires covered everything that you experience when you are stressed? Yes      No

If you answered 'No', what else could have been included? .....

2. How many writing sessions did you perform? (a) none (b) 1 or 2 (c) 3 or more

If you circled (a) or (b), please describe the reasons why you didn't use the writing sessions more often.

.....

- If you did complete any writing sessions, did you follow the instructions on what you were to write about? Yes      No

3. Did you find the writing sessions:

Helpful	Yes	No
Too time consuming	Yes	No
Easy to do	Yes	No
Difficult to do	Yes	No

Please rate how stressful you found the writing sessions:

1
2
3
4
5  
 Stress reducing Stress producing

4. Prior to the study, had you recently used writing as a way of releasing your emotions? Yes      No

5. Would you continue to use writing as a way of reducing stress? Yes      No

6. Please add any further comments .....

.....

***THANK YOU FOR YOUR HELP!***

Appendix H.1

Instructions for 'Profound' Intervention

**INSTRUCTION SHEET**

---

**Special Note: For the 2 week duration of the study please**

**DO NOT DISCUSS YOUR WRITING INSTRUCTIONS WITH OTHER STUDENTS**

---

Dear Participant,

Thank you for taking part in this study. In your package please find a compliance sheet, a blank writing booklet, and a sealed envelope marked 'please bring this unopened envelope to the debriefing session in class on the 6/5/98'.

Instructions

At times when you are feeling stressed over the next two weeks, would you please use the booklet to write down the feelings you are experiencing. During these times, take a few moments to sit quietly and focus on what you are feeling. Spend as much time as you need to write down what you are experiencing emotionally and physically, using as many emotion words as possible (ie. I am feeling overwhelmed, scared and my stomach feels like a big knot).

Please feel free to use this exercise as often as you like, but I ask if you would complete at least three (3) writing sessions, and enter all writing session dates on the compliance sheet. Even if you don't complete any writing sessions, for the study to work, I do need all participants to fill out the final questionnaires in 2 weeks time.

Once again, thank you very much for being in my study. Your contribution is extremely valuable.

**WOULD YOU PLEASE BRING THE ENTIRE PACKAGE WITH YOU TO CLASS ON THE 6/5/98 (2 WEEKS FROM TODAY) FOR COMPLETION OF THE FINAL QUESTIONNAIRES AND THE DEBRIEFING SESSION.**

## Appendix H.2

## Instructions for 'Distractor' Intervention

**INSTRUCTION SHEET**

---

**Special Note: For the 2 week duration of the study please**

**DO NOT DISCUSS YOUR WRITING INSTRUCTIONS WITH OTHER STUDENTS**

---

Dear Participant,

Thank you for taking part in this study. In your package please find a compliance sheet, a blank writing booklet, and a sealed envelope marked 'please bring this unopened envelope to the debriefing session in class on the 6/5/98'.

Instructions

At any time you are feeling stressed over the next two weeks, would you please take a few moments to distract yourself by using the booklet to write a description of an object you can see, or the room you are in. Please make your descriptions as detailed as possible, using no emotion words at all.

Please feel free to use this exercise as often as you like, but I ask if you would complete at least three (3) writing sessions and enter all writing sessions on the compliance sheet. Even if you don't complete any writing sessions, for the study to work, I do need all participants to fill out the final questionnaires in 2 weeks time.

Once again, thank you very much for being in my study. Your contribution is extremely valuable.

**WOULD YOU PLEASE BRING THE ENTIRE PACKAGE WITH YOU TO  
CLASS ON THE 6/5/98 (2 WEEKS FROM TODAY) FOR COMPLETION OF  
THE FINAL QUESTIONNAIRES AND THE DEBRIEFING SESSION**

Appendix I

007

**COMPLIANCE SHEET**

---

**Please enter the dates of every writing session**

---

...../98	...../98	...../98
...../98	...../98	...../98
...../98	...../98	...../98
...../98	...../98	...../98
...../98	...../98	...../98
...../98	...../98	...../98
...../98	...../98	...../98
...../98	...../98	...../98
...../98	...../98	...../98
...../98	...../98	...../98

PLEASE HAND THIS SHEET IN AT THE DEBRIEFING SESSION ON THE 6/5/98



## Appendix K.1

**Rotated Factor Loadings and Communalities for Somatic Symptoms Scale**

<b>Scale Item</b>	<b>Factor 1</b>	<b>Factor 2</b>	<b><math>h^2</math></b>
1. My hands and fingers tremble	.583	.111	.352
2. I have nervous twitches	.590	.066	.352
3. I can't sit or stand still	.607	.163	.395
4. My muscles become tense and stiff	.609	.263	.441
5. I stutter and stammer when I speak	.458	.313	.308
6. I clench my jaw or grind my teeth	.369	.075	.142
7. I develop headaches or eye tension	.268	.471	.294
8. I experience low back pain	.299	.301	.180
9. I feel my heart pounding	.657	.148	.454
10. I breathe rapidly	.760	.050	.581
11. My stomach becomes upset	.655	.304	.521
12. I perspire easily	.717	.027	.515
13. I feel lightheaded or faint	.572	.296	.415
14. My mouth and throat become dry	.654	.172	.458
15. I experience cold hands or feet	.440	.234	.248
16. I need to urinate often	.448	.103	.212
17. I have diarrhoea or constipation	.449	.223	.251
18. My face feels flushed	.643	.053	.416
19. My blood pressure is high	.580	.027	.337

## Appendix K.2

**Rotated Factor Loadings and Communalities for Signs of Stress Scale**

<b>Scale Item</b>	<b>Factor 1</b>	<b>Factor 2</b>	<b><math>h^2</math></b>
1. I feel nervous, anxious, ill at ease	.429	.382	.330
2. I feel keyed up, over excited	.435	.376	.331
3. I am worrying excessively	.324	.648	.525
4. I am confused or forgetful	.243	.679	.521
5. I am having difficulty concentrating	.248	.730	.594
6. I feel generally irritable	.189	.818	.704
7. I am feeling depressed	.089	.790	.631
8. I feel bored or apathetic	-.103	.629	.406
9. I am short tempered with others	.146	.602	.384
10. I am withdrawn	.076	.767	.595
11. I am achieving less than normal	.071	.760	.583
12. My appetite has changed markedly	.289	.402	.245
13. My sex drive is increased / reduced	.215	.403	.209
14. I am sleeping too long, staying in bed	-.048	.423	.181
15. I am suffering from insomnia	.364	.311	.229
16. I am having minor accidents / making more mistakes	.306	.582	.432
17. I am feeling the need to increase my medication	.210	.356	.171
18. I am having more alcohol and other drugs than usual	.155	.222	.074
Percentage of Variance	19.2	18.7	37.9

## Appendix L

## Tukey's HSD Pairwise Comparisons

Comparison Condition		<i>M</i> Difference	<i>SD</i>	<i>p</i>
Expressor-Profound	Repressor-Profound	7.18	5.90	.618
	Expressor-Distractor	11.93	5.03	.093
	Repressor-Distractor	2.04	5.56	.983
Repressor-Profound	Expressor-Distractor	4.74	5.50	.825
	Repressor-Distractor	-5.15	5.98	.825
Expressor-Distractor	Repressor-Distractor	-9.89	5.13	.227

\*  $p < .05$