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**PHYSIOLOGICAL, EXPERIENTIAL, & COGNITIVE
CONSEQUENCES OF SUPPRESSION, REAPPRAISAL,
& ACCEPTANCE DURING EMOTIONAL AROUSAL:
A COMPARATIVE ANALYSIS**

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

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2006

Abstract

This study investigated the experiential, physiological, and memory effects of three emotion regulation strategies: acceptance, suppression, and reappraisal. Eighty female university students were exposed to a two minute standardised film designed to evoke feelings of sadness, while under instructions to either (a) push away emotions that arose (suppression), (b) view the film in an objective detached way (reappraisal), (c) accept emotions that arose without judgement (acceptance), or (d) simply watch the film (control group). Participants rated the intensity of emotions experienced both prior to and during the film. Heart rate and skin conductance were measured prior to, during, and following the film, and participants' incidental recognition memory (visual and verbal) and subjective confidence in memory were assessed post film. No significant differences were found between the mean scores of the four instructional conditions for any of the main dependent variables (possibilities regarding why this was so are discussed in this thesis). However, analysis of mean and effect size revealed trends that were supportive of several hypotheses. None of the emotion regulation strategies were found to be effective for alleviating either physiological or subjective responses to the film. However, reappraisal and acceptance participants did rate the emotive stimulus as more positive/pleasant than control participants. Clear differences also emerged with respect to incidental verbal recognition memory. Acceptance participants were the only group to achieve higher scores than control participants on this measure. These findings suggest different emotion regulation strategies may have different adaptive consequences depending on their emphasis on emotional control.

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Acknowledgements

I would like to express my deepest thanks to my supervisors, Dr Patrick Dulin and Dr Shane Harvey. The guidance, knowledge, and encouragement you both provided throughout this process was invaluable.

I am also very thankful to Dr John Podd for providing statistical advice, Malcolm Loudon for providing training in the use of physiological instruments, and Hung Ton for editing the film clips. I appreciate the time you all devoted to this project and your patience with my never ending questions and requests.

Thanks to Di and Amber for taking time out of your busy schedules to read parts of this thesis. Your ideas, feedback, and humour were greatly appreciated.

Thankyou to my family for your ongoing support throughout the course of my studies. Special thanks go to my Mum for proofreading parts of my project, and to Pete, Indiya, Samara, and Cassius for providing me with the love, tolerance, support, and motivation to get it done.

Finally, my appreciation goes out to the psychology staff who assisted in the recruitment of participants, and most importantly, to the students who volunteered their time to participate in this study. Without you all, I couldn't have done it.

Preface

Emotion regulation, defined as the strategies individuals use to “influence which emotions they have, when they have them, and how these emotions are experienced and expressed” (Gross, 1998b, p. 275), is a regular human activity that can result in a variety of consequences, some positive, others negative. Over the last decade increasing attention has been focused on emotion regulation as a common factor in a variety of physical and psychological disorders. Indeed, problems of emotion regulation and dysregulation have been implicated in more than half the DSM-IV-TR clinical disorders and all the personality disorders (American Psychiatric Association, 2000; Gross & Levenson, 1997). For instance, Major Depressive Disorder involves an excess of negative emotion, often accompanied by a decrease in positive emotion (Gross & Levenson, 1997; Sadock & Sadock, 2003), and Borderline Personality Disorder is characterised by a heightened sensitivity to emotional stimuli and a protracted emotional recovery period (Bateman, 2004; Jennings, 2004; Putnam & Silk, 2005). A growing body of literature also illustrates a relationship between disorders characterised by deficits in emotion regulation and medical conditions like chronic pain disorder (Von Korff et al., 2005) and coronary artery disease (Barrick, 1999). These findings highlight a need for research examining the advantages and disadvantages of different forms of emotion regulation (Gross, 1998b; Jackson, Malmstadt, Larsen, & Davidson, 2000; Wong, 2005). Conducting such research may help elucidate the mechanisms operating within the relationship between emotion regulation and mental and/or physical health conditions.

Clinical practice, psychological theory, and traditional wisdom have at times expressed divergent ideas regarding how humans should regulate their emotions. A central argument concerns the degree to which emotions should be avoided or controlled (Gross, 1998a). Some theorists argue that avoidance and control are potentially harmful and can lead to physical and psychological disturbances and even impair cognitive processes (i.e. Blackledge & Hayes, 2001; Hayes, Luoma, Bond, Masuda, & Lillis, 2006). Others maintain that control-based techniques have been used successfully in the treatment of psychological problems for decades, and that

failure to control emotion can lead to disruptive, dangerous, and socially inappropriate behaviour (i.e., Beck, Rush, Shaw, & Emery, 1979).

In an effort to evaluate the relative validity of these arguments, psychological research has begun to investigate the consequences of emotion regulation strategies that vary in the nature or level of control they impose. Much of this research has explored the consequences of *suppression*, an avoidance-based strategy that attempts to alter emotional responses as they arise, and *reappraisal*, a less avoidant (but still control-based) approach that aims to alter the trajectory of emotion.

Research indicates these strategies possess divergent consequences across physiological, experiential, and cognitive domains (Gross, 1998a; Richards, 2004). For instance, reappraisal has been demonstrated to be effective in reducing emotional distress, without impinging on memory or physiology (Gross, 1998a; Richards & Gross, 2000), whereas suppression has detrimental consequences for physiology and memory, but fails to reduce emotional distress (Gross & Levenson, 1997; Richards & Gross, 2000). These findings suggest not all methods of controlling emotion are created equal, with some incurring greater costs than others. However, they fail to answer one fundamental question – what would the consequences be if individuals were encouraged to accept and experience their emotions, rather than avoid or control them?

This question is currently of particular relevance due to the increasing number of therapies emerging that incorporate acceptance-based strategies for dealing with emotions. Acceptance and Commitment Therapy (Hayes, Strosahl, & Wilson, 1999) and Dialectical Behaviour Therapy (Linehan, 1993) are two examples. These therapies are based on the rationale that it is not the experience of emotion per se or an inability to control it which causes harm, instead, harm results as a consequence of unhealthy attempts to control thoughts, feelings, and physical sensations. Rather than avoiding internal expressions of emotion, these therapies teach clients to simply notice and accept their emotions without judging them (Hayes, Follette, & Linehan, 2004).

Despite the growing number of acceptance-based therapies, relatively few controlled studies have compared acceptance techniques with other forms of emotion regulation. Furthermore, the implications of current findings are difficult to decipher due to (a) the narrow range of emotional states explored; (b) inconsistent findings pertaining to physiological effects; (c) a tendency to solely focus on physiological and self reported markers of functioning at the expense of other important domains (such as cognition); and (d) the absence of research comparing acceptance to multiple strategies that vary in the level of control they impose. The present study was designed to address these issues by experimentally comparing the impact of acceptance, suppression, and reappraisal on physiology, memory, and subjective emotional experience.

Studying the consequences of strategies that vary in the degree to which they promote avoidance or control of emotions may provide clues as to the degree to which emotional control is adaptive or maladaptive. It may also help explain the development and maintenance of disorders characterized by emotion dysregulation, and identify the components of current therapeutic modalities that are most effective in treating and/or preventing these disorders. From a physical health perspective, assessing the physiological consequences of emotion regulation may highlight the mediating mechanisms operating within the relationship between emotion regulation and physical health (Gross, 1998b). It may even identify which psychological adjuncts could be added to current medical treatment approaches to assist in the maintenance and prevention of health problems for which emotion regulation plays a role (i.e., the provision psychological services for individuals identified to be at risk for coronary artery disease). Finally, exploring the specific costs and benefits of each strategy across multiple dependent variables may highlight the contexts and individuals for which certain strategies are likely to be most adaptive within both clinical and non-clinical populations (Gross & Levenson, 1997).

Introduction

The Nature of Emotion and Emotion Regulation

Conceptualisations of emotion regulation are firmly planted in perceptions regarding the nature of emotion and its function (Consedine, Magai, & Bonanno, 2002).

Consequently, any exploration of emotion regulation should be based on a clear understanding of what constitutes emotion (Gross, 1998b).

Historically, emotions have been conceptualised in varied ways. Darwinists call attention to the functional adaptive nature of emotions, behaviourists see emotions primarily as a physiological phenomenon, cognitivists focus on the role of thought in the development of emotion, and social constructionists view emotions as cultural constructions that are contextually specific (Cornelius, 1996). For the purposes of the present study I draw on themes inherent in each of these perspectives. However, my conceptualisation of emotion is most strongly predicated on an evolutionary/functionalist standpoint. From this perspective, emotions constitute adaptive response mechanisms that have evolved in order to prime humans to respond effectively to threats, opportunities, and challenges in their environment (Consedine et al., 2002; Gross, 1998b; Kring & Werner, 2004). Emotions can be distinguished from alternative valenced states (i.e., mood) in that they are comparatively brief and tend to be triggered in response to a specific object or event (Consedine et al., 2002; Gross, 1998b). Although the terms affect and emotion are sometimes used to refer to similar phenomena, affect is generally conceptualised as a feeling state. In contrast, emotions are made up of several components or “response tendencies,” which include behavioural (i.e., facial expressions), experiential (subjective feelings), physiological (i.e., sympathetic activity), and cognitive (i.e., thoughts, attentional capacities, memory) components (Consedine et al., 2002; Gross, 1998b; Kring & Werner, 2004). These components make up a coordinated response system that has been shown to play a central role in daily living, assisting humans in problem solving (Kring & Werner, 2004), communication (Forgas, 1991), decision making (Johnson-Laird & Oatley, 2000; Naqvi, Shiv, & Bechara, 2006), conflict resolution (Fisher & Sharp, 2004), social functioning (Keltner & Buswell, 1997; Mongrain & Vettese, 2003), and preparing the body for necessary action (Parrott, 2002).

The adaptive and multifaceted nature of emotion is clearly exemplified in the case of fear. When we experience fear, in addition to possessing a subjective feeling of being afraid, our senses are heightened, our facial expressions change, and our cardiovascular functioning is adjusted to increase the availability of oxygen to the large muscle groups. This coordinated set of responses can serve an adaptive function: enhancing a person's ability to detect further signs of danger, warning others of danger, and increasing the likelihood of self-protection or escape (Parrott, 2002).

Although emotions may serve us well at times, promoting positive adaptation to the demands of our environment, some suggest they are also capable of leading us astray (Gross, 2002). In certain situations emotions that arise fail to mesh with the demands or expectations imposed by that situation (John & Gross, 2004). For instance, while attending church you may experience an overwhelming desire to burst out laughing on realising the minister has his zipper down. In cases like this, humans often attempt to influence their emotions in a manner more appropriate to the situation. This process of influencing one's emotions is known as emotion regulation (John & Gross, 2004).

Emotion regulation is a common phenomenon that occurs for most individuals on a daily basis. In fact, 90% of undergraduate students acknowledge engaging in regulatory strategies approximately once a day (Gross, Richards, & John, 2006). Despite its common use, a consistent definition of emotion regulation is still lacking (Gratz & Roemer, 2004; Kring & Werner, 2004). Traditional conceptualisations generally focused on the control of subjective emotional experience (in particular control of negative emotions), with the goal being reduction of arousal (Garner & Spears, 2000). However, many contemporary theorists have taken a broader approach. Gross (1998b) provided one of the most influential conceptualisations when he defined emotion regulation as "the processes by which individuals influence which emotions they have, when they have them, and how the experience and express them" (p. 275). Gross suggested emotion regulation involves not only changes in subjective experience, but also alterations in any or several of the components of the emotional system (i.e., expression, experience, physiology, or

cognition). Some strategies focus on altering the overt or behavioural signs of emotion, such as holding back a desire to laugh during a formal ceremony; others seek to alter the experiential component of emotion, such as attempting to calm the butterflies in your stomach before an important job interview. Alterations may occur in the intensity, magnitude, duration, speed, or latency of a response, the overall effect being to alter the dynamics of emotion and adjust the relative input of the various components.

Emotion regulation may be conscious and effortful or unconscious and automatic (Consedine et al., 2002; Gross, 1998b; Parrott, 2002), and different strategies may operate at different stages of the emotion generation process (Gross, 2001). For example, by changing your work timetable you may avoid confrontation with a difficult work colleague, thereby regulating feelings of anger before they arise. Conversely, holding back laughter during a formal ceremony serves to regulate an emotion that is already underway (Gross, 2002).

Although traditional conceptualisations perceive emotion regulation as synonymous with minimisation or control of negative emotions, many theorists argue emotion regulation also involves initiating, maintaining, and exacerbating emotions (Gratz & Roemer, 2004; Gross, 1998b; Johnson, Hurley, Benkelfast, Herpetz, & Taber, 2003). This perspective equates strategies like acceptance, awareness, understanding, and valuing of emotion within the regulatory domain (Bridges, Denham, & Ganiban, 2004; Gratz & Roemer, 2004). Some theorists imply these latter approaches are actually the most adaptive, because they allow the individual to hone in on the positive facets of emotion (Blackledge & Hayes, 2001; Bridges et al., 2004; Greenberg, 2002; Linehan, 1993; McMMain, Korman, & Dimeff, 2001).

Based on the conceptual framework outlined above, the present study conceptualised emotion regulation as a broad construct that includes both implicit and explicit processes. These processes serve to initiate, maintain, exacerbate, control, or enhance one's awareness and/or understanding of the experience or expression of emotion.

Adaptive versus Maladaptive Emotion Regulation

Over the last two decades, theorists and researchers in the area of emotion regulation have become increasingly interested in the issue of what constitutes adaptive versus maladaptive emotion regulation (John & Gross, 2004). This is a difficult question as few strategies are likely to be either intrinsically adaptive or maladaptive (Bridges et al., 2004). As Gross pointed out, “the same strategies that permit medical professionals to operate successfully, may also neutralise empathic distress in torturers” (p. 282). Therefore, to suggest a strategy is inherently good or bad without consideration of factors such as context and individual difference, would be a gross simplification of the issue (Bonanno, Papa, Lalande, Westphal, & Coifman, 2004).

Armed with the knowledge that the benefits of a strategy may depend on context and flexibility of use, it is still important to elucidate some of the basic costs and benefits of various emotion regulation strategies (Gross & Levenson, 1997). Doing so may provide clues as to the contexts and individuals for which they are most appropriate and the potential role they play in the prevention and treatment of psychological and/or physical disorders (Gross & Levenson, 1997). Although all forms of emotion regulation may be beneficial in moderation, too much of any one is likely to be unhealthy. What is not yet completely understood is which strategies are most likely to pose a risks to one’s emotional or physical health and which are likely to enhance it.

In line with these issues, contemporary theorists are increasingly emphasising the detrimental consequences of strategies that promote tight control or avoidance of emotion. The perspective that tight control of one’s emotions is detrimental to well-being appears to contradict traditional western wisdom, which tended to view out of control emotions as the route to madness (Gross, 1998; Kring & Werner, 2004). This assumption was exemplified in the work of early philosophers like Sauvage (1772, as cited in Foucault, 1967). Sauvage once stated “the distraction of our mind is the result of our blind surrender to our desires, our incapacity to control or moderate our passions” (1772, as cited in Foucault, 1967, p. 77).

Many clinical interventions are also based on the assumption that regaining control over the frequency, intensity, or nature of internal experiences (like emotion) is the

path to psychological recovery: a fact denoted in the names given to some popular cognitive behavioural techniques, such as cognitive restructuring, thought stopping, and anxiety management (Hayes et al., 1999). These techniques focus on controlling one or more facets of the emotional response. The popularity of such interventions suggests the belief that emotional control is synonymous with emotional health is still prominent amongst clinicians.

However, not all psychological theories view emotional control as the key to well-being. Psychodynamic and experiential paradigms have long implied that certain forms of emotional control (in particular emotional inhibition) may have detrimental consequences for mental wellbeing (Consedine et al., 2002; Greenberg, 2002; Gross & Levenson, 1993). Freud created talk therapy as a means of releasing 'strangled' emotions (Breuer & Freud, 1957). Similarly, experiential therapies are based on the common premise that greater expression of ones emotions is the route to wellbeing (Greenberg, 2002). Contemporary theorists have elaborated on these perspectives. For example, Hayes and colleagues have suggested it is not the experience of emotion or an inability to control it that causes harm. Instead, harm is a consequence of failed attempts to avoid or control the internal expression of emotion, a phenomenon broadly labelled as *experiential avoidance* (Hayes & Strosahl, 2004).

Experiential avoidance.

Experiential avoidance "occurs when a person is unwilling to remain in contact with particular private experiences (i.e. bodily sensations, emotions, thoughts, memories, behavioural predispositions) and takes steps to alter the form or frequency of these events and the contexts that occasion them..." (Blackledge & Hayes, 2001, p. 244). Although the goal of experiential avoidance is to control or decrease the impact of negative internal experiences, authors from a variety of theoretical orientations (including Client-centred therapy, Gestalt therapy, and Behaviour therapy) have acknowledged that attempts to avoid internal experiences actually serve to increase the intensity and persistence of these experiences and are often destructive (Greenberg, 2002; Hayes et al., 2004; Linehan, 1993). Examples of potentially destructive methods of experiential avoidance include drug and alcohol use, risky sexual behaviour, and avoidance of feared objects, places, or situations (Blackledge & Hayes, 2001).

Academics within the behaviour analytic tradition have recently developed a model based on human associative learning, research, and theory (primarily relational frame theory), explaining the significance of experiential avoidance in the development and maintenance of psychopathological conditions like anxiety and depression (Blackledge & Hayes, 2001). According to Blackledge and Hayes, experiential avoidance has developed as humans' language capacities have increased in complexity. Animals can successfully prevent aversive experiences (i.e., pain) from occurring by simply avoiding the contexts in which they previously occurred; unfortunately, this is not the case with humans. This is because humans respond to the words they use to interpret or describe their experiences, as if the words were those experiences. As Blackledge and Hayes (2001) point out, a good deal of emerging research suggests that from a young age children learn that symbols and the situations, events, or objects to which they refer are comparable (see Hayes & Gifford, 1997, for more in depth exploration of this research). Words and their situational referents are not separate from one another, but function interchangeably (Hayes et al., 2004, p. 14).

The bidirectionality of function between language and its referents means negative situations carry over some of the distress associated with them to their verbal descriptions, and verbal descriptions carry evaluative connotations associated with them to situations (Hayes et al., 2006). For instance, a person listening to a colleague describe a terrifying altercation between two members of the public on the way to work may experience distress and react negatively to the description, even though they never witnessed the incident (Blackledge & Hayes, 2001). The verbal description is sufficient to evoke emotion in and of itself, because the person's own evaluative connotations associated with emotional labels (i.e., the personal situations and events they associate with the word terrifying) allow them to experience the emotion vicariously (Blackledge & Hayes, 2001).

The ability to avoid private experiences is only made possible by humans' ability to define and label emotions. As language capacities have evolved, humans' conceptualisations of emotion have become increasingly more elaborate (Hayes & Strosahl, 2004). As Blackledge and Hayes (2001) note "a loose collection of bodily states, thoughts, behavioural predispositions, and contextual factors are gathered

together under a verbal label and we learn to call them depression or anxiety” (p. 246). These labels are then evaluated and gradually begin to possess their own meaningful connotations; over time, these evaluations come to be seen as an intrinsic part of the emotion. For example, it has become the normative perspective that depression is “bad” (Hayes et al., 2006). These evaluations are often reinforced by the cultural ideals surrounding them. For example, it is the Western cultural ideal that feeling good is synonymous with being a healthy person, whereas emotional pain is associated with poor health (Hayes et al., 2004). The capacity to label and evaluate emotion is important because it allows humans to grapple with the internal situations that result. Depression is no longer a natural set of bodily responses and behavioural tendencies (as is the case for non verbal organisms). Instead, it is a highly evaluative word that is perceived to be extremely undesirable and should be controlled or avoided at all costs (Hayes & Strosahl, 2004).

The consequences of private events becoming “historically and verbally entangled” (Hayes & Strosahl, 2004, p. 14) are not entirely positive, particularly when one is seeking to avoid a particular thought or feeling. For example, imagine that before attending an important job interview you experience a thought that you immediately evaluate as negative and wish to avoid (i.e., “I am feeling anxious”). However, avoiding the thought requires creating a rule (i.e., “If I don’t think about how anxious I am, I will appear more confident in the interview, and come across more positively to my potential employer”). The problem is that the rule itself refers to the avoided thought or emotion, and ascertaining your success in achieving the goal is reliant on maintaining proximity to the rule and hence the negative thought or feeling (Hayes & Strosahl, 2004). Thus, the method used to avoid the distressing thought actually serves as a contextual trigger for the thought and the “psychological presences of the events it is related to” (Hayes, 2004, p. 650). This then triggers a negative cycle of experiential avoidance, where the distress caused by initial avoidance results in continued evaluative verbal comparisons, which in turn triggers increased avoidance, and so on.

Therefore, although humans often attempt to alter the form, frequency, or intensity of internal experiences in an effort to control them, the bidirectionality of human language and experience means these efforts are likely to be futile (Hayes &

Strosahl, 2004). From Hayes' perspective, emotional control is not the route to wellbeing but the route to harm. Emotion regulation strategies that focus on the avoidance or control of emotion, rather than preventing emotions from emerging, are actually likely to have paradoxical self-amplifying effects.

Hayes' (2004) theory has growing empirical support, with psychological and health research linking emotional avoidance to a variety of pathological processes (see Hayes & Strosahl, 2004, for a review of the literature). Although analysis of all the literature in this area is beyond the scope of this thesis, I will focus on a key form of emotional avoidance pertinent to the present study and currently receiving increased empirical attention, namely *suppression*.

Suppression: Adaptive or Maladaptive?

Suppression is a prototypic form of experiential avoidance that involves inhibiting one or more facets of the emotional response (Gross, 2002). Suppression represents a common method for dealing with emotions in everyday life and can operate at either expressive (behavioural) or experiential (internal responses, such as thoughts and feelings) levels (John & Gross, 2004). Trying to appear outwardly confident while conducting an important presentation, in spite of the butterflies you're experiencing inside, is a form of expressive suppression. Trying to push away thoughts and feelings of a loved one is a form of experiential suppression.

Suppression is even employed in clinical settings for the prevention and treatment of disorders like depression and anxiety. Thought stopping, a behavioural technique that trains clients to inhibit undesirable thoughts from emerging, is one example (Chaplin, 1985).

In spite of its frequent use, evidence suggests a general tendency to suppress, along with experimental instructions to do so, may be associated with impaired mental and physical functioning. Correlational studies have reported a relationship between emotional suppression and a number of medical conditions. These include minor physical ailments like asthma and diabetes (Penza-Clyve, 2000), along with more serious problems, like sudden cardiac arrest (Appels, Golombeck, Gorgels, DeVreede, & Van Breukelen, 2002) and cancer (Grassi & Cappellari, 1988). Emotional suppression has also been implicated in a variety of psychological

difficulties including depression (Rude & McCarthy, 2003), anxiety (Salters-Pedneault, Tull, & Roemer, 2004), hopelessness, suicidal ideation (Lynch, Cheavens, Morse, & Rosenthal, 2004), Borderline Personality Disorder (Cheavens et al., 2005), and health related stress (Iwamitsu et al., 2003, 2005).

However, there are difficulties associated with correlational research – the main problem being its inability to infer directionality. Correlational research is only capable of identifying associations between variables, as opposed to cause-effect relationships. Therefore, conducting experimental research is important if one wishes to determine the specific agent/s of control (Coolican, 1999).

Experimental research in the area of emotional suppression has increased over the last decade as researchers attempt to parse the consequences of suppression across multiple domains of functioning (i.e., physiology, subjective experience, cognition and behaviour). Overall, findings support those obtained using correlational methods and indicate that suppression represents a fairly ineffective means of regulating emotion and may even be detrimental to wellbeing if used as a primary regulatory technique. However, as will be shown, there are several difficulties with the literature that need to be resolved before solid conclusions can be reached. My review will focus solely on physiological, experiential, and cognitive effects, as these are most germane to the present study.

Suppression: Physiological effects.

Experimental studies examining the physiological effects of suppression have produced somewhat inconsistent results (Pauls, 2004). The earliest controlled studies were conducted in the United States by Lanzetta and colleagues in the 1970s (Colby, Lanzetta, & Kleck, 1977; Lanzetta, Cartwright-Smith, & Kleck, 1976). Their findings diverged from those hypothesised by avoidance theory, by indicating that suppression may actually be an effective means of decreasing physiological arousal. Lanzetta and colleagues found that college students who were requested to suppress facial responses to an electric shock, exhibited lower skin conductance levels than participants asked to exaggerate their facial expressions (Colby et al., 1977; Lanzetta et al., 1976). Concurrent findings were reported by Zuckerman, Korman, Larrance, and Spiegel (1981). They found that students who inhibited facial expressions in

response to positive or negative video clips showed lower levels of physiological arousal (as indicated by blood volume, skin conductance, and heart rate) than participants asked to react spontaneously or exaggerate their responses. These early findings indicated emotional suppression, rather than impairing physical health, might actually be beneficial.

However, more recent research has produced contradictory results to those reported by Lanzetta and colleagues (Pauls, 2004): a series of studies conducted by Gross and colleagues (Gross, 1998a; Gross & Levenson, 1993, 1997) indicate that suppression of certain emotions can actually increase physiological arousal levels. These studies exposed university students to emotionally evocative films while under instructions to either suppress (operationally defined as watching “the film in such a way that “someone watching you would not know that you are feeling anything at all,” Gross & Levenson, 1993, p. 976), or simply watch the clip (control condition). Data was collected throughout baseline, film, and post-film periods to establish levels of physiological reactivity and recovery. In their initial study, Gross and Levenson (1993) exposed participants to a film intended to elicit feelings of disgust while under instructions to either suppress or just watch the clip. Results diverged from those reported earlier. Compared with control participants, suppressors exhibited increased skin conductance, decreased finger pulse amplitude, and decreased finger pulse transmission (all of which suggest heightened sympathetic activation), but decreased heart rate (which can function as an indicator of sympathetic or parasympathetic activation, or both) and somatic activity.

The finding that suppression decreased heart rate but evoked changes on other physiological measures indicative of increased sympathetic activation (i.e., skin conductance) is somewhat perplexing. However, as Gross and Levenson (1993) noted, the impact of suppression on heart rate may be explained by the fact that suppression targets somatic behaviour (i.e., its central goal is to eliminate the outward signs of emotion) and there is a close relationship between cardiac and somatic activity (Obrist, 1981). Furthermore, because the relationship between heart rate and somatic activity is largely vagally mediated, a deceleration in heart rate as a consequence of decreased somatic activity could very well occur alongside

sympathetic nervous system activation of alternative systems (i.e., the electrodermal system) (Gross & Levenson, 1993).

Gross and Levenson (1993) suggested the divergence of their findings from earlier results could be a consequence of the type of emotion elicited. This appeared to be a relevant concern, given that a limited number of emotional states were covered in the previous studies, and in some cases (i.e., Zuckerman et al., 1981) results were collapsed across positive and negative emotional states.

To examine the hypothesis that the impact of suppression differs across emotional subtypes, Gross and Levenson (1997) conducted a second study in which participants were exposed to either sad, neutral, or amusing films, under instructions to suppress or simply watch. Results indicated that suppression led to increased levels of sympathetic activation across all three film conditions. Participants exposed to the amusing film showed decreased heart rate but increased sympathetic activation of the cardiovascular system (as indicated by combining scores for finger pulse amplitude, pulse transit time to the ear, finger temperature, and pulse transit time to the finger) when compared with control participants. Similarly, participants exposed to the sad film exhibited increased skin conductance, sympathetic activation of the cardiovascular system, and respiratory activity, but decreased heart rate, when compared with controls. Interestingly, suppression was found to exert negligible effects on physiological measures in the neutral condition. This finding was interpreted as evidence that the physiological effects of suppression arise from the counterpoising of efforts to inhibit expression against natural impulses to express. In the neutral condition there was no impulse to express (as would be the case when one is exposed to an emotionally neutral stimuli), therefore no conflict, and hence no impact on physiology. Overall, results indicated that although there may be a degree of specificity to the emotion elicited, heightened sympathetic activation in response to suppression is a common factor across several emotional subtypes.

Later research demonstrated the strength and generality of Gross' initial findings. For example, Richards and Gross (1999) found that participants instructed to suppress their reactions to slides of injured men exhibited heightened blood pressure and decreased finger temperature when compared with control participants (although no

changes in skin conductance or heart rate were found). Similarly, Harris (2001) found suppressors exhibited heightened blood pressure both during and following a task (during a 5-minute recovery period) designed to elicit feelings of embarrassment, and Kunzeman, Kupperbusch, and Levenson (2005) found that suppression during a disgusting film produced decreased heart rate but heightened blood pressure and skin conductance levels in a sample of both younger and older adults.

Cumulatively, the literature explored thus far examining the impact of suppression on physiology, suggests suppression (of a variety of emotions) may have a physiological cost for the individual as a result of increased sympathetic activation (although there does appear to be a degree of specificity to the emotion involved). The exception to this rule is heart rate, which in most studies has been found to either decrease or remain the same.

One difficulty with the research explored above is that it focuses entirely on suppression of objective behavioural responses, as opposed to suppression of subjective internal responses. Therefore, there is no guarantee these findings will generalize to alternative forms of emotional suppression, such as suppression of emotional thoughts and feelings (Gross, 1998a). According to Hayes and Strosahl (2004), this form of suppression is most detrimental to the individual, and most likely to incur negative effects.

Indeed the majority of research in the area of experiential suppression suggests its physiological effects are similar to those found for expressive suppression. The first study addressing suppression of internal emotional responses was conducted by Martin (1964). Martin's study required male undergraduate students to view pictures of men in a state of undress under inhibitory conditions (i.e., whilst focusing on memories of either their mother or father). Results showed inhibitors exhibited heightened skin conductance levels when compared with control participants who were not given any instructions.

The generality of Martin's (1964) findings across diverse emotive stimuli has also been demonstrated. Koriat, Melkman, Averill, and Lazarus (1972) found that

subjects requested to assume a detached stance while viewing a sawmill accident exhibited lower skin conductance levels than participants in a non-instructed condition. Elevated levels of skin conductance have also been reported in response to suppression of exciting (Merckelbach, Muris, Van den Hout, & De Jong, 1991; Wegner, Shortt, Blake, & Page, 1990) and personally relevant thoughts (i.e., thoughts of an old flame) (Wegner & Gold, 1995).

However, not all research on experiential suppression has produced such consistent results. A recent study found that participants asked to suppress a negative emotional state (fear) exhibited decreased corrugator activity and eye blink startle magnitude compared with participants asked to maintain their emotional responses (Jackson et al., 2000). These results suggest the impact of suppression may not be the same across all indices of physiological functioning.

Unfortunately, comparison of research findings in the area of experiential suppression is made difficult by the absence of a consistent or empirically validated conceptualization of emotional suppression. For example, emotion regulation instructions in Jackson et al.'s (2000) study were fairly vague. Participants in the suppression condition were instructed to decrease the intensity of fear they experienced, but the methods via which they were allowed to decrease feelings of fear appeared to be broad. For example, participants in the suppression condition were allowed to focus on positive aspects of the picture or a positive outcome of the situation as a means of decreasing their emotions, which meant participants were not precluded from using alternative regulatory methods, such as cognitive reappraisal, as a means of influencing their emotions. Arguably, it is unclear whether Jackson et al.'s research really assessed the impact of suppression or a broader array of emotion regulation strategies. Operations used to induce suppression in a number of the other studies cited previously were also somewhat ambiguous (i.e., reminders of parents, and instructions to appear detached) (Wegner et al., 1990).

A further limitation of current research on experiential suppression is that the emotive stimuli employed in these studies were frequently non-standardised. Aside from Jackson et al. (2000), all the studies cited above relied on confederate interactions or relived emotion procedures as the evocative stimuli. The absence of a

standardised approach means the nature of the experimental manipulation is likely to differ across participants, potentially introducing confounds related to these differences (Rottenberg, Ray, & Gross, in press). Moreover, research conducted thus far has investigated a limited number of emotional states. In many cases researchers were non-specific in defining the nature of the emotion evoked or failed to put in place manipulation checks to determine the usefulness of the induction procedure for eliciting the target emotion (Jackson et al., 2000; Wegner & Gold, 1995). These are salient limitations, given that research exploring expressive suppression has indicated some specificity to the emotion elicited (Gross & Levenson, 1997).

Research exploring experiential suppression has also used a limited range of physiological measures. Most studies have focused on skin conductance levels; Jackson et al.'s (2000) study being the exception. Therefore, the degree to which findings pertain to emotional suppression extend to other indexes of physiological arousal is unknown. Further research investigating a broader range of physiological measures is necessary to obtain a better understanding of the physiological effects of suppression and how these might relate to physical wellbeing. It could be particularly interesting to examine heart rate, given the demonstrated relationship between emotional wellbeing and cardiac functioning.

Notwithstanding the inconsistencies noted above, overall, available evidence suggests emotional avoidance (in the form of suppression) may have detrimental consequences for physical health. Studies on expressive and experiential suppression by and large show that suppression of a variety of emotions increases the load imposed on the sympathetic nervous system. This may be problematic from a health perspective because although the occasional use of suppression is unlikely to induce negative effects, it would seem probable that consistent reliance on suppression may do so through (a) sustained physiological reactivity that is in excess of metabolic demands (Gross, 1998a; Gross & Levenson, 1993, 1997), and/or (b) activation of aspects of the stress response demonstrated to impinge on immune functioning (Gross, 1998).

Suppression: Experiential effects.

In addition to exerting potentially negative effects on physiological functioning, suppression may also exert negative effects on the subjective experience of emotion by triggering a “paradoxical increase in emotional experiencing” (Salters-Pedneault et al., 2004, p. 98). Indeed, research in the area of thought suppression, pioneered by Wegner’s classic white bear experiments (see Abramowitz, Tolin, & Street, 2001 for a review), suggests the intensity or frequency of negative emotional thoughts often increases during the post suppression period (Cioffi & Holloway, 1993; Harvey & Bryant, 1998a, 1998b, 1999). Although some studies have not supported these findings (Janeck & Calamari, 1999; Matthews & Milroy, 1993; Muris, Merckelbach, Horselenberg, Sijsenaar, & Leeuw, 1997; Muris, Merckelbach, Van den Hout, & de Jong, 1992), a recent meta-analysis of 44 studies reported a small to medium rebound effect of thought suppression (Abramowitz et al., 2001).

Given these findings, it is unsurprising that suppression has also been found to influence affect and mood. In an early study, Roemer and Borkovec (1994) found that suppression of personally relevant anxious or depressing thoughts heightened participants’ self-reported feelings of anxiety and increased the frequency of emotive thoughts. Later research suggested these findings were applicable to a variety of emotional states. Purdon and Clark (2000) reported that suppression of obsessional thoughts led to increased discomfort and negative mood when compared with suppression of positive or neutral thoughts. In a related vein, Borton and colleagues found suppression of negative thoughts to exert deleterious post-suppression effects on anxiety, depression, and self esteem – the more depressing the self-referent thoughts, the more negative the outcomes (Borton, Markowitz, & Dieterich, 2005; Markowitz & Borton, 2002).

Similar emotional effects have been reported using more distal emotive stimuli and participants that diverge emotionally from the norm. Campbell-Sills, Barlow, Brown, and Hoffman (2003, cited in Levitt, Brown, Orsillo, & Barlow, 2004) found that participants diagnosed with mood disorders were more likely to report suppressing their emotions while viewing a film designed to induce a negative emotional state, than participants without mood disorders. Moreover, use of suppression was associated with delayed mood recovery.

These studies appear to provide evidence that suppression serves to exacerbate rather than attenuate distress. However, not all findings coincide with this perspective. Research conducted by Gross and colleagues (cited earlier) found that suppressors self-reports of emotional experience did not differ from control participants who were simply instructed to watch the clip (Gross, 1998a; Gross & Levenson, 1993; Richards & Gross, 1999). The only exception was when the target emotion was positive in nature (amusement). In this case, suppression led to lower ratings of positive emotion (Gross & Levenson, 1997). These findings suggest suppression of negative emotions is no worse – although also no better – than what most individuals normally do anyway.

Divergent findings pertaining to the experiential impact of suppression can probably be explained by the fact that Gross and colleagues focused solely on expressive suppression, while the previous research focused on experiential suppression. However, differences may also be attributed to Gross' focus on participants' emotional responses during the film as opposed to post-suppression responses, which have been the focus of research on experiential suppression. Contradictions may even be a consequence of the different emotive stimuli used. Research addressing the impact of emotional thought suppression on subjective dimensions of emotion has largely used individually generated personally relevant thoughts as the evocative stimuli. For example, Roemer and Borkovec (1994) asked participants to recall a personally relevant incident involving loss and criticism or rejection, while Borton and colleagues asked participants to write down negative distressing thoughts (Borton et al., 2005; Markowitz & Borton, 2002). As noted in the previous section, the use of individually generated emotive stimuli is potentially problematic as this type of stimuli cannot be standardised, meaning the potential for individual differences to impinge on results is increased (Coolican, 1999; Rottenberg et al., in press). Moreover, the sole focus on internally generated emotion elicitors limits the generality of the research. As Gross and Levenson (1993) noted, research on the impact of suppression needs to focus on both internal and external emotion elicitors.

In sum, methodological differences across studies exploring the impact of suppression on subjective experience undermine one's ability to draw robust

conclusions as to its effects. However, taken together, the research reviewed above suggests that suppression represents a relatively ineffective means of regulating subjective emotional experience. At best, suppression fails to provide additional relief from the experience of negative emotion (i.e., Gross, 1998a; Gross & Levenson, 1997), and at worst it may actually intensify or exacerbate distress (Borton et al., 2005; Purdon & Clark, 2000).

Suppression: Cognitive effects.

Evidence suggests emotional suppression may also induce negative cognitive outcomes. Research indicates that suppression impairs cognitive performance by promoting disengagement from frustrating or distressing activities (Muraven, Tice, & Baumeister, 1998), increasing cognitive interference (Derakshan, Myers, Hansen, & O'leary, 2004), and encouraging superficial processing (Beavers & Scott, 2001). Another facet of cognitive functioning recently found to be impaired as a result of suppression is memory. Richards and Gross (1999) found that female participants who were instructed to suppress observable emotional responses, while viewing slides of injured men, performed more poorly on a subsequent test of incidental recall and recognition of verbal information than control participants (who were not provided regulatory instructions). This effect was found to be independent of the level of emotion elicited by the slides.

The generality of Richards' and Gross' (1999) findings to alternative emotional states, facets of memory, and emotional stimuli has also been supported by more recent research. Richards and Gross (2000 study 1) exposed male and female participants to a film containing a negative socio-emotive theme (a husband's admission of infidelity to his wife) while under instructions to suppress. Results indicated suppressors performed more poorly on tests of visual and verbal incidental memory, and reported less confidence in the accuracy of their responses, than participants given no instructions. Furthermore, Bonnano et al. (2004) reported that instructions to suppress facial expressions, while exposed to both positive and negative slides, led to poorer visual memory. These memory effects have been found to remain stable even when the nature of the emotional situation is altered from one of passive consumption to active interaction. For example, a recent study found that participants instructed to suppress vocal and facial expressions of emotion during

discussion of a conflictual situation with a romantic partner, exhibited reduced recall when compared with participants asked not to suppress (Richards, Butler, & Gross, 2003).

Analysed as a whole, these findings suggest there may be substantial cognitive costs of suppression. This is a disturbing finding, given the many and varied circumstances in which humans attempt to suppress their emotions. Examples include performing on stage, attending a job interview, and sitting an important exam. All of which represent situations where optimal cognitive functioning may be desirable.

However, once again, the studies examined thus far solely addressed the impact of expressive suppression. As such, there is no guarantee these findings would extend to suppression of internal components of emotion (i.e., thoughts and feelings). Unfortunately, research assessing the impact of emotional thought suppression on memory is minimal. While studies addressing individual differences in trait tendencies toward experiential suppression have generally demonstrated poorer content memory in suppressors when compared with non-suppressors (Rassin, 2001; Siddique, 2004), particularly when the material suppressed is negative (Shane & Peterson, 2004), experimental research is sparse. To my knowledge, only one study has assessed the impact of emotional thought suppression on adults' memory in a controlled setting. Rassin, Merckelbach, and Muris (1997) explored the consequences of thought suppression for participants' memory for details of an emotional film and its chronological sequence. The film depicted a real-life scene of a tourist being attacked by a bear. Rassin et al. found that suppression during a 5-hour period following exposure to this film had no impact on participants' subsequent memory of details of the film or its chronological order (although a small effect on meta-memory was observed).

There are several possible reasons for inconsistencies in research addressing the impact of suppression on memory. First, contradictions may be a result of the type of suppression examined. It is possible that expressive suppression has a more negative impact on memory than suppression of internal emotional responses. Although this suggestion appears to contradict Hayes' theory of experiential avoidance, which

implies that suppression of internal emotional states is more detrimental than suppression of observable emotional responses (Hayes & Strosahl, 2004). Furthermore, it seems more likely that suppression of internal experiences would compromise memory (also an internal phenomenon) than suppression of behavioural responses (an external phenomenon). Second, contradictory findings may be a consequence of the timing of the suppression manipulation. As noted earlier, studies on expressive suppression tend to focus on suppression during exposure to the emotional stimuli, whereas research on thought suppression generally focuses on suppression during the period following exposure to the emotive stimuli. This is an important divergence because it is possible that suppression following emotion evocation has a lesser impact on memory than suppression during emotion evocation because in the former case the memory trace has already been created. Research in the area of physiology has demonstrated that increases in sympathetic activation serve to blunt sensory perception, undermining encoding processes that create memories (Lacey & Lacey, 1974). From this perspective, we would expect suppression (regardless of the type), with its demonstrated effects on sympathetic functioning, to compromise memory for objects or events that are concurrent with the suppression period (Richards & Gross, 1999). However, this would not necessarily be the case when the events to be remembered did not co-occur at the time the emotion was suppressed. Hence, suppression following emotion evocation may not induce the detrimental consequences for memory found when suppression occurs during emotion evocation. Third, Rassin et al.'s (1997) study focused on fear-based emotions, whereas previous expressive suppression literature focused on more generalised emotion states. Thus, it is possible that the impact of suppression on cognitive aspects of functioning may be moderated by the type of emotion elicited.

Finally, Rassin et al.'s (1997) study failed to differentiate between the various sensory facets of memory (i.e., verbal and visual memory), whereas the expressive suppression literature does. If Rassin et al. had investigated visual and verbal facets of memory separately their results may have differed. This seems particularly likely given that Richards and Gross (2000) found suppression served to worsen verbal memory, but had a negligible impact on visual memory.

Aside from these difficulties, on balance, research examining the impact of suppression on memory indicates suppression may compromise an individual's ability to spontaneously recall or recognise information presented during the suppression period. In saying this, more research is needed in the area of experiential suppression before findings can be confidently applied to this domain.

Summary of suppression findings.

Cumulatively, the findings of research examining the impact of suppression indicate excessive control of one's emotions may induce substantial costs across physiological, experiential, and cognitive domains. By and large, available literature indicates suppression fails to provide additional relief from the subjective experience of emotion, and at worst, may even intensify or exacerbate distress. Furthermore, the finding that suppression appears to heighten sympathetic activation and reduce spontaneous memory suggests it may also have detrimental effects on cognitive functioning and physical health. Overall, suppression appears to be a fairly maladaptive ineffective means of regulating emotion.

In saying this, inconsistencies in the literature are apparent and should not be ignored. Further research could help clarify some of these contradictions. There is a particular need for research examining the impact of experiential suppression. To summarize the key limitations noted earlier, research in this area could be improved by (a) utilising empirically validated conceptualisations of suppression (Bridges et al., 2004; Gratz & Roemer, 2004); (b) using additional measures of physiological arousal (to those explored thus far) (Wegner et al., 1990); (c) exploring alternative (and definitive) emotional states (Gross, 1998a; Harris, 2001); (d) utilising standardised procedures for evoking emotion (both internal and external emotion elicitors) (Rottenberg et al., in press); and (e) exploring memory effects in greater depth (Rassin et al., 1997; Richards, 2004). The present study served to address each of these limitations.

Are all Emotion Regulation Strategies Created Equal?

Although evidence suggests the costs of suppression outweigh the benefits, this finding does not necessitate that all methods of controlling one's emotions are equally detrimental. According to Gross' (1998b, 2002; John & Gross, 2004) process

model of emotion regulation, different methods of emotional control may have different effects depending on their primary point of impact on the emotion generation process.

Gross' process model is based on the key assumption that emotions unfold progressively over time. Therefore, one means of differentiating between the multiple regulatory strategies available, is to identify the point in the "emotion generative process" (John & Gross, 2004, p. 1303) where a strategy has its principal impact.

At a basic level, the model makes a distinction between antecedent and response focused strategies (John & Gross, 2004). Antecedent-focused strategies are techniques used before activation of emotional response tendencies, hence, they prevent emotions from being activated in the first place. In contrast, response-focused strategies are used to modulate emotional response tendencies once they have already been set in motion. Suppression would be conceptualised as a response-focused strategy because it involves inhibition of thoughts, feelings, or expressions as they arise (Gross, 2002).

Response-focused strategies are theorised to be more physiologically and emotionally taxing than antecedent-focused strategies. Because response-focused strategies are utilised once response tendencies have already been evoked, they require an individual to identify and manage emotions as they arise. This process requires a good deal of attention and effort, and has a high failure rate. The effort required to manage emotions is likely to heighten physiological arousal, and momentary lapses in attention may lead to failure to control subjective feelings effectively. The level of effort and attentiveness suppression requires may explain why it has been found to be such an ineffective method of regulating emotion (John & Gross, 2004).

In contrast, antecedent-focused strategies are used before full activation of the emotional response tendencies and hence prevent physiological and subjective feelings of distress from spilling out in the first place. Therefore, the level of attention and effort required when using an antecedent-focused strategy tends to be

lower and more acute than the attention and effort required for response-focused techniques (see John & Gross, 2004, for a more thorough description of this model).

Antecedent-focused strategies are also theorised to be less cognitively taxing than response-focused strategies. Because response-focused strategies require ongoing self-monitoring they place a heavy burden on a person's cognitive resources.

Response-focused strategies require continual evaluation of the current functioning of the emotional system (e.g., sad thoughts) in comparison with an ideal or desired level of functioning (e.g., calm non-emotive thoughts), along with corrective activity to reduce discrepancies as they arise. From this perspective, the effortful nature of suppression means fewer cognitive resources are available for alternative activities, such as remembering what is going on around you. In contrast, because antecedent-focused strategies are used early on in the emotion generation process there is no need for ongoing self-monitoring and corrective action. Thus, effects on memory would be expected to be minimal (Gross, 2001).

Indeed a growing body of research is available indicating strategies of controlling emotion that involve altering the trajectory of emotion, rather than modulating response tendencies once they are already activated, have beneficial effects. One strategy that has been suggested to induce a positive impact is that of reappraisal (Gross, 1998).

Reappraisal: Adaptive or Maladaptive?

Reappraisal is an antecedent-focused strategy that involves cognitive re-evaluation of a situation perceived to possess emotion reactive cues, with the goal of reducing its emotional impact (Gross, 2002). Deciding to view an important exam as just a test, rather than perceiving it as a measure of self-worth, constitutes a form of reappraisal (Gross, 2002). Both correlational and experimental studies indicate reappraisal constitutes a useful method of regulating emotion and does not possess the detrimental experiential, physiological, or cognitive consequences associated with suppression

Several correlational studies have suggested the use of reappraisal may be linked to increased tolerance of difficult experiences, and better psychological health.

Garnefski, Baan, and Kraaij (2005) found that the use of positive reappraisal by farmers whose stock were affected by the foot and mouth epidemic in Europe was related to lower levels of psychological distress compared with the use of alternative forms of emotion regulation (i.e., self-blame, other blame, and rumination). There is also evidence that reappraisal may play a preventative role in psychological conditions like depression, anxiety, and suicidality (Garnefski, Kraaij, & Spinhoven, 2001; Garnefski, Teerds, Kraaij, Legerstee, & Van den Kommer, 2004; Kraaij, Pruymboom, & Garnefski, 2002).

Early experimental evidence that reappraisal has quantifiable benefits was provided in a series of American studies by Lazarus and colleagues in the 1960s (Lazarus & Alfert, 1964; Lazarus, Opton, Nomikos, & Rankin, 1965; Speisman, Lazarus, Mordkoff, & Davison, 1964). Lazarus and Alfert (1964) exposed a sample of male undergraduate students to a brief film depicting a male circumcision ritual. Before viewing the film, some participants were provided with an introductory soundtrack designed to deny the negative aspects of the surgery and emphasise the positive aspects. Other participants were provided with no such introduction. In comparison with participants provided with no introduction, those provided with the sound track exhibited decreased heart rate and skin conductance levels, along with more pleasant affect. These results supported earlier findings by Speisman et al. (1964), and were later replicated in research by Lazarus et al. (1965). The results of these studies were interpreted as evidence that changing the way an individual views an emotive situation can alter their emotional response (Gross, 1998a).

These findings have been influential across both theoretical and applied domains. The perspective that cognitive strategies are useful for reducing stress and conquering one's emotions is apparent in many prominent psychological theories (Gross, 1998a). Barlow's (1988) theory of psychopathology, Beck's (Beck et al., 1979) model of depression, and Lazarus' conceptualisation of coping and stress reduction (Lazarus & Folkman, 1984), constitute a few examples. Cognitive reappraisal is also commonly used in clinical settings for the treatment and prevention of disorders like depression and anxiety (O'Donohue, Fisher, & Hayes, 2003).

However, some theorists have questioned the benefits of reappraisal, given that later research produced a less coherent picture (Gross, 1998a). For instance, a British study conducted in the 1980s found no significant differences between reappraisal and control participants' subjective or physiological responses to a distressing film (Stephoe & Vogele, 1986). Results here indicated reappraisal may be no more effective than individuals' spontaneous methods of reacting to their emotions.

In an effort to provide a clearer picture of the costs and benefits of reappraisal and assess its comparative impact in relation to a response focused technique (suppression), Gross and colleagues conducted a series of studies comparing participants' physiological, subjective, and cognitive responses to emotive films under instructions to either reappraise (defined as thinking about the film in such away that they would feel nothing), suppress, or simply watch the film (Gross, 1998a; Richards & Gross, 2000). Results indicated that participants instructed to reappraise reported decreased feelings of disgust when compared with suppressors and controls (Gross, 1998). Reappraisal also failed to evoke the heightened levels of sympathetic activation found for suppressors, with similar physiological effects reported for reappraisers and control participants. Moreover, the negative effects on memory induced by suppression were not found for reappraisal. No differences between participants instructed to reappraise or "simply watch" a series of negative slides were found for verbal incidental memory, and visual memory actually improved (Richards & Gross, 2000, study 2). This finding has since been replicated in research examining alternative stimuli (i.e., evocative conversations) (Butler et al., 2003; Richards et al., 2003) in real life settings (Richards & Gross, 2000, study 3). Overall, these findings suggest reappraisal is a relatively effective method of controlling emotion.

Summary of reappraisal findings.

On the basis of findings pertaining to reappraisal, it would appear that not all methods of controlling emotion are universally detrimental. When regulatory strategies are appropriately timed and involve control of the trajectory of emotional experience, rather than control of emotional response tendencies as they arise, they may actually induce benefits (John & Gross, 2004).

However, one important question remains: What would the comparative impact be if no attempts to control one's emotions were made? Research conducted thus far cannot adequately answer this question because the control conditions employed in these studies did not equate to free expression or acceptance of one's emotions. In fact, what they represented is fairly unclear. For example, in Gross' (1998a) research, control participants were instructed simply to watch the clips without being provided with any specific regulatory instructions. However, they were not precluded from engaging in emotion regulation of their own free will, and given the frequent use of emotion regulation techniques in everyday life; it is likely they did. As such, the size or relevance of the yardstick against which findings pertaining to suppression and reappraisal were measured is unclear. As Gross (2002) acknowledged, the control conditions utilised in their studies constituted a conservative test of the costs and benefits of suppression. This is a salient concern because although the research of Gross and colleagues found reappraisers reported a decreased experience of emotion when compared with control participants, no significant differences were found on dimensions of physiology and memory. This result is alarming, given that many contemporary theories of stress and emotion are built on the assumption that reappraisal is an effective means of dissipating stress, yet in most respects it appears to be no better than what most individuals do anyway.

Even if one was to accept that reappraisal is an adaptive form of emotion regulation, in certain circumstances it may not be desirable. As Gross (1998a) pointed out, reappraisals that are unrealistic or rigid may cause one to overlook or deny important aspects of a situation, such as the loss of a loved one or a partner's infidelity. In these situations the initial benefits of reappraisal (i.e., reducing emotional experience) are likely to be surpassed by the long-term consequences of controlling one's emotions (i.e., becoming entrapped in a chronic grieving process). In fact, any form of emotion regulation that aims to avoid or control emotional experience may impair functioning over the long term. Theorists as early as Darwin (1965) have noted that emotions serve a number of important functions, such as informing others of one's needs, desires, and preferences. Consequently, attempting to reduce or eliminate emotions through techniques of control or avoidance may inadvertently undermine the adaptive value of emotions (Gross, 1998a).

The difficulties noted above highlight the need to obtain an understanding of diverse methods of regulating emotion. Most of the research conducted thus far has focused on strategies that involve control or elimination of emotional responses. However, there is a need for research examining the efficacy of alternative regulatory strategies that serve to temper the negative consequences of emotion while still allowing the individual to hone in on the positive facets. One strategy that may fit into this category and is receiving growing clinical, theoretical, and empirical attention is that of acceptance.

The Alternative to Avoidance and Control: Acceptance-based Strategies

Over the last 10 years there has been growing empirical interest in *acceptance* as a means of regulating emotion. This has largely been stimulated by the new wave of cognitive behavioural approaches that emphasise the importance of interacting with thoughts and feelings, and noticing or evaluating them in an accepting, non-judgemental way.

Ideas of acceptance are implicit in many traditional therapeutic paradigms, including humanistic, existential, and even Freudian therapies – all of which acknowledged that client and/or therapist acceptance are vital components of therapeutic progress and change (Eifert & Forsyth, 2005). However, acceptance-based strategies have been further operationalised and conceptualised in contemporary therapies. These interventions aim to decrease experiential avoidance and emotional control, while promoting behavioural change. For example, Linehan's Dialectical Behaviour Therapy for the treatment of Borderline Personality Disorder is based on notions of emotional tolerance and experiential acceptance (Linehan, 1993; Robins, 2002). Similarly, Roemer and Orsillo (2002) have proposed a new approach to the treatment of Generalised Anxiety Disorder that incorporates traditional cognitive behavioural strategies with notions of mindfulness/acceptance, and Karekla (2005) recently piloted an acceptance-enhanced panic control programme for the treatment of Panic Disorder. Within these therapies acceptance is not simply seen as a therapeutic goal, but instead as a method of empowering clients to live a life that is worth living and directed toward attainment of valued goals. In this way acceptance-based therapies share ties with Eastern Buddhist philosophies and meditation practices that emphasise the importance of mindfulness (i.e., "approaching internal experiences

with curiosity and acceptance” and engaging in “intensive self-observation without judgment, elaboration, or attempts to fix or change the experience”) (Hayes & Feldman, 2004, p. 257; see also Baer, 2003, for more in-depth exploration of these practices).

Acceptance also forms the central foundation of Acceptance and Commitment Therapy (ACT), a new cognitive behavioural therapy developed by Hayes and Strosahl (2004). The underlying precept of ACT is that experiential avoidance and control are key mechanisms in the development and maintenance of psychopathology. ACT refutes the assumption that private experiences need to be controlled for clients to remain psychologically healthy. Paradoxically, they suggest avoidance and control of private experience is the problem rather than the solution (Hayes, 2004). Using an ACT framework, clients are encouraged to abandon their inner tug-of-war with their emotions and begin to accept and experience uncomfortable internal experiences (i.e., thoughts and feelings), without attempting to avoid, control, or judge them (as being either true or untrue). Acceptance within an ACT framework is conceptualised as “taking a stance of non-judgemental awareness and actively embracing the experience of thoughts, feelings, and bodily sensations as they occur” (Hayes & Strosahl, 2004, p. 7). It is not synonymous with tolerance, resignation, or abandonment of effort (Hayes et al., 2006). ACT aims to adjust the context in which “negative” events occur from one in which they are to be believed and operated on, to a context where they are purely to be noticed and accepted. By encouraging clients to abandon their inner struggle with their emotions, the impact of the emotions is altered (Eifert & Heffner, 2003).

ACT can be differentiated from other cognitive behavioural treatments that aim to decrease avoidance of emotionally evocative situations and sensations, in that a central goal of these therapies is still to decrease the frequency or intensity of symptoms; consequently, they are still control based (i.e., relaxation and cognitive restructuring). In contrast, ACT aims to reduce the use of methods of internal control and experiential avoidance, while promoting physical control and willingness (Levitt et al., 2004).

It is important to acknowledge that there is some controversy concerning the conceptualisation of acceptance as an emotion regulation strategy. ACT theorists like Eifert and Forsyth (2005) conceptualise acceptance in polar opposition to emotion regulation. They argue that the goal of emotion regulation is to increase clients control over internal experiences, whereas the goal of acceptance is to abandon the struggle to alter emotions. Although Eifert and Forsyth (2005) maintain acceptance has “transformative power” (p. 71) (i.e., it serves to alter the nature and intensity of the emotional experience), they argue that this power is not derived from manipulating internal experiences, but by experiencing emotions as they are “nothing more nothing less” (p. 71).

Indeed, if emotion regulation is defined as synonymous with control of emotional experience (as has traditionally been the case), acceptance is inherently non-regulatory. However (as noted previously), in line with more contemporary theorists (i.e., Gratz & Roemer, 2004; Johnson et al., 2003), the present study has taken a less conservative approach to emotion regulation. In the present study emotion regulation is conceptualised as a broad array of implicit and explicit processes that serve to initiate, exacerbate, maintain, or alter an individuals experience or expression of emotion, either directly or indirectly. From this perspective I would suggest acceptance can be validly defined as an emotion regulation technique (for a more in depth discussion of these issues see Eifert & Forsyth, 2005; Gratz & Roemer, 2004.) Although emotional change is not the primary objective of acceptance techniques, as is shown in the following section, there a good deal of evidence to suggest changes in emotional response tendencies occur as a by-product of the strategy. Thus, I would argue that acceptance is implicitly regulatory.

Acceptance versus avoidance based strategies: Empirical findings.

Preliminary findings indicate that therapeutic strategies based on an acceptance rationale possess substantial therapeutic merit. Research conducted thus far supports its usefulness in the treatment of depression (Zettle & Hayes, 1986; Zettle & Rains, 1989), work-related stress (Bond & Bunce, 2000), mathematics anxiety (Zettle, 2003), smoking cessation (Gifford et al., 2004), performance anxiety (Block, 2003), trichotillomania (Twohig & Woods, 2004; Woods, Wetterneck, & Flessner, in press), and diabetes management (Gregg, 2004). It has even been shown to be efficacious

for the treatment of “difficult” client problems that are often resistant to treatment, such as poly-substance abuse (Bissett, 2002), psychotic disorders (Bach & Hayes, 2002; Gaudiano & Herbert, 2006), and chronic pain (Dahl, Wilson, & Nilsson, 2004; McCracken, Vowles, & Eccleston, 2005; Wicksell, Dahl, Magnusson, & Olsson, 2005). Importantly, in a number of these studies ACT was found to produce more favourable outcomes than traditional cognitive behavioural approaches or treatment as usual (Bond & Bunce, 2000; Zettle & Hayes, 1986), and benefits were demonstrated across both short-term and extended time periods (Bach & Hayes, 2002; Gifford et al., 2004; Zettle & Hayes, 1986).

Although evidence suggests acceptance-based approaches are effective in the treatment of a variety of psychological problems, the above studies did not explore acceptance as a sole strategy for dealing with specific emotions but rather as one part of a multi-componential treatment package, meaning the relative effectiveness of acceptance compared with alternative components of the therapy is unknown (Hayes et al., 1999). Conducting research on acceptance as an isolated regulatory technique is important to establish the avenues through which these therapies promote client growth and the possible usefulness of acceptance in everyday contexts (i.e., the workplace, business, and schools).

Research comparing acceptance (as an isolated strategy) with control-based or avoidance-based approaches is still relatively sparse. However, studies in the area of pain and anxiety management have produced some promising results. Three early studies found that participants encouraged to sit back and notice thoughts and feelings during a cold pressor task (designed to evoke feelings of pain) exhibited increased pain tolerance (Hayes et al., 1999), and were less focused on distressing thoughts and feelings (Forsyth, Roche and Maher, 2003), when compared with participants who used a control-based approach that incorporated positive self-talk, controlled breathing, positive imagery, and body focusing. Later studies have also found acceptance to be more effective than control-based techniques (that aim to alter pain related thoughts and feelings) for decreasing sensory pain (Keogh, Bond, Hanmer, & Tilston, 2005) and the believability of experienced pain (Gutierrez, Luciano, Rodriguez, & Fink, 2004).

The benefits of acceptance appear to extend beyond the regulation of pain experiences to alternative emotions. A recent study found that individuals requested to suppress upsetting intrusive thoughts reported heightened levels of personal discomfort following suppression. In contrast, participants encouraged to accept their thoughts (through the use of a prototypic ACT metaphor – marching soldiers) exhibited reduced discomfort during a follow-up phase, although no decreases in thought frequency were found (Marcks & Woods, 2005).

The above findings indicate acceptance has similar effects on the subjective experience of emotion as control or avoidant based strategies; however, it is significantly more effective in alleviating the distress associated with these symptoms.

The difficulty with the research explored above is that it focuses largely on self-reported experiences of emotion while failing to investigate the impact of acceptance on alternative emotional response tendencies, such as physiological responses. This represents an important domain of inquiry, given the growing body of literature demonstrating a relationship between certain forms of emotion regulation and physical illness.

Research exploring the physiological effects of acceptance suggests acceptance may not be as effective for modulating physiological response tendencies as it is for decreasing subjective distress. An initial study conducted by Feldner and colleagues (Feldner, Zvolensky, Eifert, & Spira, 2003) examined the impact of observation/acceptance versus suppression during an anxiety-provoking carbon dioxide (CO²) challenge. Participants were male and female undergraduate students who had previously been identified as high or low experiential avoiders. Results showed that high experiential avoiders who suppressed, reported (on average) higher levels of anxiety and subjective distress than participants who simply observed their emotional responses. However, participants instructed to observe actually exhibited increased heart rate during the challenge, relative to participants instructed to suppress.

Similar findings were reported by Eifert and Heffner (2003) when they contrasted the impact of acceptance- versus control-based strategies (diaphragmatic breathing) for female undergraduates identified as anxiety sensitive, in the context of a CO² challenge. They found that participants in an acceptance condition exhibited decreased behavioural avoidance and feelings of fear/losing control, and were less prone to catastrophic thinking than individuals who used the control-based approach or received no instructions. However, no differences in physiological effects or self-reported panic symptoms were found.

Comparable findings were reported by Levitt et al. (2004). Their study contrasted the impact of acceptance training with either suppression or no training (control) while participating in a CO² challenge. Results showed that participants instructed to accept thoughts and feelings exhibited lower levels of self-reported anxiety and avoidance (defined as willingness to participate in a second CO² challenge) compared with suppressors and controls. Physiological responses failed to differentiate between groups.

The only study to report decreased physiological arousal as a consequence of acceptance was conducted by Campbell-Sills, Barlow, Brown, and Hoffman (2003, as cited in Levitt et al., 2004). They exposed individuals diagnosed with anxiety or mood disorders to a series of films designed to elicit a fearful emotional response. Results showed that individuals who accepted their emotions exhibited lower levels of sympathetic arousal, and recovered more rapidly on subjective dimensions of emotion, than suppressors.

Summary of acceptance findings.

The collective findings of the acceptance literature indicate that acceptance represents a useful method of alleviating subjective distress evoked in response to emotional stimuli, and is superior to both avoidance and control based approaches on this dimension. However, acceptance strategies may not exert any benefits over and above control-based approaches on physiological dimensions. In saying this, any conclusions derived from the literature must be tentative at best, as the current body of research is small and the generality and scope of findings is limited in the following ways.

First, the ecological validity of methods used to induce emotion in current research on acceptance is questionable. The majority of research conducted thus far on acceptance has used CO² challenges, cold pressor tasks, or electric shocks to evoke emotion. Focusing on such techniques may limit the generality of results as they constitute an unlikely source of emotional arousal in everyday life (Hayes et al., 1999; Levitt et al., 2004). The use of CO² challenge to induce emotion may also explain differences between studies on physiological variables. It is notable that in three out of four studies that explored physiological effects, instructional condition failed to differentiate responses on this dimension. Campbell-Sills et al. (2003, as cited in Levitt et al., 2004) were the only researchers to report physiological differences between groups. Interestingly, they were also the only group to use film as their emotive stimulus. Their divergent results suggest the impact of acceptance on physiological reactivity may be dependent on the emotional stimuli used (Levitt et al., 2004). Further research using more ecologically valid forms of emotion evocation would help clarify these findings.

Second, all controlled research on acceptance (thus far) has focused on pain- or anxiety-based emotions (i.e., fear or panic), meaning the usefulness of acceptance in the regulation of alternative emotional states is unknown. It is important not to assume that the consequences of acceptance will be equivalent across all emotional subtypes. This assertion has already been borne out in research pertaining to suppression, which (as noted previously) indicates the effects of suppression are somewhat specific to the target emotion (Gross & Levenson, 1997). As such, it is important to conduct further research that focuses on varied emotion states to those examined thus far.

Third, the range of dependent measures studied so far is limited and has largely focused on subjective and physiological responses to acceptance. Examination of multiple dependent variables is important to establish the relative costs and benefits of acceptance and the specific situations in which its use may be most appropriate (Gross, 1998a). For example, if research were to indicate a particular strategy was useful in alleviating self-reported distress and reducing sympathetic activation, but detrimental to cognitive functioning, this might suggest acceptance-based approaches

are useful for individuals experiencing health-related distress, but not recommended for individuals working in academic environments where a high level of cognitive functioning is desired.

Fourth, although research conducted so far addressing the comparative impact of acceptance- versus control/avoidant-based approaches indicates accepting one's emotions is more beneficial than attempting to control them, what we still do not know is how much control is too much? Gross and colleagues (i.e., Gross, 1998a; Richards & Gross, 2000) have already demonstrated that not all methods of controlling emotion are inherently maladaptive. Given such findings, it would be salient to compare the impact of acceptance with strategies that vary in the level of control they impose. Conducting such an analysis would provide clues as to if, and at what level, emotional control becomes detrimental to psychological and physical wellbeing.

To summarise, research indicates acceptance may have beneficial effects at least for the subjective experience of emotion; however, further research is needed to (a) clarify inconsistencies regarding the impact of acceptance on physiology; (b) compare the impact of acceptance with alternative forms of emotion regulation that vary in the level of emotional control they impose; (c) extend the range of dependent variables explored to domains like cognition; and (d) examine alternative emotion states.

The Present Study

Based on Hayes' (2004) theory of experiential avoidance, and preliminary research illustrating the benefits of acceptance-based interventions, the present study aims to explore the costs and benefits of three emotion regulation strategies that vary in the levels of emotional control they impose. More specifically, I sought to compare the impact of acceptance, suppression, and reappraisal strategies on physiology, self-reported emotional experience, and incidental memory.

This research issue was explored using similar methods to those employed by Gross and colleagues in their research on suppression and reappraisal (i.e., Gross, 1998a; Richards & Gross, 2000). A between-subjects experimental design was used,

whereby a sample of healthy volunteers were individually exposed to a film clip designed to elicit feelings of sadness while under instructions to reappraise, suppress, accept, or simply watch the film (control condition). The impact of these manipulations on physiological reactivity and recovery, self-reported emotional experience during the film, incidental verbal and visual recognition, and self-reported confidence in memory were assessed.

Conceptualisation of key constructs and rationale for use.

Definitions of key constructs used in the present study were predicated on current research and theory. My conceptualisation of reappraisal was based on definitions used in research by Lazarus and Gross (Gross, 1998b; Lazarus & Alfert, 1964). They conceptualised reappraisal as “interpreting potentially emotion relevant stimuli in unemotional terms” (Gross, 1998a, p. 226). Acceptance was conceptualised from an ACT perspective as the ability to notice and experience emotions without attempting to control or judge them (Hayes & Strosahl, 2004). Finally, as with Levitt et al.’s (2004) study, suppression in the present study was conceptualised as inhibition of emotional thoughts and feelings during emotional arousal.

The decision to focus on experiential suppression of internal emotional responses differs from recent conceptualisations of suppression, which have tended to focus on emotionally expressive behaviour (i.e. Gross, 1998a). I choose to explore experiential suppression because findings in this area are less coherent, and the impact of experiential suppression on certain response domains (i.e., memory) is still poorly understood. Furthermore, there is a lack of consistency in some areas between findings pertaining to experiential suppression and those focusing on expressive suppression. However, the extent to which these differences are a function of the type of suppression examined, versus methodological differences, is unclear. The present study may help clarify these issues by examining the impact of experiential suppression using methods similar to those employed in the expressive suppression literature (i.e., standardized emotive stimuli).

Experiential suppression was also chosen because I considered it a more clinically relevant form of emotion regulation than expressive suppression. As noted earlier, recent theories of emotion suggest experiential avoidance may be the common factor

in a variety of psychopathological conditions (Hayes et al., 1999). In spite of this, experiential suppression techniques like thought-stopping are still commonly used in the prevention and treatment of psychopathological conditions. Conducting research on the relative costs and benefits of experiential suppression is therefore timely, and has probable applied value.

The present study included suppression, reappraisal, and acceptance as instructional conditions because they represent methods of regulating emotion that vary in the extent they seek to control or minimize emotion. This study conceptualised emotional control as existing on a continuum ranging from high levels of control (i.e., suppression), to moderate control (i.e., reappraisal), to minimal control (i.e., acceptance). Suppression involves a high level of emotional control, as it requires directly inhibiting emotional response tendencies as they arise. In contrast, reappraisal involves only a moderate level of emotional control. The goal with reappraisal is not to control the emotional response tendencies themselves but to alter the trajectory of the emotional response. Therefore the aim of reappraisal is not so much to eliminate emotion completely, but to alter the type of emotion experienced (John & Gross, 2004).

The present study extended previous work on suppression and reappraisal by including acceptance as an instructional condition. As noted earlier, previous research has included control conditions against which findings pertaining to suppression and reappraisal were compared (see Gross, 1998a). However, participants assigned to these conditions were not precluded from using their own regulatory strategies. As such, the size or relevance of the yardstick against which findings pertaining to suppression and reappraisal were compared was undefined. By including acceptance as a non-control-based strategy in the present study, we essentially provide a stable operationally defined yardstick against which findings pertaining to suppression and reappraisal could be compared. The inclusion of a control-free instructional context was perceived as particularly important, in light of the demonstrated association between tight emotional control and a variety of mental and physical health difficulties.

Acceptance was chosen from the range of non-control based forms of emotion regulation available as I wanted to use a theoretically defined form of emotion regulation that represents a viable means of responding to everyday situations. As shown earlier, acceptance fits this criterion. Acceptance also constitutes a clinically relevant form of emotion regulation. As noted earlier, the number of acceptance-based therapies used in clinical practice is growing, yet there is a dearth of controlled research examining the impact of acceptance (as an isolated strategy) on emotional response tendencies (Hayes et al., 1999).

Hypotheses

Suppression.

The following hypotheses were formulated regarding the impact of suppression on physiology, self-reported experience, and memory.

1. It was predicted that participants instructed to suppress emotional thoughts and feelings would show greater increases in physiological arousal (as indicated by higher skin conductance levels and increased heart rate), both during and following exposure to an emotional film, than would control participants. This prediction was contrary to previous findings by Gross and colleagues which reported decreased heart rate under suppression conditions (Gross & Levenson, 1993). However, Gross focused on expressive suppression as opposed to experiential suppression. Therefore, a probable reason suppression led to decreased heart rate (yet increased sympathetic activation on alternative physiological indices, i.e., skin conductance) is that expressive suppression targets somatic and facial behaviour (Gross & Levenson, 1997) and there is a close relationship between cardiac and somatic activity (Obrist, 1981). In contrast, the present study focused on experiential suppression, which is not directly related to somatic activity, meaning the impact on cardiac functioning could be different.
2. Suppression participants were expected to report similar levels of sadness and positive/pleasantness in response to the film as control participants. This prediction was concurrent with the findings of previous research conducted by Gross and colleagues (Gross, 1998; Gross & Levenson, 1993, 1997).

3. Finally, in line with previous research (i.e., Richards & Gross, 2000) and Gross' process model (John & Gross, 2004), it was predicted that participants in the suppression condition would exhibit poorer memory (as indicated by lower scores on the incidental recognition memory test) for details of the film and report lower levels of confidence in their memory when compared with control participants.

Reappraisal.

Predictions made regarding the impact of reappraisal were in line with recent findings reported by Gross and colleagues (Gross, 1998; Richards & Gross, 2000).

1. It was predicted that participants instructed to reappraise would exhibit similar mean levels of heart rate and skin conductance as control participants.
2. Reappraisal participants were expected to report smaller mean increases in sadness ratings during the film, and rate the film as more positive/pleasant than control participants
3. Participants in reappraisal and control conditions were expected to achieve similar scores on the incidental memory test and report similar levels of confidence in their memory of information presented in the film.

Acceptance.

The following predictions were made regarding the impact of acceptance on physiology, self-reported experience, and memory.

1. It was expected that participants instructed to accept emotional thoughts and feelings would show decreased sympathetic activation (as denoted by lower skin conductance levels and heart rate) when compared with participants in suppression, reappraisal, or control conditions. This hypothesis went against the findings of Eifert and Heffner (2003) and Levitt et al. (2004) (the only studies reviewed that have used a control condition) who found no

differences between individuals instructed to accept emotional responses and control participants. However, these studies differed from the present one because the emotive stimuli used were of an intense nature (CO² challenge), and directly relevant to the participants' presenting difficulties (panic disorder). These divergences may have altered the results. As Gross (1998a) noted, when emotional stimuli are of an intense nature a sole strategy delivered in a brief format may not initially be enough to temper physiological effects. This would seem especially likely when participants' presenting problems are directly relevant to the target emotion. In the present study, healthy participants were used and the emotional stimuli were more subtle in nature. In this context, acceptance may have a positive influence on physiology.

2. Based on the conceptualisation of acceptance used in the present study (which emphasizes the importance of experiencing and noticing thoughts and feelings), acceptance participants were expected to report greater increases in sadness, but rate the emotional film as more positive/pleasant than suppression, reappraisal, or control participants. This prediction is concurrent with two core goals of acceptance-based interventions: to allow clients to experience emotions "fully and without defense", and to "turn suffering that cannot be tolerated into pain that can be tolerated" (Eifert & Forsyth, 2005, p.70). These expectations are also in accord with the findings of Marcks and Woods (2005), who found acceptance had a minimal impact on the intensity of emotion reported, but appeared to alleviate the distressing component of the experience.
3. It was predicted that participants who were instructed to accept emotional thoughts and feelings would achieve higher scores on the incidental memory test than suppression, reappraisal, or control participants, and report greater confidence in their memory for information presented during the film. At first sight, these expectations may appear to contradict the process model of emotion regulation proposed by Gross (1998a). Based on this model, acceptance would be expected to decrease memory capacity. That is because acceptance constitutes a response-focused emotion regulation strategy – in

that it has its primary impact following evocation of emotional response tendencies. According to a process model, response-focused strategies like acceptance consume a good deal of cognitive resources and therefore have detrimental effects on memory. However, the perspective that response-focused strategies induce negative cognitive effects is based on the view that the objective of these strategies is to alter the emotional response; ongoing self-monitoring and corrective action is required to achieve this goal. In contrast, with acceptance the goal is not to alter one's experience of emotion, but rather to observe and notice emotions without judging or changing them (Hayes et al., 2006). Although changes in emotional responding have been found to be a by-product of this strategy, with acceptance there is no explicit effort to control, avoid, or alter one's emotions (Hayes & Strosahl, 2004). This means compared with other response-focused strategies acceptance is likely to require less cognitive resources, meaning participants have more resources available to devote to attending to the film. This perspective is supported by Eifert and Heffner (2005) who have suggested that by eliminating the evaluations, judgements, and interpretations individuals place on their emotions, acceptance serves to heighten one's cognitive awareness of the external world.

Method

Participants

Eighty healthy female university students participated in this study. The number of participants needed was estimated based on a statistical power analysis conducted prior to the experiment using Borenstein et al.'s (2000) power analysis software. Borenstein et al. recommend a sample of 80 (20 per cell) to achieve power of .85 when the estimated effect size is .40 (a large effect) and alpha is set at .05. Although it would have been desirable to have sufficient power to detect small and moderate effects, this would have required a substantially larger sample size. For instance, to achieve power of .80 when the estimated effect size is small would have required a sample of 1100 participants (275 per cell), and a sample of 180 participants would be required to detect medium effects. In the present study, time constraints and pragmatic considerations meant the largest sample deemed possible was 80 participants. This was considered an acceptable size, primarily because similar research using comparable group numbers has detected significant effects (e.g., Levitt et al., 2004).

In the present study, a decision was made to solely focus on women as past research indicates the presence of a gender bias, with women tending to be more expressive and susceptible to emotion induction procedures than men (Gross & Levenson, 1995; Hagemann et al., 1999). Because the validity of this experiment relied on the ability of the emotion induction procedure to actually evoke emotion (emotions cannot be suppressed or accepted without being experienced), difficulties evoking emotion in men could represent a potential confound. Hence males were excluded from participating.

Participants were recruited from a mixture of undergraduate and graduate psychology classes at Massey University (Turitea campus). Based on the recommendations of Rottenberg et al. (in press), all volunteers completed a Health Screening Questionnaire (HSQ) to determine whether they met pre-specified inclusionary criteria. Rottenberg et al. recommend the use of screening measures in research examining emotion regulation to eliminate individual differences that have the potential to confound results. The HSQ was constructed specifically for the

present study to screen out volunteers who could be at risk of physical or psychological harm as a consequence of participating. Employing inclusionary criteria also served to increase the likelihood that results obtained were caused by the experimental manipulation rather than extraneous factors (i.e., mind altering substances or pre-existing memory deficits).

The HSQ is a seven-item self-report questionnaire that uses a forced choice (YES/NO) response format (see Appendix A for a copy of the HSQ). The HSQ asks participants about the presence of psychological disorders, cardiovascular problems, hereditary diseases, colour blindness, uncorrected visual/hearing deficits (corrective lenses or hearing aids were acceptable), neurological disorders, and receipt of psychotherapy. In the present study, an affirmative response to any of the screening questions indicated a failure to meet inclusionary criteria.

Data were collected over a 6-week period, during autumn, in the middle of the first university semester. All participants received \$10 to compensate for their time and/or travel expenses.

Design

A between-subjects design, with random assignment to conditions, was used to explore the impact of emotion regulation conditions (acceptance, suppression, reappraisal, or simply watch instructions) on dependent measures of physiology (heart rate and galvanic skin response), self-reported emotional experience, objective memory (verbal and visual incidental recognition), and subjective memory (memory confidence ratings).

A between-subjects design was considered more appropriate than a repeated-measures design, as the latter possess several disadvantages that could not be controlled in the context of the present study. For example, with repeated-measures designs there is an increased risk of carryover effects (where individual's performance either improves or deteriorates during second or subsequent sessions as a result of factors like practice and fatigue), participant drop out (the greater time investment required by repeated measures designs increases the likelihood of losing participants between conditions), and hypothesis guessing (by exposing participants

to all levels of the independent variable the likelihood they will be come aware of the purposes of the experiment increases) (Coolican, 1999). As Coolican notes, repeated-measures designs are particularly problematic in research assessing areas like memory, where practice is known to enhance performance. While alternate measures can be developed to control for these effects, this can be a time-consuming process. Furthermore, it is not appropriate when exploring incidental processes, which require participants to be naïve to the research objectives (as was the case in this study). A between-subjects design avoids the problems noted above by exposing participants to a single level of the independent variable. Consequently, the chances of inter-condition contamination are reduced, and participants can remain blind to the nature of the alternative conditions.

Of course, between-subjects designs also possess disadvantages. These are primarily related to “*participant variables*” (Coolican, 1999, p. 58): variations amongst individuals that are unevenly distributed across conditions (i.e. participants in the suppression condition could possess a higher resting heart-rate than participants in the control condition). In the present study, difficulties associated with non-equivalent groups were controlled for in several ways. First, using the HSQ participants were screened for the presence of psychological/physical disorders that could impact on results. Second, all participants were randomly assigned to emotion regulation instructional conditions. Third, participants’ self-reported emotions and physiological responses were pre-tested before introducing the experimental manipulation. Rather than simply measuring differences between groups in post-test measures of emotion or physiology (which could be attributed to pre-existing differences between participants), the dependent variables for physiology and self-reported emotion in the present study were change scores. These were calculated by subtracting mean baseline physiological and/or self-reported responses from mean responses obtained during the film or post-film periods responses. This procedure helps control for any pre-existing group differences (Coolican, 1999), and has been used extensively in prior research (i.e., Demaree et al, 2004; Gross, 1998; Gross & Levenson, 1997).

Measures

Overview.

Three primary categories of dependent variables were measured: self-reported emotional experience, physiology, and memory. Participants self-reported emotional responses were assessed before viewing the film, and following the film participants responses during the film were assessed. Physiological responses (heart-rate and skin conductance levels) were measured across baseline (2 minutes), instructional (2 minutes), film (2.50 minutes), and recovery (2 minutes) periods. Memory was solely assessed during the post-film period. A manipulation check was also completed (Exit Questionnaire) during the post-film period to assess the effectiveness of testing procedures.

Subjective experience.

The first set of measures used in this study assessed participants' self reported emotional experience. As noted earlier, emotions are made up of several components (i.e., experiential, cognitive, and physiological). Thus, obtaining an overall picture of the consequences of a particular strategy requires assessment of its impact across more than one domain (Gross, 2002). This was particularly important in the present study, as my primary objective was to elucidate the relative costs and benefits of each strategy, rather than label a specific approach as inherently adaptive or maladaptive.

Participants' subjective experiences of emotion were assessed using pre- and post-film versions of the Discrete Emotions Questionnaire (DEQ) (Gross & Levenson, 1995). The DEQ was used to establish whether the intensity of various emotions experienced during the film clip varied as a function of the instructional manipulation, and assess whether the film was effective in eliciting the target emotion (sadness). The DEQ is a brief (5 minute), easily understood measure, that has been adapted by Gross & Levenson (1995) specifically for assessment of emotional responses to film. Although the DEQ has been extensively used in emotion research (i.e., Demaree, Schmeichel, & Robinson, 2004; Gross, 1998; Gross & Levenson, 1995, 1997), no research has been conducted directly assessing its psychometric properties. However, as Marcks and Wood (2005) noted, this is the

case with most of the self-appraisal scales currently used in emotion research. Thus despite the absence of psychometric evidence, given its wide use, and demonstrated brevity and comprehensibility, the DEQ was still considered to be the most appropriate and available measure of subjective emotion.

In the present study, using the DEQ, participants rated their feelings before viewing the film (baseline measure), and following the film they rated how they felt during the film (experimental measure). Ratings were made on 9-point Likert type scales ranging from 0 ("not at all") to 8 ("the most I've ever felt"). The primary goal was to obtain participants ratings of sadness. However, sadness was presented amongst 15 alternative emotional states (amusement, anger, arousal, confusion, contempt, contentment, embarrassment, fear, happiness, interest, pain, relief, fear, surprise, and tension) to lessen the impact of demand characteristics and hypothesis guessing (Gross, 1998a). Including alternative emotional states also served as a manipulation check to establish whether the target emotion was elicited, as opposed to a broader array of emotions (Demaree et al., 2004). Following the experimental procedures, changes scores were derived for each participant by subtracting pre-film responses for each emotion state from during film responses (Gross, 1998a).

The post-film version of the DEQ also requested participants to rate on two bipolar scales how pleasant they found the film (0 = extremely unpleasant to 8 = extremely pleasant) and their levels of engagement (0 = disengaged to 8 = engaged). These measures were included to establish the overall levels of attentiveness and negative/positive affect induced by the clip. The scales were adapted for use from a similar study conducted by Kunzemann et al. (2005) (see Appendix B for copies of pre- and post-film versions of the DEQ).

Physiological responses.

Physiological measures were included in this study in an effort to clarify inconsistent findings pertaining to the physiological effects of acceptance. In the present study heart rate (interbeat interval) and skin conductance were used as concurrent indicators of participants' levels of sympathetic activation. The inclusion of heart rate as a dependent variable differs from previous experiential suppression research, which has predominantly focused on skin conductance as the sole indicator of

sympathetic arousal. The decision to include this measure was predicated on findings within the expressive suppression literature that indicated the impact of suppression might not be the same across all indices of physiological functioning. Heart rate appeared to be one dimension within which differences were observed (Gross & Levenson, 1993, 1997). The present study may help clarify whether these same differences occur for experiential suppression.

Using laboratory software, heart rate and galvanic skin responses were monitored throughout the experiment, and scores were calculated for each individual representing their mean level of physiological arousal during baseline, instructional, film, and post-film periods (respectively). Change scores were calculated at a later date, by subtracting mean baseline responses (collected during the 2-minute period before participants were presented with the emotion regulation instructions) from mean responses derived from instructional (1 minute), film (2.50 minutes), and post-film periods (2 minutes), respectively.

Interbeat interval (IBI) was calculated as “the interval in milliseconds between successive R waves” (Gross, 1998a, p. 228). IBI is a frequently used measure of sympathetic activation in emotion regulation research (Gross, 1998a; Gross & Levenson, 1993, 1997; Levitt et al., 2004). Furthermore, research has shown sadness to produce predictable changes in IBI (decreased IBI) (Averill, 1969; Levenson, Ekman, & Friesen, 1992; Prkachin, Williams-Avery, Zwaal, & Mills, 1999). As in previous research, in the present study a decreased interbeat interval was used to infer increased heart rate (e.g., Kunzmann et al., 2005).

GSR involves the measurement of “electrical skin conductance (usually from the fingers or hands) as a result of sweat gland activity and the size of the skins pores” (Andreassi, 2000). Skin conductance is a frequently used measure of sympathetic activation in suppression research (Gross, 1998a; Gross & Levenson, 1993, 1997; Wegner et al., 1990), with increased skin conductance levels indicative of increased sympathetic activation (Kunzmann et al., 2005). Previous research has demonstrated skin conductance levels to be sensitive to changes in emotional status (Gross, 1998; Kunzmann et al., 2005). In the present study, as in previous research (Kunzmann et

al., 2005), increased skin conductance was used to infer increased physiological arousal.

Objective and subjective memory.

The present study extended previous research conducted on acceptance, by including memory (alongside physiology and subjective emotion) as a dependent variable. The decision to examine memory effects was based on previous research highlighting the differential effects on memory under conditions of suppression and reappraisal (Richards & Gross, 2000, study 2). Memory is a salient variable due to the importance of retaining optimal levels of cognitive functioning in a variety of potentially emotive situations (Richards & Gross, 2000). Often humans are confronted with situations that evoke feelings of sadness (e.g., death of a family member, divorce, failing a test), yet even in the midst of such situations the problems of everyday life, such as going to work, attending exams and lectures, remembering appointments, must be negotiated. Moreover, few studies have examined the impact of experiential suppression on memory, and no studies have explored the impact of acceptance on memory.

Participants incidental recognition of information presented throughout the duration of the film was assessed using a pencil and paper cued recognition test, made up of 16 (five alternative) multiple choice questions. Seven of the items assessed verbal memory (characters names, what they said, etc) and nine assessed visual memory (what was worn, scenery, colours of specific items). Following completion of each memory item, participants rated their level of confidence in their response on a scale ranging from 0 (not at all confident) to 6 (extremely confident).

The decision was made to investigate both visual and verbal facets of memory as this is the first study to assess the impact of acceptance on memory. As such, obtaining information about the two key components of memory was considered important.

Incidental memory, as opposed to intentional memory, was assessed to reduce the cognitive load imposed on participants whilst watching the clip. I did not want participants to be focused on memorizing the details of the film during exposure, as this would likely impair their ability to follow the regulatory instructions provided, or

experience emotions in a natural manner (Richards & Gross, 2000). Furthermore, I was interested in participants' spontaneous memory of what they had seen, as this is most reflective of everyday learning. The basic components of the memory test were based on those used by Richards and Gross (2000, study 1), although specific questions were tailored to the film clip (see Appendix C for a copy of the memory test).

Following the procedures of Richards and Gross (1999), six memory scores were calculated for each participant. These reflected the proportion of correct responses when collapsed across information type (visual and verbal), the proportion of correct visual items, the proportion of correct verbal items, the overall confidence rating for visual items, the overall confidence rating for verbal items, and the overall confidence rating when collapsed across information type (visual and verbal).

Piloting the memory test.

Prior to being used in the present study, the memory test was piloted on a sample of 20 female university students (recruited via word of mouth), under the "simply watch" viewing conditions described in the procedure section. Piloting was carried out at the Perception and Cognition Laboratory at Massey University, Turitea Campus, under the same contextual conditions as described for the main study (see p.55 of this thesis). The only divergence was that sessions were conducted in groups of four or five, as opposed to individually (see Appendix D for a copy of the standardized instructions provided to pilot participants, and Appendix E for a copy of the Information Sheet). As Coolican (1999) points out, contextual elements of a pilot study should replicate experimental conditions as closely as possible. However, in the present study, time constraints meant group sessions were the only practical option.

Participants were not informed of the true purposes of the pilot study. They were simply told the study aimed to assess experience and perception in response to emotionally evocative film. During the 1-minute period directly prior to viewing the film clip, all participants were given the following instructions: "Shortly you will be shown a brief film clip. Please pay close attention to the clip. If at any point the clip

becomes too distressing, just say ‘stop.’” (These instructions replicated those provided to the control group in the main study.)

Participants were then exposed to the film clip, after which they were given 5 minutes to complete a post-test DEQ (inclusion of the post-test DEQ enhanced the credibility of the cover story and provided an opportunity to assess the effectiveness of the experimental clip in evoking sadness), and a further 10 minutes to complete a post-test distracter task — consisting of 90 (year 4/5) mathematical problems involving basic addition, subtraction, and multiplication. Finally, they were presented with the memory questionnaire, which they were instructed to complete at their “own pace.” As in the main study, the film clip and pre-film instructions were presented via DVD (in both visual and auditory form).

Three versions of the memory test were piloted. Piloting of an initial version of the test (N = 5 students) indicated the presence of a floor effect, where a substantial proportion of items were overly difficult. After making changes to the test it was again piloted on a group of 10 students. This time a slight bimodal distribution was observed, whereby there was a tendency for items to be either too difficult or too easy. Minor changes were made to the test before it was piloted a third time (N = 5 students). This time a relatively normal distribution of results was observed. This final version of the test was used in the main study (Appendix F shows the frequency and percentage of correct responses for individual memory items).

Exit questionnaire.

Following the procedures of Eifert and Heffner (2003), on completion of the post-film DEQ, participants completed an Exit Questionnaire. The Exit Questionnaire served as a manipulation check to assess (a) the extent to which participants perceived pre-film instructions as useful; (b) how easily they were able to follow them; and (c) their compliance with them. The usefulness of pre-film instructions was assessed using a Likert type scale ranging from 0 (very helpful) to 8 (very unhelpful). Participants’ ability to follow pre-film instructions was assessed by asking them to rate on a bipolar Likert type scale ranging from 0 (very easy) to 8 (very difficult) how easy they found it to follow the instructions provided for viewing the clip. Compliance was assessed by asking participants to rate (on a 9-point scale

ranging from 0 = totally disagree to 8 = totally agree) their level of agreement with four statements that reflected instructions provided to participants in acceptance, suppression, reappraisal, and control conditions. For example, statement (a) read, "While watching the film, I pushed away or attempted to get rid of feelings and emotions that emerged". This statement closely approximated instructions given to participants in the suppression condition (see Appendix G for a copy of the Exit Questionnaire).

Apparatus

Heart rate sensors.

Three types of electrodes were used to measure heart rate: an MLT1020PPG finger electrode attached via velcro strap to the index finger of the participants non-dominant hand; an MLT1020FC spring clip sensor attached to the participants thumb pad (on the non-dominant hand); and an MLT1020EC ear clip attached to the left earlobe.

A decision was made to use three heart rate sensors in an effort to prevent loss of physiological data as a result of equipment malfunctions or other factors (e.g., sudden movement) that piloting suggested might compromise the validity of results. Data obtained from the ear-clip constituted the primary source of analysis. Data obtained from thumb and finger sensors were only used to substitute for missing data when the sensitivity of the ear sensor was compromised (this only occurred in three cases).

ML112 quad bridge amplifier.

Heart rate sensors were attached to an ML112 quad bridge amplifier approved to IEC601-ICF cardiac protection standards. The quad bridge amplifier was used to detect the raw signals from the heart rate sensors and amplify them to a level suitable for the Powerlab (ADI Instruments Chart 5, 2006).

8/SP Powerlab.

An 8/SP Powerlab was used to convert the raw analogue data (obtained from the quad bridge amp) to a digital signal that could be interpreted by the computer. The 8/SP Powerlab digitized the analogue signal at a rate of 1000 samples per second. A

high sampling rate was chosen to prevent loss of information and ensure the original signal was presented as accurately as possible (ADI Instruments Chart 5, 2006).

Galvanic skin response MLT116F finger electrodes.

Skin conductance was measured using two silver/silver chloride MLT116F finger electrodes. These were attached via velcro straps (in a bipolar configuration) to the palmar sides of the middle phalanges, on the second and third fingers of the non-preferred hand.

ML116 galvanic skin response amplifier.

Skin conductance electrodes were connected to an ML116 Galvanic Skin Response Amplifier (GSR Amp). The ML 116 GSR Amplifier is a constant voltage apparatus that transmits a low current AC voltage (22 millivolts RMS @ 75 Hz) across the finger electrodes. The advantage of an AC system is that it reduces electrode polarisation errors that can arise with a DC system. The ML 116 GSR Amp is galvanically isolated to protect participant safety and meets IEC 60601-1 standards (ADI Instruments Chart 5, 2006).

ADI chart software (version 5.4.1).

Physiological data were monitored and recorded throughout the experimental procedures via a Pentium 4 computer using the software package ADI Instruments Chart 5 (version 5.4.1.) Chart software displays the digitised data points constructed by the Powerlab and recreates the original wave form by drawing lines between points (ADI Instruments Chart 5, 2006). The data pad option of the ADI Chart windows menu was later used to calculate participants mean physiological responses for baseline, instructional, film, and post-film periods from the wave form data. These data were used as the basis for later analyses.

Television and video equipment.

Participant instructions and film clips were written to DVD and presented on a 21 inch Sony Trinitron colour television monitor via a Pioneer WMA/MP3 DVD player. Four DVDs were created, one for each experimental condition (suppression, reappraisal, acceptance, and control). Aside from the emotion regulation instructions

presented directly before viewing the experimental film, the content and timing of these DVDs was identical

Film Stimuli

The present study replicates Gross and colleagues research by utilising film as the emotive stimulus (Gross, 1998a; Gross & Levenson, 1993, 1997). A number of procedures can be used to evoke emotion. Film clips were used in the present study for several reasons. First, exposure to film is a fairly common activity engaged in by both males and females, of a variety of ages, on a fairly regular basis (Sloan, 2004). By using a common emotive stimulus the external validity of findings beyond the laboratory is increased. Second, film (unlike alternative techniques of evoking emotion such as self-statements) has been found to be effective in eliciting emotional responses across a variety of domains (e.g., experiential and behavioural responses tendencies), including those perceived to be outside of explicit control (e.g., physiological responses) (Gross & Levenson, 1997). Third, the standardisation of film is relatively simple. The content of film, methods of presentation, and viewing context can be consistently controlled across experimental conditions. Using standardised stimuli also minimises the potential for inter-individual differences to impinge on results, and allows simple replication of the research (Coolican, 1999). Fourth, the ecological validity of film appears to be high. In film, emotional experiences are generated over time (unlike other methods such as slides which simply capture a brief moment of time) and tend to focus on prototypical emotional situations relevant to human experience (common themes depicted in film include poor health, loss and danger) (Rottenberg et al., in press). Fifth, unlike alternative methods, film clips have been demonstrated to provide a valid and reliable means of evoking discrete, prolonged, and intense emotional states (Gross, 1998a; Gross & Levenson, 1993, 1997; Sloan, 2004).

The present study used two film segments: a neutral clip designed to elicit little emotion of any type (clip 1), and an experimental clip designed to elicit feelings of sadness (clip 2). The neutral clip was 170 seconds in length and consisted of a dynamic screen saver display made up of overlapping coloured bars. This clip was selected from a series of standardised clips developed by Gross and Levenson

(1995), and has been found to reliably produce a relatively neutral emotional state (Gross & Levenson, 1995; Rottenberg et al., in press). The neutral clip was solely included in the present study to acclimatise participants to the laboratory procedures. This helped prevent baseline measures from being compromised (Gross & Levenson, 1997; Hagemann et al., 1999).

The experimental clip consisted of a series of segments derived from the 1979 motion picture "The Champ" (Lovell & Zeffirelli, 1979). This clip was also selected from the standardised set of clips developed by Gross and Levenson (1995). Copyright permission was obtained from the director of clip and still licensing at Warner Brothers in the United States for use of the clip in the present study (M. Eastman, personal communication, September, 19, 2005), and editing instructions were provided by Professor James Gross (personal communication, September 7, 2005). The final clip was 170 seconds in length and depicted a young boy distraught upon witnessing his father's death following a boxing injury. This clip has been widely used in emotion research, and has been found to trigger an intense and relatively discrete state of sadness across both physiological and subjective response domains, in individuals of a variety of ethnicities (e.g., African American, Caucasian, Asian American, Hispanic, and German) (Gross & Levenson, 1995; Hagemann et al., 1999). This film was chosen over and above other standardised clips as both Gross and Levenson, and Hagemann, found it exhibited the highest hit rate (conceptualised as the percentage of subjects who reported experiencing the target emotion at least one point more intensely than the non-target emotions) of any of the films included in their standardisation studies.

The decision to target a specific emotion state (sadness) was predicated on previous research, which has found the impact of suppression to be somewhat specific to the emotion investigated (e.g., Gross & Levenson, 1997). Sadness was chosen as the target emotion because it has relevance for both clinical and non-clinical populations. Deficiencies in the ability to regulate sadness have been implicated in a variety of psychopathological conditions, including the entire spectrum of mood disorders (American Psychiatric Association, 2000; Kring & Werner, 2004). Even in healthy individuals, sadness is an inescapable emotion that affects everyone in some shape of form throughout their lives.

Furthermore, sadness has received insufficient attention in relation to the types of emotion regulation investigated in the present study. To my knowledge, no controlled research has been conducted examining the impact of either acceptance or reappraisal on emotional responses to sad stimuli. This observation warrants attention as these strategies are commonly used in the treatment of disorders for which sadness represents a key symptom (i.e., mood disorders) (O'Donohue et al., 2003).

Prior to using the film in the present study, it was piloted on a sample of 20 female university students from Massey University (Turitea campus) to establish whether it was as successful in inducing sadness in a New Zealand sample as it had been for previous samples. Piloting of the film clip was carried out alongside piloting of the memory test (these procedures were outlined in the memory section). Success was conceptualised as how effective the film was in eliciting an intense and discrete state of sadness. Intensity was defined as participants' overall mean sadness rating on the DEQ. Discreteness was defined as the percentage of participants whose sadness ratings were at least 1 point higher than ratings on any of the other non-target emotions. These success criteria were adopted from Gross and Levenson (1995).

Results of the pilot study indicated the film evoked moderate to high levels of sadness in our sample ($M = 4.55$, $SD = 1.99$). The mean rating for sadness was more than two points higher than the mean rating for all alternative emotion states, other than interest ($M = 3.85$, $SD = 2.66$). The film was moderately effective in evoking a discrete state of sadness, with 55% of the sample rating sadness at least one point higher than any other emotion. Participants' overall ratings of pleasantness and engagement indicated they found the film highly engaging ($M = 5.75$, $SD = 2.15$), but very unpleasant ($M = 6.00$, $SD = 1.03$).

Results obtained for the pilot study were slightly lower than those reported in previous standardisation studies (Gross & Levenson, 1995; Hagemann et al., 1999). For example, Gross and Levenson (1995) reported a mean sadness rating of 5.71, and a hit rate of 94.5%. Although it would have been desirable to source a film stimulus that was more effective in evoking discrete feeling of sadness, the time constraints of

a Masters thesis prohibited piloting of alternative films. Moreover, the film was effective in evoking prominent feelings of sadness, albeit not in isolation. Hence, a decision was made to go ahead and use this clip in the main study

Procedures

Orientation.

On recruitment, participants were given an information sheet to read, and the HSQ to complete (to determine their eligibility to participate). The information sheet provided a thorough description of research procedures, risks, benefits, and rights of involvement, but did not detail the specific emotions the films were designed to evoke, or that participants' memory would be assessed (see Appendix H for a copy of the information sheet).

Deception regarding these aspects of the study was considered essential to protect the validity of the findings. If participants were focused on memorising details of the film, their ability to comply with viewing instructions and simultaneously experience and notice emotions may have been impaired. The specific emotion state the experimental film targeted was not explicated, in an effort to prevent participants' responses being affected by their preconceived expectations. Failure to explicate the target emotion also allowed a manipulation check to be conducted to assess the usefulness of the film in eliciting the target emotion. This was important for establishing whether results could be most reliably applied to specific versus more generalized emotion states (Gross & Levenson, 1997). All procedures used in this study were approved by the Massey University Human Ethics Committee, and subjects were informed of their right to withdraw from the research at any time, without penalty.

Individuals who choose to participate and met the inclusionary criteria (HSQ criteria) were scheduled to attend a single data collection session (1 to 1 ½ hours in duration) located at the Perception and Cognition Laboratory at Massey University, Turitea Campus. Sessions were conducted individually and scheduled for approximately the same times each day (between 9.30 am and 3.30 pm), Monday to Friday. Conducting sessions on consecutive days, at similar times, decreased the potential for external factors and time of day effects to influence participants' results.

Individual sessions were conducted, rather than group sessions, to eliminate difficulties associated with using film as an emotive stimulus within a group context. The dynamic nature of film and its ability to engage both visual and auditory senses means it tends to invoke a heavy cognitive load. As such, the emotional impact of film can easily be affected by additional attention demands, such as the presence of others or surrounding noise (Rottenberg et al., in press). Furthermore, conducting sessions individually increases the likelihood that findings will reflect a personally derived response, as opposed to a socially derived one (Coolican, 1999).

On arriving at the laboratory, participants were asked to read and sign a consent form (see Appendix I for a copy of the consent form). Subjects were then randomly assigned to one of four experimental conditions (suppression, reappraisal, acceptance, or control). Assignment was based on picking a random code (containing a colour and number) from a box. Each code corresponded to a particular experimental condition (e.g., B 1-20 corresponded to the suppression group). Based on the code selected, participants were exposed to different instructions for viewing the film. Participants remained blind to the condition they were assigned.

Following group assignment, participants were seated in a comfortable chair in a dimly lit (4.6 x 4.5 metre) room, at a distance of 1.75 metres from a colour television monitor. The laboratory was set up to resemble a living room with artwork on the wall and a coffee table to the left of the participant's chair. The physiological equipment was positioned on a side table to the right of the participant's chair. The goal was to make the viewing conditions as natural as possible. Close attention was paid to standardising the experimental context, as evidence suggests seemingly minor aspects of a physical context, such as lighting, have the ability to effect emotional responses (Knez, 1995).

Once seated, standardised instructions outlining session procedures were read out (see Appendix J for a copy of standardised instructions). Participants then completed a demographic questionnaire, after which, physiological sensors were attached to their left earlobe and non-dominant hand (participants attached sensors themselves under the experimenter's guidance). They were then provided a series of booklets

numbered 1 to 7; these contained the remaining questionnaires for the study. At this point, they were told the experimenter would be leaving the room, and all further instructions would be shown on the television monitor. Before the experimenter left the room, participants were provided with an intercom, which could be used to communicate with the experimenter if they experienced any concerns or distress during the remainder of the session. If distress was experienced, participants were instructed to call out "stop." Participants were told not to open the questionnaire booklets "until instructions on the screen indicated they may do so".

After delivering this last instruction, the experimenter left the room to occupy an adjacent room where the physiological and video equipment (which allowed physiological responses to be recorded and monitored) was located. The experimenter then started the DVD (containing the remaining experimental instructions, along with the neutral and experimental film clips) and physiological monitoring equipment simultaneously. Physiological data were collected continuously throughout the remainder of the session. This decreased the potential for experimenter error (i.e., failure to activate the physiological equipment on cue) to compromise the reliability of the research.

Data collection (phase 1).

Following the orientation phase, instructions on the television monitor requested participants to complete booklet number 1 (pre-test DEQ) (5 minutes), then "relax and clear their mind of all thoughts, feelings, and memories" for 2 minutes (baseline, phase 1). This was followed by a 1-minute instructional period during which the monitor read, "Shortly you will be shown a brief film clip. Please pay close attention to the clip. If at any point the clip becomes too distressing, just say 'stop.'" Participants were then shown the neutral film. This was followed by a 2-minute recovery period, during which participants were again requested to "relax," and then a further 5-minute period where they were requested to complete booklet number two (post-test DEQ). This completed the first data collection phase. The sole purpose of this initial phase was to acclimatise participants to experimental procedures. The goal was to lower levels of anticipatory anxiety to ensure baseline measures were not compromised. Data collected during this phase were not analysed.

Data collection (phase 2).

Directly after completion of the first data collection phase, participants were again requested to “relax and clear your mind of all thoughts, feelings, and memories” for 2 minutes (baseline, phase 2). This was followed by a 1-minute instructional period, during which participants received one of four instructions depending on the experimental condition they had been assigned. Participants in the control condition received the same instructions delivered directly before viewing the first film (see data collection phase 1). Participants in the suppression condition were provided with the following instructions:

Shortly you will be shown a brief film clip. Please pay close attention to the clip. If at any point you find the clip overly distressing, just call out “stop.” This time, as you watch the clip, if you experience any feelings or emotional thoughts, try your best to push them away. Do not allow your feelings or thoughts to emerge or take over. Just try to get through the task feeling as little as possible. So remember, watch the film carefully, but do not allow yourself to dwell on emotional thoughts or feelings, do everything in your power to remove them from conscious awareness.

Participants in the reappraisal condition were told:

Shortly you will be shown a brief film clip. Please pay close attention to the clip. If at any point you find the clip overly distressing, just call out “stop.” This time, as you watch the clip please try your best to assume a neutral, detached mind-set. Do your best to view the clip with the objective, analytical interest of a film director, critically observing his/her own work. Try to see it as just a movie, rather than in a personally or emotionally significant manner. So remember, watch the film carefully, but think about what you are viewing in a neutral detached way.

Finally, participants in the acceptance condition were given the following instructions

Shortly you will be shown a brief film clip. Please pay close attention to the clip. If at any point you find the clip overly distressing, just call out “stop.” This time, as you watch the clip, please try your best to simply sit back and take note of emotional thoughts and feelings that may arise. Do not attempt to avoid or judge them. Just let them be, embrace them, and allow them to wash over you like waves in the ocean. So remember, watch the film carefully, but as feelings and thoughts arise – accept and embrace them without judgement.

After presentation of these instructions, participants were shown the experimental clip (2 minutes 50 seconds), then requested to “relax” for a further 2 minutes (recovery period). After recovery, participants were allowed 10 minutes to complete booklets number 4 (post-test DEQ) and 5 (Exit Questionnaire) (in that order). Participants were then asked to complete booklet number 6 (the distracter task) (5 minutes), and finally booklet number 7 (memory test). They were allowed to complete this last measure at their “own pace”. (Please note: the distraction task used in this study was shorter than the task used in the pilot study. That is because the Exit Questionnaire was not included in the pilot study.)

On completion of the memory test, the experimenter re-entered the room and physiological sensors were detached. Participants were then fully debriefed as to the nature of the research (including provision of a clear rationale regarding the use of deception), and any questions or concerns were addressed. Participants were requested not to discuss the study with other students, as this could compromise the accuracy of findings (given that data were collected over a lengthy period within a specific student group). However, if they experienced any queries, concerns, or distress as a result of their involvement, they were directed to contact the persons/support agencies listed at the bottom of the participant information sheet. Participants were then thanked for coming and given \$10 compensation.

Data Analysis

ANOVA versus MANOVA

Data were analysed using the one-way between-groups Analysis of Variance (ANOVA) procedure provided in the Statistical Package for the Social Sciences, version 12 (SPSS 12). ANOVA was used to establish whether there were significant differences between emotion regulation instructional conditions in mean scores obtained for dependent measures of subjective experience, physiological responses, and memory. ANOVA does this by comparing the variance in scores between groups, with the intra-group variance (variability in scores within the groups). The F ratio that is computed reflects between groups variance (which is a function of the independent variable) divided by within-groups variance. A large F ratio indicates inter-group variability is greater than intra-group variability (Pagano, 2004).

The use of ANOVA in research involving multiple dependent variables has advantages and disadvantages. The main difficulty is that conducting multiple ANOVAs can increase the probability of committing a Type 1 error (rejecting the null hypothesis when it is actually true). To control for this problem, when multiple dependent variables are involved, several authors suggest it may be more appropriate to conduct a Multivariate Analysis of Variance (MANOVA). This procedure incorporates multiple dependent variables into a single analysis (Pallant, 2005), essentially creating a new dependent variable that constitutes a "linear combination" (Tabachnick & Fidell, 2001, p. 322) of the combined dependent variables. A single ANOVA is then conducted on this dependent variable. The advantage of MANOVA is that it eliminates the need to conduct multiple ANOVAs and thus controls for Type 1 error.

Despite MANOVA's ability to control for inflated Type 1 error, the circumstances in which it is more powerful than ANOVA are restricted (Tabachnick & Fidell, 2006). Because MANOVA evaluates the impact of the experimental manipulation on linear combinations of dependent variables rather than single dependent variables, interpretation of effects on individual dependent variables can be ambiguous and effects can be lost (Stevens, 1996; Tabachnick & Fidell, 2006). For these reasons,

some authors (e.g., Tabachnick and Fidell, 2006; Stevens, 1996) suggest MANOVA should only be used if there is a clear rationale for analysing variables together.

In the present study, I was concerned about combining sets of variables within a MANOVA procedure for two reasons. First, this study was the first of its kind to be conducted on a New Zealand sample. It therefore seemed unwise to assume relationships amongst variables that were present in foreign samples would also be present in this study. Second, previous research has at times produced contradictory results concerning the relationship between emotional response tendencies, even when they are theoretically assumed to be connected. For instance, Gross and Levenson (1993) predicted that heart rate and skin conductance responses would follow a similar pattern, yet an opposite pattern was found (heart rate increased, but skin conductance decreased). Findings like this suggest the relationship between many of the variables included in the present study is unclear, and indicate that any rationale for combining variables in a single analysis would be weak.

Another important consideration in selecting data analysis procedures is the degree to which the assumptions underlying these approaches are fulfilled (Gravetter & Wallnau, 2004). MANOVA has several assumptions (over and above those required for ANOVA) that must be met for it to retain its power. Violating these assumptions generally has more dramatic effects than violating ANOVA's assumptions (Tabachnick & Fidell, 2001).

In the present study, several assumptions specific to MANOVA were violated: namely, absence of multivariate outliers, linearity, and absence of multicollinearity/singularity. For example, MANOVA is extremely sensitive to outliers, particularly when they are of the multivariate variety (Pallant, 2005; Stevens, 1996). In the present study, Mahalanobis distances, which detect "the distance of each case from the centroid of the remaining cases" (Tabachnick & Fidell, 2006, p. 68), were calculated to detect multivariate outliers. Using this procedure, multiple outliers were found across several dependent variables.

In order to retain sufficient power, MANOVA also requires linear relationships to be present amongst all pairs of dependent variables (Pallant, 2005). In the present study,

examination of scatter plots depicting relationships amongst scores on pairs of dependent variables indicated the assumption of linearity was violated for several combinations of variables.

Assumptions of multicollinearity and singularity were also violated. MANOVA is most powerful when dependent variables are moderately negatively correlated with each other (Pallant 2005; Tabachnick & Fidell, 2006). In cases where low correlations are found, Pallant (2005) suggests it is more appropriate to execute separate ANOVAs for each variable. In the present study, calculation of Pearson's product moment correlation coefficients detected a number of correlations in the low range (using Cohen's, 1988 guidelines for interpreting effect sizes). For the negative emotions 15 out of 74 correlations were in the low range ($r =$ between $-.10$ and $.10$); for the positive emotions 14 correlations were low.

It is important to note that data that violate MANOVA assumptions can be transformed. However, this process can be time consuming, disrupt the interpretation of data, and is sometimes impossible (particularly with multivariate outliers because the issue is with a combination of scores) (Stevens, 1996; Tabachnick & Fidell, 2006). Given these factors, in the context of the present study, transformation was considered impractical.

In sum, the absence of a clear conceptual rationale for combining variables, coupled with severe violations of important MANOVA assumptions, led to the conclusion that incorporating MANOVA into the present studies data analysis procedures would not add value, and might even reduce the chances of detecting significant effects. Hence, ANOVA was deemed the more appropriate choice.

Assumptions of ANOVA

Before conducting the ANOVA procedure, the key assumptions underlying this approach were evaluated for each dependent variable. A key assumption of ANOVA is that participants' observations are independent of the observations of others (Gravetter & Wallnau, 2004). This assumption was considered valid in the present study, as several controls were put in place during the design phase in an effort to fulfil this criterion. These included (a) collecting data in individual sessions (as

opposed to in group format); (b) using standardized pre-recorded instructions to ensure interactions with the experimenter were minimal; and (c) asking participants to refrain from discussing the experiment with other students.

A second assumption of ANOVA is that data are obtained using a random sample (Gravetter & Wallnau, 2004). This assumption was violated to a degree in the present study as ethical considerations required subjects to be screened for health problems before participating. However, this was not considered a fatal violation, as only one participant was excluded due to health difficulties. Furthermore, authors like Pallant (2005) and Gravetter and Wallnau (2004) suggest true random sampling in social sciences research is fairly rare and can be safely assumed unless the research constitutes a clinical trial. This assertion is supported by Tabachnick and Fidell (2006), who argue that random sampling in experimental studies involves obtaining participants from a homogenous group then randomly assigning them to the conditions of the independent variable. The key criterion is that before introducing the experimental manipulation all participants are derived from the same population. Given that all participants involved in this study were recruited from psychology classes and then randomly assigned to the conditions, this assumption was considered valid.

A third assumption of ANOVA is that the scores obtained for dependent variables are normally distributed within the sample (Gravetter & Wallnau, 2004). Based on the recommendations of Hair, Black, Babin, Anderson, and Tatham (2006), a combination of graphical and non-graphical methods were used to establish normality in the present study. These included, calculation of the Kolmogorov-Smirnov statistic, calculation of skewness and kurtosis values, examination of frequency histograms (plotted against normal distribution curves), and examination of box plots (to detect outliers).

Initially, the Kolmogoriv Smirnov test, which calculates “the level of significance for the differences from the normal distribution” (Hair et al., 2006, p. 82), was used to assess normality. The assumption of normality is considered violated if the Kolmogoriv Smirnov statistic is significant ($p \leq .05$) (Pallant, 2005). In the present study the normality assumption was satisfied for all three of the confidence in

memory variables (visual, verbal, and overall confidence in memory). However, normality deviations were apparent across subjective emotion, physiological and objective memory variables. For example, non-significant results were only obtained for 3 (sadness, interest, and confusion) out of 16 subjective emotion variables. The remaining 12 emotion variables received a significant result, indicating abnormal distributions. Deviations from normality for physiological and objective memory variables were less dramatic and were only apparent across one or two of the emotion regulation conditions. For example, assessment of the normality of skin conductance change scores during the film period revealed non-significant results for acceptance, suppression, and reappraisal groups (all three groups had p values greater than .05), but a significant result for the control group ($p = .01$).

To establish the nature and level of normality deviations among all study variables, skewness and kurtosis values were examined along with frequency histograms. Box plots were used to identify the presence of extreme scores that could be having a substantial effect on mean values. For discrete emotions, in the majority of cases normality deviations appeared to be due to positive skewness (i.e., a clustering of scores to the left of the graph), with a large proportion of scores clustered close to the zero point. This was unsurprising given that change was expected to be minimal for emotions other than sadness, as these were not the target of the emotional stimulus. Mild to moderate platykurtosis, evidenced by a slightly flattened distribution relative to normal, was found for amusement, happiness, and interest.

Elevated kurtosis was observed for several physiological variables, with frequency histograms showing a peaked distribution with relatively flattened ends. Moderate levels of positive skew were also observed. However, observation of frequency histograms indicated these deviations were in the minor range.

Examination of box plots indicated deviations from normality were due in part to the presence of outliers. Outliers are defined as extreme scores that “extend more than three box-lengths from the edge of the box” (Pallant, 2005, p. 61) (the box represents 50% of the scores for that group). No extreme outliers were found across the memory variables but multiple outliers were found for emotion variables, and a few on the physiological variables. When outliers were identified, the original

data/questionnaires were rechecked to ensure the score/response was genuine, and congruent with the range of scores available. Given that multiple statistical transformations were made to some forms of data prior to conducting the main statistical analyses (i.e., physiological responses), it was possible that mistakes had been made when calculating physiological change scores from the original data. However, careful comparison of original questionnaire data with data contained in the SPSS file failed to reveal any errors. Hence, removal of these scores from the analysis was deemed inappropriate. Moreover, comparison of original mean values with trimmed mean values (derived by removing the upper and lower 5% of scores, to create a new mean), indicated these outliers were having a negligible impact on the mean. This further supported the decision to retain outliers in the final analyses.

Because scores obtained for some of the dependent variables violated the assumption of normality, consideration was given to employing a non-parametric alternative to ANOVA. However, perusal of the literature indicated violations of normality (of the nature and type described above) have a minimal impact on Type 1 or Type 2 error rates (Hair et al., 2006; Pallant, 2005; Stevens, 1996; Tabachnick & Fidell, 2006). Stevens (1996) noted that the impact of skewness on Type I error is merely a few hundredths. Although kurtosis has a slightly larger impact, its overall effects are also minimal. Moreover, negative consequences of non-normality diminish rapidly as the sample increases in size. According to the Central Limit Theorem; “the sum of independent observa-*[sic]*tions having any distribution whatsoever, approaches a normal distribution as the number of observations increases” (Stevens, 1996, pp. 242–243). Thus, as Tabachnick and Fidell (2006) point out, in moderate to large samples (30 or more) violations of normality are unlikely to impinge a great deal on either significance or power. Even when distributions diverge dramatically from the norm, samples of 50 or larger “approximate to normality” (Block, 1975, as cited in Stevens, 1996, p. 243). The exception to this rule occurs with respect to platykurtic (flattened) distributions. Platykurtosis serves to decrease power, particularly when it is observed in more than one group (Stevens, 1996).

Based on the finding that ANOVA is fairly robust against assumptions of normality (Pallant, 2005), a decision was made to use ANOVA for all 16 discrete emotion variables. However, because there is evidence to suggest platykurtosis has a

substantial impact on power, for the emotion variables for which platykurtosis was observed in more than one group (amusement, happiness, and interest) analyses were conducted using both ANOVA and its non-parametric alternative, the Kruskal Wallis test (please note, the results of the Kruskal Wallis test are not reported in this thesis as they were concurrent with those derived using ANOVA).

In addition to assuming normality, univariate techniques assume samples are derived from populations of equal variances (homogeneity of variance assumption) (Stevens, 1996). In this study, the Levene test was conducted (as part of the ANOVA procedure) to assess homogeneity. The Levene test was considered more appropriate than alternative tests (e.g., Bartlett's or Cochran's) because it has been demonstrated to be robust against violations of normality (Stevens, 1996; Tabachnick & Fidell, 2001). Results of the Levene test indicated the homogeneity assumption was satisfied (as indicated by p values $> .05$) for all memory and physiological variables. With regards to subjective emotion variables, homogeneity was fulfilled in 12 out of 15 cases. Violations of homogeneity occurred for pain, interest, and amusement, suggesting the population variances for each of these samples was flawed (Stevens, 1996). In spite of these violations, ANOVA was still considered an appropriate form of analysis for this study for two reasons: (a) the violations were minor ($p = 0.35$ for pain, 0.13 for interest, and 0.24 for amusement); and (b) there is literary consensus that ANOVA is insensitive to violations of homogeneity, provided group sizes are equal (Pallant, 2005; Stevens, 1996; Tabachnick & Fidell, 2006).

Missing Data

Before conducting any of the analyses, the data file was screened for missing data. Data were missing for the pleasantness, amusement, confusion, and contempt scales of the post-film DEQ. For each of these scales data were only missing for one participant. Based on the recommendations of Pallant (2005), these missing value were dealt with by using the exclude cases pairwise option provided by SPSS. This option "excludes the cases (persons) only if they are missing the data required for the specific analysis" (Pallant, 2005, p. 118).

Type I Error

Although ANOVA appeared to be a valid method for analyzing the data, a further decision to be made was how to control for the increased risk of Type I error as a result of conducting multiple analyses. In cases like this, Tabachnick and Fidell (2006) suggest conducting a Bonferroni adjustment. This procedure controls for inflated Type I error by dividing alpha by the number of dependent variables included in the study. When separate families of variables are used, some authors (e.g., Huberty & Morris, 1989) suggest it is acceptable to set a family-wise error rate for the overarching variable system, and then conduct separate Bonferroni adjustments within each family of variables. In cases where particular dependent variables are deemed more important than others, it is not necessary for all alphas to be set at the same level, and it may be appropriate for some dependent variables to be provided “more liberal alphas” (Tabachnick & Fidell, 2006, p. 349). According to Tabachnick and Fidell (2006), so long as the combined alpha for all sub-variables within the variable family add up to .05 the adjustment remains valid.

In the present study, subjective emotional experience, heart rate, skin conductance, objective memory, and subjective memory, were conceptualised as separate variable systems. As such, Bonferroni adjustments were conducted individually for each of these variable families. A family-wise alpha level of .05 (the probability of committing a Type I error) was set for each variable family. This alpha was then divided by the number of ANOVAs that would be conducted within each family of variables. With the discrete emotion variables, a slightly different approach was taken. Because I was most interested in the impact of instructional conditions on sadness, a decision was made to adopt a more liberal alpha level for sadness, and more conservative alphas for the remaining emotion states.

Post hoc testing

Post hoc analyses were conducted as part of the ANOVA procedure to determine the location of any significant inter-group differences. Post hoc comparisons were used rather than planned comparisons because the latter are generally reserved for situations where the goal is to test specific hypotheses that only involve a few groups. The downside of post hoc testing is that it tends to be overly conservative in controlling for Type I error, and hence decreases the chances of obtaining a

significant result (Pallant, 2005). Because the sample used in the present study was relatively small (decreasing the chances of detecting significant small and moderate effects) and a Bonferroni adjustment was already being conducted to control for Type 1 error, it was important not to decrease power further by using an overly liberal post hoc testing method. Consequently, a decision was made to use Tukey's Honestly Significant Difference (HSD) test. This is one of the less conservative post hoc tests and is suitable for pair-wise comparisons (Pallant, 2005).

Subjective Emotion Data

Separate pre- and post-film versions of The DEQ provided data for 17 dependent variables comprised of scores for each of the 16 discrete emotion rating scales, along with participants' ratings of the overall levels of negative/positive affect they experienced during the film. A number of steps were involved in the analysis of these data.

First, for all 16 emotion states, pre-film scores were subtracted from during-film scores to create an emotion change score that reflected alterations in emotional experience when viewing the film.

Second, using these change scores, separate ANOVAs were executed for each emotion state to evaluate differences in mean scores for the various instructional conditions. An ANOVA was not conducted for the emotion of embarrassment, as only six participants registered a score other than 0. With regards to the discrete emotion variables, the focus was on ascertaining the impact of the emotion regulation conditions on sadness. Hence, a decision was made to adopt a more liberal alpha level of .035 for sadness, and alphas of .001 for the remaining emotion variables.

Physiological Data

Two dependent physiological variables were included in the study: galvanic skin response (also known as skin conductance), and cardiac inter-beat interval. These were measured during baseline, instructional, film, and post-film periods. Statistical analysis of data occurred in several stages:

1. Mean physiological responses for baseline (2 minutes), instructional (1 minute), film (2 minutes, 50 seconds), and post-film (2 minutes) periods were calculated using computer software (the data pad option of ADI Chart, windows menu).
2. Physiological change scores were calculated by subtracting baseline mean heart rate and skin conductance responses (respectively) from instructional, film, and post-film mean responses.
3. Using the physiological change scores, six between groups one way ANOVAs (three for heart rate and three for galvanic skin response) were conducted to identify any significant main effects of emotion regulation instructions on heart rate or skin conductance during instructional, film, or post-film periods. Alpha levels were set at .016.

Objective Memory Data

Based on participants' performance on the memory test, the following scores were calculated for each individual: (a) the proportion of correct responses when collapsed across information type (overall memory, range = 0–16); (b) the proportion of correct visual items (visual memory, range = 0–9); and (c) the proportion of correct verbal items (verbal memory, range = 0–7).

Three separate between-subjects one-way ANOVAs were executed to establish whether the mean scores of the four instructional groups differed significantly on visual, verbal, or overall memory variables. A family-wise error rate of .05 was set, with individual alpha levels of .016 set for each ANOVA.

Subjective Memory Data

Based on participants' confidence ratings across the 16 items of the memory test, three subjective memory scores were calculated: (a) the sum of all confidence ratings when collapsed across information type (range = 0–96); (b) the sum of confidence ratings for visual items (range = 0–54); and (c) the sum of confidence ratings for verbal items (range = 0–42). The ANOVA procedures used to assess the impact of instructional condition on these variables were identical to those outlined for the objective memory variables.

Manipulation Checks

A series of one-way between-groups ANOVAs were conducted to assess whether any significant differences existed between suppression, acceptance, reappraisal, and control groups in the following areas: (a) their overall and functional health status (see the demographic questionnaire); (b) their perceptions regarding the usefulness of pre film instructions; (c) their perceived ability to follow pre-film instructions; (d) their level of agreement with statements reflecting suppression, reappraisal, acceptance, and control instructions (see the Exit Questionnaire); and (e) their level of engagement with the film (see the post-film DEQ). In total, nine ANOVAs were conducted for this family of variables. Using the Bonferroni procedure, an alpha level of .005 was set for each ANOVA.

Effect Sizes and Power

In addition to reporting the results of the statistical significance tests, the effect size is reported for each ANOVA, and post-hoc statistical power (*SP*) values are provided for tests conducted on key variables (sadness, heart rate, skin conductance, and all of the subjective and objective memory variables).

Several authors have noted the importance of providing effect sizes and power values alongside the results of statistical significance tests (Pallant, 2005; Stevens, 1996; Tabachnick & Fidell, 2006), with some suggesting sole reliance on significance testing within psychological research has impeded the growth of knowledge (Cohen, 1994; Dillon, 1999; Whittington, 1999). Even authors like Spatz (2000, cited in Dillon, 1999), who maintain significance testing plays an important role in research, acknowledge that a good deal of data obtained from well designed and potentially informative research has been “lost due to our worship at the .05 shrine” (p. 233).

The key problem with researchers relying solely on significance tests is that there is a tendency to interpret significant *p* values as denoting the existence of a “real effect,” while non-significant results are interpreted as evidence that there is no-effect. In reality this is not necessarily the case. The problem with statistical significance testing is a null result can be a consequence of two factors: One, there truly was no

difference between groups on the variables explored, or two, a difference exists – but there was inadequate power to detect it.

It was important to be aware of these factors when interpreting the present results. As noted previously, a statistical power analysis conducted priori indicated the sample size recruited for this study only provided sufficient power ($> .80$) to detect large effects, but minimal power to detect medium and small effects. As such, there was a strong possibility that non-significant results could be a consequence of insufficient power, rather than the absence of an effect (Pallant, 2005). Calculation of effect sizes and power values allows the researcher to establish the validity of this argument (Whittington, 1999). It also enhances the researcher's ability to interpret results in light of previous findings and draw conclusions as to their pragmatic value (Kotrlík & Williams, 2003). Thus, in the interests of preserving informative data, the interpretation of findings in the present study was not solely based on the results of significance testing but also on effect size estimates and power analyses.

In this study, the effect size statistic, partial eta squared ($\mu^2\rho$), was calculated to indicate the magnitude of differences between groups. Partial eta squared represents the proportion of variance within the dependent variable that is attributable to the various levels of the independent variable (Tabachnick & Fidell, 2006). Tabachnick and Fidell suggest partial eta squared is a more reliable measure of effect size than the more commonly used statistic, eta squared (μ^2), because the eta squared calculation for a particular independent variable is partially affected by the number or significance of alternative independent variables included in a study. This means eta squared values for independent variables in one-way versus two-way designs may differ. In contrast, with partial eta squared, the denominators variance is solely associated with the “effect of interest plus error” (Tabachnick & Fidell, 2001, p. 52). Although the present study only included one dependent variable, partial eta squared is still a more reliable calculation when the researcher is seeking to produce comparable results (Tabachnick & Fidell, 2006). Cohen's (1988) effect size (f) was calculated from partial eta squared to assist in the interpretation of findings. Partial eta squared was converted to Cohen's f using the formula, $f = [\mu^2\rho / (1 - \mu^2\rho)]^{1/2}$.

For variables where an overall effect size was obtained that was equal to or greater than Cohen's (1988) definition of a medium effect ($f = .25$ or greater), further point estimates of effect size and their associated 95% confidence intervals were calculated to assess the magnitude of differences between all possible pairs of means (e.g., suppression and acceptance, acceptance and controls, etc.) using Cohen's d effect size index. These were calculated using the Effect Size Generator-Pro software package (2005). A $f = .25$ cut off point was used for more in-depth investigation of effect size as it was important to focus on the effects that were most likely to have genuine pragmatic relevance.

Cohen's (1988) conventions for defining small (.10), moderate (.25), and large (> .40) effects were used to explore the effect size statistic f . Cohen provides the following guidelines for interpretation of the effect size index d : small = .20, medium = .50, large = .80.

Power values were calculated using SPSS. SPSS calculates the power of a specific test based on the alpha level, sample size, and effect size (Pallant, 2005).

Results

Sample characteristics

Participants ages ranged from 18 to 51 years ($M = 24.11$, $SD = 7.99$). The majority of participants identified as single (82.5%) and of European descent (75%). On average, participants reported 14.8 years of education (beginning at the start of primary school). The majority of participants rated their overall health as good, and reported rarely experiencing health problems that interfered with daily living. (See Tables 1 and 2 for more in-depth demographic information.)

Table 1

Participant Characteristics (n = 80)

Variable	<i>n</i>	<i>%</i>
Ethnicity		
European	60	75
Maori/European	7	8.8
Maori	2	2.5
Pacific Islander	1	1.3
Asian	5	6.3
Other	5	6.3
Marital Status		
Single	66	82.5
Married	7	8.8
Divorced	4	5.0
Defacto	3	3.8
Civil Union	0	0
Widowed	0	0

Table 2*Participant Characteristics (n = 80)*

Variable	Range	Minimum	Maximum	<i>M</i>	<i>SD</i>
Age	33	18	51	24.11	7.99
Education	19	8	27	14.76	2.91
Overall Health	2	3	5	4.38 ^a	.58
Functional Health	3	2	5	4.30 ^b	.68

^aScale ranged from 1 = *very poor health* to 5 = *very good health*.

^bScale ranged from 1 = *very often* to 5 = *not at all*.

Subjective Emotion

Comparison of mean ratings for the four instructional conditions revealed a mixed pattern of results for sadness. As shown in Table 3, all four instructional groups exhibited increases in sadness between pre and during film assessment. The mean increase, when data was collapsed across groups, was 4.41 points. Increases were greatest for acceptance participant and smallest for control participants (.7 of a point difference was apparent between these two groups). Differences amongst suppression, reappraisal, and control groups were extremely small. No more than .1 of a point difference between any two groups.

A mixed pattern of results was apparent for the remaining discrete emotion variables. For all four instructional conditions, increases in sadness were greater than increases exhibited for the other emotion states. But no consistent differences were found between acceptance, reappraisal, and control participants in reports of negative emotion. In contrast, comparison of the mean scores of suppression and acceptance participants across the negative emotion states showed that acceptance participants consistently exhibited greater increases in negative emotion than suppression participants (this occurred for eight out of nine emotions) (see Table 3).

Table 3

Mean Change in Negative Emotions During the Film as a Function of Instructional Condition

Variable	Instructions							
	Accept		Reappraise		Suppress		Control	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Anger	.84	1.34	.74	1.05	.10	1.30	.90	1.86
Confusion	.70	2.64	.30	2.64	-.40	1.82	.70	1.87
Contempt	.45	1.32	.20	.62	-.30	.86	.00	.88
Disgust	1.35	1.90	1.15	1.81	.75	1.55	1.00	1.62
Embarrassment	.05	.51	.15	.49	0	0	-.15	.93
Fear	.65	1.42	.95	1.93	.35	1.31	.60	1.23
Pain	.60	1.54	1.15	2.16	.40	.82	.45	1.40
Sadness	4.90	2.10	4.25	2.34	4.30	2.45	4.20	1.79
Tension	.85	1.95	1.25	2.75	1.45	2.33	.85	1.84

For the positive emotions, as expected, self-reported changes in intensity between pre- and post-testing were small (no more than + or – 2.5 points); no consistent pattern of results was apparent. While some emotions appeared to increase in intensity, others appeared to decrease. For example, self-reported feelings of amusement, contentment, happiness, and relief appeared to decrease across all four instructional conditions, yet emotions of surprise and arousal appeared to increase (see Table 4).

Although acceptance participants indicated they experienced greater increases in negative emotion than the other three instructional groups, overall, their mean score on the pleasantness scale ($M = 5.60$, $SD = 1.14$) was lower than those obtained by reappraisal ($M = 5.90$, $SD = 1.02$), suppression ($M = 6.16$, $SD = 1.01$), or control ($M = 6.20$, $SD = 1.10$) participants. The pleasantness scale ranged from 0 to 8. Higher scores were indicative of a more unpleasant experience.

Table 4

Mean Change in Positive Emotions During the Film as a Function of Instructional Condition

Variable	Instructions							
	Accept		Reappraise		Suppress		Control	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Amusement	-.35	1.95	-1.10	2.24	-.53	.90	-1.05	1.90
Arousal	.65	1.42	1.15	2.21	1.00	2.18	.85	1.50
Contentment	-2.20	2.19	-1.85	2.37	-1.55	1.70	-1.50	1.54
Happiness	-2.55	2.23	-2.45	2.26	-2.30	1.80	-2.40	1.90
Interest	.60	2.82	-.10	3.67	-.20	1.44	-.30	2.77
Relief	-.20	1.32	-.80	2.48	-.15	1.90	-.30	1.62
Surprise	.65	1.78	.555	2.50	1.35	1.66	.70	1.98

Results of an ANOVA indicated differences between instructional groups in the intensity of sadness reported were not significant, $F(3, 76) = .447, p = .72$. As shown in Tables 5 and 6, separate univariate tests conducted on the remaining discrete emotion variables also failed to reveal any significant differences for either negative or positive emotion states. Similarly, differences between groups in pleasantness ratings failed to reach significance, $F(3, 75) = 1.32, p = .274$. The magnitude of differences between the group means for both sadness and pleasantness ratings were small ($f = .13$ and $f = .23$, respectively).

Table 5*Analyses of Variance for Negative Emotion Variables*

Source	<i>df</i>	<i>F</i>	<i>p</i>
Anger	3	1.56	.21
S within-group error	76	(2.94)	
Confusion	3	1.24	.30
S within-group error	75	(4.69)	
Contempt	3	2.20	.09
S within-group error	75	(.911)	
Disgust	3	.43	.73
S within-group error	76	(2.98)	
Fear	3	.54	.66
S within-group error	76	(2.25)	
Pain	3	.98	.40
S within-group error	76	(2.41)	
Tension	3	.36	.78
S within-group error	76	(5.05)	

Note. Values in parentheses represent mean square errors. S = subjects. N = 100.
F = Fisher's *F* Ratio; *p* = probability

Table 6*Analyses of Variance for Positive Emotion Variables*

Source	<i>df</i>	<i>F</i>	<i>p</i>
Amusement	3	75	.48
S within-group error	75	(3.36)	
Arousal	3	.26	.85
S within-group error	76	(3.47)	
Contentment	3	.53	.66
S within-group error	76	(3.92)	
Happiness	3	.05	.98
S within-group error	76	(4.25)	
Interest	3	.43	.73
S within-group error	76	(7.79)	
Relief	3	.50	.68
S within-group error	76	(3.54)	
Surprise	3	.66	.58
S within-group error	76	(4.03)	
Pleasantness	3	1.32	.27
S within-group error	75	(1.15)	

Note. Values in parentheses represent mean square errors. S = subjects. N = 100.
F = Fisher's *F* Ratio; *p* = probability

Physiological Responses***Instructional period.***

No prior hypotheses were made regarding the impact of emotion regulation instructions on physiological responses during the instructional period. However, following the procedures of Gross (1998), changes in physiological responses were analysed to establish whether presentation of emotion regulation instructions prompted physiological changes in the absence of an emotive stimulus.

Comparison of mean skin conductance scores across the four instructional conditions indicated skin conductance levels decreased for control participants during the instructional period, but increased for suppression, acceptance, and reappraisal participants (see Table 7).

With regards to inter-beat interval, slight decreases were apparent for both control and suppression participants, while slight increases were observed for reappraisal and acceptance participants. Differences in responses between control and acceptance participants were the greatest. Table 7 provides the means and standard deviations for inter-beat interval and skin conductance over instructional, film, and post-film periods.

Using the mean change scores (discussed above) two separate ANOVAs were calculated to examine the significance of differences in mean responses of suppression, acceptance, reappraisal, and control participants on physiological measures during the instructional period. Results indicated there were no significant differences in scores for either inter-beat interval, $F(3, 76) = 1.21, p = .31$, or skin conductance, $F(3, 76) = 1.08, p = .36$. Moreover, the magnitude of differences in means appeared to be small (skin conductance, $f = .21$; inter-beat interval, $f = .22$).

Film and post-film periods.

Comparison of mean skin conductance and inter-beat interval responses for suppression and control participants showed that relative to controls, on average, participants instructed to suppress their emotions exhibited elevated skin conductance but a shorter inter-beat interval during the film. However, contrary to expectations, reappraisal and acceptance participants also exhibited a shorter inter-beat interval and higher levels of skin conductance (during the film) than controls. Differences in the mean responses of suppression, reappraisal, and acceptance participants, for both inter-beat interval and skin conductance, were minimal (a maximum of $.02 \mu\text{S}$ for skin conductance, and $.01 \text{ s}$ for inter-beat interval). Table 7 provides a summary of means and standard deviations.

Results followed a similar pattern during the post-film period. Compared with control participants, suppression, reappraisal, and acceptance participants all

exhibited higher mean skin conductance responses and a shorter inter-beat interval (see Table 7). Comparison of mean responses across suppression, reappraisal, and acceptance groups indicated differences between these groups were minimal for inter-beat interval (.01 s difference when the mean responses of acceptance and reappraisal participants were compared with the mean suppression response). However, a small difference (.87 of a μS) was found between the mean skin conductance responses of suppression and reappraisal participants during the post-film period: Reappraisal participants, on average, exhibited elevated skin conductance levels relative to suppressors.

Four separate one way ANOVAs were conducted to assess the significance of the apparent differences between emotion regulation conditions for physiology. With alpha set at .016, no significant differences between groups were found for either inter-beat interval, $F(3, 76) = .44, p = .72$, or skin conductance, $F(3, 76) = .87, p = .46$, during the *film* viewing period. Differences between the groups for inter-beat interval, $F(3, 76) = .61, p = .61$, and skin conductance, $F(3, 76) = 1.32, p = .27$, during the *post-film* period, also failed to reach significance.

Calculation of effect size statistics indicated the magnitude of differences between the mean responses of the four instructional conditions during the film were small (inter-beat interval, $f = .13$; skin conductance, $f = .18$). Differences in mean scores during the post film (inter-beat interval, $f = .15$; skin conductance, $f = .23$) period were also small.

Table 7*Mean Change in Physiological Responses during Instructional, Film, and Post-film Periods*

Physiological measures	Instructions							
	Accept		Reappraise		Suppress		Control	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Inter-beat interval								
Instructional period	.01	.09	.01	.04	-.02	.05	-.01	.04
Film period	.01	.11	.02	.05	.01	.07	.03	.03
Post-film period	.00	.05	.00	.04	-.01	.06	.01	.04
Skin conductance								
Instructional period	.76	2.50	.02	2.22	.76	1.60	-.09	1.41
Film period	1.42	2.82	1.44	2.46	1.42	2.22	.22	3.82
Post-film period	.99	2.82	1.47	2.55	.60	2.41	-.35	3.99

Note. Skin conductance values represent micro-siemens. Inter-beat interval values represent the interval in seconds between successive R waves.

Objective Memory

The results of separate univariate analyses for verbal, $F(3, 76) = 1.83, p = .15$, visual, $F(3, 76) = 5.2, p = .67$, and overall memory, $F(3, 76) = .81, p = .49$, suggested differences between acceptance, suppression, reappraisal, and control groups on these variables were not significant at an alpha level of .016. Calculation of effect size statistics indicated the magnitude of differences observed for overall memory and visual memory were small ($f = .18$ for overall memory and $f = .14$ for visual memory). A medium-sized effect was, however, found for verbal memory ($f = .26$). The trends observed for incidental memory scores are described below. Please note, the maximum scores possible on visual, verbal, and overall memory scales differed numerically. Maximum scores are provided at the bottom of Table 8.

Table 8*Mean Memory Performance Scores as a Function of Instructional Condition*

Variable	Instructions							
	Accept		Reappraise		Suppress		Control	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Overall memory	8.75	1.92	8.20	1.97	7.95	2.01	7.90	1.83
Visual memory	5.20	1.32	5.20	1.62	5.25	1.41	4.75	1.45
Verbal memory	3.55	0.94	3.00	1.30	2.70	1.17	3.15	1.23

Note. Higher scores indicate better memory. Maximum possible score for overall memory = 16, visual memory = 9, verbal memory = 7.

Comparison of overall mean scores on the memory test showed that suppression and control groups performed similarly (only .5 of a point difference between these groups). Reappraisal participants also achieved a similar score to control participants. Their overall mean score was only .30 of a point higher than that of controls. Acceptance participants obtained the highest overall memory score of the four groups: Their mean score was .85 points higher than the mean score calculated for control participants.

When the overall memory scores of the three emotion regulation groups were compared, small differences were observed between the mean scores of suppression and acceptance participants (.80 of a point), and reappraisal and acceptance participants (.55 of a point difference). In both cases, acceptance participants obtained a higher score. Differences between the overall memory scores of reappraisal and suppression participants were quite small (.25 of a point).

When overall memory scores were broken down into those representing performance on visual and verbal memory scales of the test, divergent patterns of results emerged. On the verbal memory scale suppression participants achieved a lower mean score than that obtained by control participants (.45 of a point), although the magnitude of this difference was small ($d = .37, -0.25-1.00$). Reappraisal participants achieved

similar levels of verbal recognition to control participants (only .15 of a point difference between the two groups, $d = < .20$). The acceptance group was the only group to achieve higher scores than controls (.40 of a point, $d = .37$, -.26–.99). As the effect size statistics show, the magnitude of the above differences was small.

When the results of suppression, reappraisal, and acceptance participants were compared, a large difference was found between the scores of suppression and acceptance participants ($d = .80$, .16–1.44). Acceptance participants, on average, scored .85 of a point higher than suppression participants. Acceptance participants also scored higher than reappraisal participants ($d = .48$, -.14–1.11), and reappraisal participants achieved a higher mean score than suppression participants ($d = .24$, -.38–.86). However, the effect size statistic calculated for this latter group suggests the magnitude of this difference was very small, and the confidence interval calculated raises concerns as to the reliability of this finding.

Comparison of mean scores on the visual memory scale, showed that, on average, all three emotion regulation groups (suppression, reappraisal, and acceptance) achieved slightly higher scores on the visual memory scale than control participants (.20 to .25 of a points difference). However, differences between the scores of acceptance, suppression, and reappraisal groups were negligible (no more than .5 of a point difference between any two groups).

Subjective Memory

Group differences in memory confidence ratings failed to attain statistical significance for either verbal confidence, $F(3, 76) = 1.53$, $p = .21$, visual confidence, $F(3, 76) = .70$, $p = .55$, or overall confidence in memory scores, $F(3, 76) = 1.15$, $p = .33$. Effect sizes were small for overall memory and visual memory ($f = .17$ and $.21$, respectively), although the f statistic (.25) calculated for verbal memory indicated a medium-sized effect. The pattern of results found for subjective memory was similar to that described for objective memory. As depicted in Table 9, suppression participants reported lower levels of overall confidence in their memory for information presented during the film than control participants (3.58 points difference). Overall mean confidence ratings for control and reappraisal participants were similar (less than 1 point difference). As expected, the acceptance group was

the only group to report higher levels of confidence than controls (4.22 points difference). Interestingly, the greatest difference in overall confidence scores was observed between suppression and acceptance participants, with acceptance participants scoring 7 points higher than suppressors (maximum possible scores for verbal, visual and overall memory confidence scales are provided at the bottom of Table 9).

Table 9

Mean Memory Confidence Ratings as a Function of Instructional Condition

Variable	Instructions							
	Accept		Reappraise		Suppress		Control	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Overall confidence	52.45	15.66	47.55	14.52	44.65	10.71	48.23	12.32
Visual confidence	29.90	9.56	28.45	7.58	26.35	7.42	27.58	7.14
Verbal confidence	22.55	7.26	19.10	7.68	18.30	5.57	20.65	6.38

Calculation of separate scores for visual and verbal memory confidence scales indicated differences in mean scores between instructional conditions were greater for verbal confidence than visual confidence. As expected, suppression participants reported lower levels of confidence in their memory for verbal information presented during the clip, than control participants, although the magnitude of this difference was small (2.35 points, $d = .39$, $-.23$ – 1.02). Reappraisal and control participants showed similar levels of verbal confidence (less than $1^{1/2}$ points difference between scores, $d = .22$, -0.40 – $.84$). Once again, acceptance participants were the only group to report higher levels of confidence than controls ($d = .28$, $-.35$ – $.90$). The greatest difference in verbal confidence ratings was found between acceptance and suppression participants (a 4.25 point difference), with acceptance participants reporting higher levels of confidence than suppression participants: Cohen's d statistic ($.65$, $.01$ – 1.28) indicated the presence of a medium sized effect. A small difference was also found between the ratings of acceptance and reappraisal

participants (3.45 points, $d = .46$, -1.17 – 1.09), with acceptance participants reporting higher levels of confidence in their memory.

A similar pattern of results was found for visual memory. Suppression participants reported slightly lower levels of confidence than control participants, and reappraisers reported slightly higher levels of confidence than controls, although differences were small. The acceptance group showed the highest levels of visual confidence relative to controls (2.32 point difference). But the greatest difference in visual confidence ratings was found between acceptance and suppression participants (a 3.55 point difference).

Manipulation Checks

Usefulness of pre-film instructions.

Interestingly, when participants were asked to rate how useful they found pre-film instructions for helping them deal with emotions that arose during the film, suppression participants rated their instructions as the most helpful ($M = 2.75$, $SD = 2.02$), while reappraisal participants rated their instructions as the least helpful ($M = 4.10$, $SD = 2.22$). Mean ratings obtained for acceptance and control participants were identical ($M = 3.65$, $SD = 1.84$, and $M = 3.65$, $SD = 2.16$, respectively). Results of a one-way between groups ANOVA indicated these differences were not significant, $F(3, 76) = 1.50$, $p = .22$, $f = .24$).

Ability to follow pre-film instructions.

Results of an ANOVA conducted to determine whether differences were apparent across groups in terms of how easy they found it to “follow the instructions provided for viewing the clip” indicated the presence of a significant main effect of instructional condition, $F(3, 76) = 9.42$, $p = .00$, $f = .61$. Post hoc comparisons revealed the mean score for control participants ($M = .45$, $SD = .76$) was significantly lower than the mean scores calculated for suppression ($M = 3.15$, $SD = 2.35$) and reappraisal ($M = 3.70$, $SD = 3.01$) participants (the scale ranged from 0 *very easy*, to 8 *very difficult*). No significant differences were found between control and acceptance conditions, although, the mean rating for acceptance participants ($M = 1.50$, $SD = 1.97$) was significantly different from the mean rating calculated for reappraisal participants. These results indicated instructions provided to control and

acceptance participants were easier to follow than instructions provided for reappraisal or suppression participants. However, importantly, the scores for all 4 instructional conditions were on the *easy* side of the scale.

Compliance with pre-film instructions.

Results of four separate one-way between-groups ANOVAs, conducted to establish whether there were any significant differences between the groups in their level of agreement with statements reflecting suppression, reappraisal, acceptance, or control instructional conditions, revealed several significant effects. A significant main effect was found in the extent to which participants reported attempting to “push way” or “get rid of” feelings and emotions that emerged during the film, $F(3, 76) = 8.76, p = .00, f = .59$. Consistent with expectations, post hoc tests showed participants who suppressed ($M = 5.30, SD = 1.72$) reported pushing way and getting rid of emotions that emerged to a greater extent than either acceptance ($M = 2.35, SD = 2.03$) or control ($M = 2.85, SD = 1.90$) participants; suppressors, however, did not differ significantly from reappraisers ($M = 3.90, SD = 2.20$).

Results also revealed statistically significant differences between instructional groups in the extent to which participants allowed themselves to “experience and accept emotions that emerged,” $F(3, 76) = 10.46, p = .00, f = .64$. Post hoc comparisons indicated acceptance participants mean ratings ($M = 6.30, SD = 1.22$) were significantly different from the mean scores of either suppression ($M = 3.50, SD = 1.88$) or reappraisal ($M = 4.15, SD = 2.11$) participants. Interestingly, differences between acceptance and control groups ($M = 5.20, SD = 1.44$) failed to reach significance.

A statistically significant difference was also found in the extent to which participants allowed themselves to react “naturally to the clip,” $F(3, 76) = 11.80, p = .00, f = .68$. The acceptance group reported the highest level of agreement with this statement ($M = 6.15, SD = 1.53$), followed closely by control participants ($M = 5.85, SD = 1.31$). These scores reflected moderate to high levels of agreement. The results of post hoc testing revealed the mean rating for acceptance participants differed significantly from the mean ratings obtained for either suppression ($M = 3.00, SD = 2.20$) or reappraisal participants ($M = 4.55, SD = 2.20$). The ratings of these latter

groups reflected fairly neutral responses (suggesting they neither agreed nor disagreed). Notably, the mean response provided by control participants also differed significantly from the mean response of suppression participants.

Despite finding statistically significant mean differences between instructional groups in their levels of agreement with statements reflecting suppression, acceptance, and control instructions, the results of a one-way between-groups ANOVA failed to reveal any significant group differences in the extent to which the film was viewed in an “objective detached way,” $F(3, 76) = 1.06, p = .37, f = .20$: A statement designed to reflect reappraisal instructions. Indeed, comparison of mean ratings for suppression ($M = 5.10, SD = 2.1$), control ($M = 4.05, SD = 2.14$), reappraisal ($M = 4.95, SD = 2.26$), and acceptance ($M = 4.90, SD = 1.68$) conditions showed that the difference between the highest and lowest mean scores on this scale was only 1.05 of a point. All scores fell within the moderate agreement range. However, comparison of reappraisal participants mean scores across statements reflecting all four instructional conditions indicated reappraisal participants did agree with this statement more than any other statement. But this failed to distinguish them from the other groups – all four groups reported moderate to high levels of agreement.

Engagement with the film.

A one-way ANOVA indicated there were no significant differences (at $p < .05$ level) between instructional groups in the extent to which the experimental film engaged participants attention, $F(3, 75) = 1.29, p = .28, f = .23$. The difference between the lowest and highest ratings was only .75 of a point. The overall mean, when the results of all four instructional groups were combined, was 6.56 (The scale ranged from 0 = *disengaged*, to 8 = *engaged*). This suggests the film was similarly effective in engaging all participants’ attention (irrespective of the experimental manipulation).

Health status.

The results of two separate one-way ANOVAs indicated there were no significant differences between instructional groups in overall health, $F(3, 76) = .32, p = .81, f = .11$, or functional health, $F(3, 76) = .49, p = .69, f = .14$.

Power to Detect Effects

As shown in Table 10, calculation of effect size statistics indicated the magnitude of differences between the mean responses of the four instructional groups on key dependent variables was in the small to medium range. The largest effects were obtained for the memory variables, with effect sizes of .26 and .25 found for verbal memory and verbal confidence in memory, respectively. These effect sizes are in the medium range. Effect sizes were in the small range for the remaining variables.

Table 10 also illustrates the power of the ANOVA technique to detect different effect sizes, given the sample size used, and the level of alpha selected. For example, with 3 and 76 degrees of freedom, the power of ANOVA to detect a medium effect of .26, was only 28%. Power to detect smaller effects was even lower. For example, power to detect the effect size of .13 for inter-beat interval (film period), when alpha was set at = .016, was only 6%. When alpha was increased to .035, during analysis of the sadness data, power increased slightly to 10%, but was still well below the recommended research standard of 80%.

Table 10*Power of Selected Analyses of Variance.*

Source	Alpha level	<i>f</i>	Power
Sadness	.035	.13	10
Physiological measures			
Heart rate			
Instructional period	.016	.22	17
Film period	.016	.13	6
Post film period	.016	.15	8
Skin conductance			
Instructional period	.016	.21	15
Film period	.016	.18	11
Post film period	.016	.23	19
Memory measures			
Objective memory			
Overall memory	.016	.18	11
Visual memory	.016	.14	6
Verbal memory	.016	.26	28
Subjective memory			
Overall confidence	.016	.21	16
Visual confidence		.17	9
Verbal confidence	.016	.25	23

Note. Values represent power times 100 (i.e. the percentage of tests conducted under the conditions of the present study that would lead to rejection of the null hypothesis).

Discussion

As noted in the introduction, a central argument within the emotion regulation literature concerns the degree to which emotions should be avoided/controlled. The present study investigated this issue by exploring the costs and benefits of three emotion regulation strategies that varied in their emphasis on avoidance or control of emotion. More specifically, I sought to compare the impact of acceptance, suppression, and reappraisal, on physiological responses, self-reported emotional experience, incidental recognition memory, and confidence in memory. The following sections explore the congruency of the present findings with prior hypotheses and research. These findings are then integrated, and the possible implications across theoretical and applied domains are discussed. Finally, research limitations are acknowledged, and examples of how the current findings may be built on in future research are provided.

Before exploring the results, it is important to emphasise that differences between the mean scores of acceptance, suppression, reappraisal, and control participants failed to reach significance for any of the main dependent variables. However, post hoc power analyses suggested these non-significant results may be due to insufficient power, rather than the absence of effects. Indeed, calculation of effect size statistics indicated differences of a small to medium magnitude were apparent, but power analyses showed that with the sample size and alpha levels employed, the significance tests used possessed grossly inadequate levels of power to detect effects of these magnitudes (less than 30% power in all cases). Based on this finding, a decision was made to use trends and effect sizes as the basis for interpreting the results. Authors like Cohen (1994) and Whittington (1999) support such an approach. They argue that in cases where power is low, null results are essentially ambiguous and should not be used as the basis of interpretation. Instead, attention should be paid to effects sizes and trends. Hence, although the absence of significant results precludes grandiose claims regarding the validity of prior hypotheses, in the interests of preserving potentially informative data, the congruency of observed trends with prior hypotheses, research, and theory will still be explored.

Suppression

Three categories of predictions were made regarding the impact of suppression on physiology, self-reported emotion, and memory. The results are summarized below.

1. It was predicted that participants instructed to suppress thoughts and feelings that arose in the context of an emotionally evocative film would exhibit higher levels of heart rate (as denoted by a lower cardiac inter beat interval) and skin conductance than participants instructed to simply watch the clip (controls). The pattern of means calculated was in the predicted direction, with suppressors exhibiting higher levels of physiological arousal both during and following the film, relative to controls.
2. Suppression participants were expected to report similar levels of sadness and positive/pleasantness as control participants. As anticipated, negligible differences were found between suppressors and controls on these measures.
3. Finally, it was predicted that suppression participants would achieve lower scores on the incidental recognition memory test and report lower levels of confidence in their memory than control participants. Contrary to expectations, suppressors achieved a similar overall score on the memory test to controls. However, when scores were broken down into those representing visual and verbal indices of the test, suppression participants scored higher on the visual scale but lower on the verbal scale. As expected, suppressors reported lower levels of confidence in their memory (for both visual and verbal details of the film) than controls.

Physiological effects.

The finding that participants in the suppression condition exhibited elevated skin conductance levels compared with control participants is consistent with the findings of previous research conducted on American samples. These studies have consistently found that suppression of either behavioural (Gross, 1998a; Gross & Levenson, 1993, 1997; Richards & Gross, 1999) or experiential components (e.g., thoughts and feelings) of emotion (Koriat et al., 1972; Martin, 1964; Merckelbach et al., 1991; Wegner & Gold, 1995; Wegner et al., 1990) serves to heighten skin

conductance levels both during and following the suppression period – a finding that has been interpreted as evidence that suppression serves to heighten sympathetic activation levels (John & Gross, 2004).

However, the finding that suppression participants also exhibited increased heart rate is inconsistent with previous results. Although suppression is believed to increase sympathetic activation, prior research indicated the exception to this rule was heart rate, which has been found to either decrease or remain the same under suppression conditions (Gross & Levenson, 1993, 1997; Kunzmann et al., 2005).

The differential heart rate effect observed in the present study may be explained by divergences across studies in the conceptualisations of suppression employed. Namely, the fact that Gross and colleague's research focused on *expressive* suppression, while the present study focused on *experiential* suppression. According to Gross and Levenson (1993), expressive suppression lowers heart rate levels because it explicitly targets somatic expressions of emotion, and there is a positive relationship between somatic activity and cardiac activity (i.e. as activity levels decrease, heart rate also decreases) (Obrist, 1981). In contrast, the instructions provided to suppression participants in the present study solely targeted internal experiences of emotion (thoughts and feelings), an activity that would not necessarily be expected to decrease behavioural activity levels and hence heart rate. Clearly further research explicitly comparing the impact of these strategies is required to assess the reliability of this hypothesis.

Experiential effects.

The finding that suppressors reported similar levels of sadness to control participants is concurrent with the results of research conducted by Gross and colleagues assessing the impact of expressive suppression on self-reported experiences of disgust, sadness, and general negative affect (Gross, 1998a; Gross & Levenson, 1993, 1997). However, interestingly, this finding is at odds with the experiential suppression literature (Markowitz & Borton, 2002; Purdon & Clark, 2000; Roemer & Borkovec, 1994), which has generally reported increases in negative affect and/or mood in response to suppression.

One possible reason the present findings are incongruent with previous experiential suppression research is that the present study solely focused on participants reports of emotion *during* the film, while the experiential suppression literature has tended to focus on post evocation experiences of emotion. This is an important divergence, as several authors have suggested the impact of suppression can change over time (e.g., Wegner et al., 1990). Although suppression may initially appear to induce little harm, rebound effects may occur later (Abramowitz et al., 2001). Unfortunately, very little research has systematically explored the subjective impact of suppression over multiple time periods. Such research is warranted in order to evaluate more clearly the overall impact of suppression on psychological wellbeing.

A second possible reason the present findings are incongruent with previous experiential suppression literature is that the present study (like previous expressive suppression research) used an external stimulus to evoke emotion (i.e., film), whereas previous experiential suppression studies have tended to use internal stimuli, most commonly, relived emotion procedures (e.g., Borton et al., 2005; Markowitz & Borton, 2002; Purdon & Clark, 2000; Roemer & Borkovec, 1994). This difference may account for divergent results, as it seems intuitively valid that emotions evoked via an external stimulus (such as film) would be easier to suppress than internally evoked emotions. Rottenberg et al. (in press) have noted that film emotion is somewhat aesthetic, in that it “requires a willing suspension of disbelief for its operation,” that is, “participants become emotional in response to films in spite of the fact that the film images are an illusion of reality” (pp. 11–12). Alternatively, relived emotion procedures require individuals to evoke emotions using situations or experiences of direct personal relevance (e.g., thinking about the death of a family member) (Rottenberg et al., in press). Hence, these emotions may be perceived by some to be more salient and real, and therefore more difficult to suppress effectively.

Memory effects.

The finding that suppression participants achieved similar overall scores on the memory test to control participants is congruent with previous research conducted by Rassin et al. (1997), which found that suppression had little impact on participants' memory of details of an emotional film. These findings are particularly interesting because the timing of the suppression manipulation used in Rassin et al.'s study

differed from the present study. While Rassin et al. focused on suppression during the five hour period following exposure to the emotive stimulus, the present study focused on suppression during exposure to the emotive stimulus. The nature of the emotive stimulus also differed. Rassin et al. focus on fear-based emotions, while the present study focused on sadness. The present results, when considered in conjunction with Rassin et al.'s findings, suggest the impact of suppression on memory may be similar across emotion states, and is fairly stable irrespective of the timing of the suppression manipulation. In saying this, a key limitation of Rassin et al.'s (1997) research was that it failed to assess the different sensory components of memory. This may be an important variable to consider in future experiential suppression studies, as the present findings indicated suppression may impact differently on different facets of memory: Suppression led to degradation in verbal memory performance and self-reported confidence in memory, but to a slight enhancement of visual memory.

The finding that suppressors performed more poorly on the verbal component of the memory test and reported lower levels of confidence in their memory than control participants, is consistent with previous expressive suppression findings (e.g., Richards & Gross, 2000, study 2). Richards and Gross found that participants instructed to suppress observable emotional responses while exposed to slides intended to evoke negative emotions, performed more poorly on verbal tests of incidental cued recall and recognition than control participants, and reported lower levels of confidence in their memory. The congruency of the present findings with those obtained by Richards and Gross suggests the impact of suppression on verbal memory may be similar irrespective of the specific type of suppression investigated.

In contrast, the finding that suppressors exhibited better recognition of visual information than control participants, is incongruent with prior findings which have found suppression to either have no effect on visual memory (Richards & Gross, 2000, study 2) or actually impair it (Richards & Gross, 2000, study 1).

Methodological differences may partially explain this divergence. As noted earlier, Richards and Gross' (2000) research focused on suppression of behavioural signs of emotion. In contrast, the present study focused on experiential suppression of

emotional thoughts and feelings. It seems likely that requesting participants to suppress facial indicators of emotion could impair their ability to encode visual information, especially if eye movement responses were one of the targets of inhibition. Indeed, in Richards and Gross' studies participants in the suppression condition were explicitly requested to keep the muscles around the eyes very still. It is possible that in attempting to isolate these muscles, participants also reduced their general eye movements (i.e. visual scanning activities). This in turn may have affected the amount of visual information they were able to encode and later recognise. Alternatively, in the present study, the suppression instructions used placed no explicit demands on behavioural activities; hence visual encoding processes were more likely to remain intact.

Overall, the present findings suggest suppression may exert similar effects on verbal memory, irrespective of the type of emotion elicited or the nature of the suppression instructions. However, the impact of suppression on visual memory may vary as a function of the form of the suppression instructions.

Reappraisal

Three categories of predictions were made regarding the impact of reappraisal on physiology, self-reported emotional experience, and memory. The results are summarised below.

1. It was predicted that participants instructed to reappraise the nature of a potentially emotion-eliciting film would exhibit similar levels of heart rate and skin conductance as control participants. The pattern of results obtained was inconsistent with this hypothesis, with reappraisers actually exhibiting small elevations in heart rate and skin conductance relative to control participants.
2. Reappraisers were expected to report smaller increases in sadness and rate the film as more positive/pleasant than control participants. Contrary to this hypothesis, reappraisers and controls reported similar levels of sadness, although, as predicted, results indicated reappraisers found the film more positive/pleasant.

3. Reappraisers were expected to achieve similar scores on the memory test and exhibit equivalent levels of confidence in their memory as control participants. Concurrent with these expectations, overall reappraisers and control participants exhibited similar memory scores. When scores were broken down into those representing visual and verbal components of the test, however, reappraisers actually achieved a slightly higher score on the visual component. Consistent with prior expectations, reappraisers reported similar mean levels of confidence in their memory (for both visual and verbal information) as controls.

Experiential and physiological effects.

The finding that reappraisal failed to decrease the intensity of sadness experienced, and actually led to a slight increase in levels of physiological arousal, is inconsistent with prior research in this area. Previous research conducted by Gross and colleagues (Gross, 1998a) has found reappraisal to be an effective means of decreasing the intensity of emotions experienced during emotionally evocative films, while research investigating the physiological effects of reappraisal has found it either has no effect on heart rate (Gross, 1998a; Steptoe & Vogele, 1986), or actually decreases it (Lazarus & Alfert, 1964; Lazarus et al., 1965; Speisman et al., 1964).

Methodological divergences between the present study and previous studies may explain why reappraisal failed to deliver the physiological and experiential results expected. First, the present study focused on sadness, while previous research has focused on either disgust (Gross, 1998a) or non-specific emotion states (Lazarus & Alfert, 1964; Lazarus et al., 1965; Speisman et al., 1964). As noted previously, different emotions may interact distinctly with different regulatory strategies (Gross & Levenson, 1997). It may simply be that reappraisal is not as effective for modulating feelings of sadness as it is for controlling feelings of disgust.

Second, the impact of reappraisal may be culturally moderated. Previous reappraisal research has been predominantly conducted on American samples (Lazarus & Alfert, 1964; Lazarus et al., 1965; Speisman et al., 1964). In fact, to my knowledge this is the first study to explore the impact of reappraisal on a New Zealand based sample.

Hence it seems possible that divergent findings could be explained by differences in the effectiveness of this strategy for individuals of different cultures. Indeed there is a substantial body of research elucidating differences in emotional experience, expression, and modulation tendencies across different cultural groups (see Tsai, Chentsova-Dutton, Freire-Bebeau, & Przymus, 2002, for a more in-depth discussion of these issues).

Third, the reappraisal instructions provided to participants in the present study may not have been as effective in targeting the physiological and experiential signs of emotion as those provided by previous researchers. Although the reappraisal instructions used in this study were based on definitions outlined in Gross' (1998a) research, they were not an exact replication. In the present study, reappraisal participants were instructed to view the clip with the "objective, analytical interest of a movie director, critically observing his/her own work," rather than in "a personally or emotionally significant way". The effectiveness of this instruction was based on the assumption that adopting a movie director stance is an effective means of decreasing the emotional significance of a film. Indeed, there was good reason to believe it was, as the movie director metaphor is frequently used by Gross and colleagues as a theoretical example of reappraisal (Gross, 2002; John & Gross, 2004), hence its face validity appeared to be high. However, to my knowledge this was the first study to actually use this metaphor in a research context; thus its effectiveness was not guaranteed.

In saying this, the finding that reappraisal participants rated the film as more positive/pleasant than controls suggests that the reappraisal instructions used in this study possessed some merit. Although, notably, the magnitude of this effect was small, thus further research is required to assess its replicability.

Memory effects.

The finding that reappraisal induced few if any cognitive costs and may have actually enhanced visual memory replicates findings obtained by Richards and Gross (2000, study 2). They found that instructing participants to view slides of injured men, with the neutral "detached interest of a medical professional" (Richards & Gross, 2000, p.

18), performed similarly to control participants on a subsequent test of verbal memory and actually exhibited enhanced visual memory.

Richards and Gross (2000) suggested reappraisal may have enhanced visual memory in their study because assuming the role of a medical professional served to direct participants attention to medically relevant visual components of the slides. As noted above, the instructions used in the present study did not require participants to assume the role of a medical professional, but rather a movie director. Whether this role would also naturally lead to preferential processing of visual information is unclear. One would expect a movie director to be more attentive to visual aspects of a film scene (e.g., scenery, positioning of extras, etc.) than the average movie viewer. However, further research comparing the impact of different reappraisal techniques is needed to assess whether enhanced visual memory is a general consequence of reappraisal, or whether this effect is moderated by the specific form the reappraisal instructions take.

Acceptance

Three categories of predictions were made regarding the impact of acceptance on physiology, self-reported emotional experience, and memory. The results are summarised below.

1. Participants instructed to accept thoughts and feelings that arose in the context of an emotionally evocative film clip were expected to exhibit lower heart rate and skin conductance levels than suppression, reappraisal, or control participants. The pattern of physiological responses detected in the present study was contrary to that hypothesised. Acceptance participants were actually found to exhibit higher levels of skin conductance, and increased heart rate relative to controls, while negligible differences were found between the responses of acceptance participants and those in either reappraisal or suppression conditions.
2. Acceptance participants were expected to report greater increases in sadness, but rate the film as more positive/pleasant than suppression, reappraisal, or

control participants. As expected, acceptance participants reported the highest levels of both sadness and positive/pleasantness of the four groups.

3. Finally, it was predicted that acceptance participants would achieve higher scores on the memory test than suppression, reappraisal, or control participants, and report higher levels of confidence in their memory. As anticipated, acceptance participants obtained the highest overall scores on the memory test of the four groups. Analysis of individual scale scores revealed acceptance participants exhibited better memory for both verbal and visual information than controls, and performed better on the verbal memory scale than either reappraisers or suppressors. The magnitude of difference between suppression and acceptance participants was large. Acceptance participants also reported the highest levels of confidence in their memory (for both visual and verbal information).

Physiological Effects.

The finding that acceptance participants exhibited elevated levels of physiological arousal compared with controls, and that this response was indistinguishable from those found for suppression and reappraisal participants, is congruent with results reported by Feldner and colleagues (Feldner et al., 2003). They found that participants instructed to simply observe and notice emotions experienced during the course of a CO² challenge (designed to evoke feelings of anxiety) exhibited increased heart rate responses relative to control participants during the challenge (Feldner et al., 2003). However, the present findings are somewhat inconsistent with the findings of researchers like Eifert and Heffner (2003) and Levitt et al. (2004) who found acceptance instructions had a negligible impact on responses to CO² challenge.

Overall, the present results, when combined with those obtained previously, suggest acceptance is not a particularly useful strategy for alleviating the physiological signs of sadness and may even slightly elevate levels of sympathetic activation. Small divergences in results across studies exploring the impact of acceptance could be explained by variability in the comprehensiveness of acceptance instructions and mode of delivery. For instance, researchers like Eifert and Heffner (2003) and Levitt et al. (2004) have used extensive training protocols that included both auditory and

experiential components (e.g., the Chinese finger trap exercise), and were delivered in a personal therapeutic like format. Others, like Feldner et al. (2003) and the present study provided briefer interventions and delivered them in a standardised pre-recorded format.

Experiential effects.

The finding that participants instructed to accept emotional thoughts and feelings while viewing an emotionally evocative film reported the most intense feelings of sadness, but the highest levels of positive/pleasant affect, is consistent with outcomes reported by previous researchers (Hayes et al., 1999; Marcks & Woods, 2005). Hayes et al. (1999) found that acceptance of emotional thoughts and feelings during a cold presser task had minimal effects on participants' pain experience, but did improve their tolerance levels. Similarly, Marcks and Wood (2005) found acceptance of upsetting intrusive thoughts had negligible effects on thought frequency, but effectively reduced the discomfort associated with them.

Memory effects.

Findings pertaining to the impact of acceptance on memory are especially intriguing, as acceptance participants were the only group to perform better than control participants on both visual and verbal indices of the memory test. They also performed better than either reappraisal or suppression participants on verbal indices. The difference between acceptance and suppression participants is particularly interesting, as the magnitude of this effect was quite large ($d = .80$), and the confidence limits calculated indicate a difference did occur, even in the absence of a significant result (.16–1.44). To my knowledge, this is the first study exploring the impact of acceptance on memory, thus the replicability of such an effect is unclear. However, the present results indicate further research is warranted to assess the impact of acceptance on memory.

Summary of Findings

Comparison of results obtained for suppression, reappraisal, and acceptance groups revealed some interesting commonalities in the effects of these strategies, but also some important differences.

Across the physiological variables, trends obtained for acceptance, suppression, and reappraisal participants were similar, with all three groups exhibiting heightened levels of physiological arousal relative to control participants. However, across experiential and cognitive domains the consequences of these strategies began to diverge. None of the instructional conditions were found to be effective for alleviating subjective feelings of sadness experienced during the film, and acceptance participants actually reported heightened levels of sadness. However, reappraisal and acceptance participants did report higher levels of positive/pleasant affect than control participants, with acceptance participants reporting the highest levels overall. This finding suggests that although none of the emotion regulation strategies are particularly effective in alleviating feelings of sadness, acceptance and reappraisal may be useful for alleviating the distress associated with an emotionally evocative situation.

Similar trends were observed for the cognitive variables. The three instructional groups exhibited comparable memory for visual information, but clear differences were observed with respect to verbal information. Compared with the control group, acceptance participants performed better, while reappraisal participants achieved similar scores, and suppressors performed more poorly. These memory deficits were prominent enough to be evident to participants, with the confidence in memory scores replicating the pattern of results found for objective memory.

Theoretical and Practical Implications

Suppression.

The finding that suppression was ineffective in reducing the intensity of sadness experienced or the unpleasantness of the film, and impacted negatively on verbal memory, provides tentative support for the view espoused by contemporary theorists that (e.g., Hayes et al., 2006) attempts to avoid internal experiences of emotion are futile, and may even cause harm.

One explanation for findings pertaining to the impact of suppression stems from Hayes' and Strosahl's (2004) experiential avoidance theory. According to this theory, the inextricable links between humans' private internal events and evaluative verbal regulatory strategies make avoidance of internal events extremely difficult,

and attempts to control emotion often become a problem as opposed to a solution. From Hayes' perspective, deliberately trying not to think of or feel something is generally a futile task, because the rule ("I must not think of x") refers to the avoided thought/feeling, and ascertaining one's success in achieving the goal requires maintaining close proximity to the rule and hence the emotional thought or feeling, as well as "the psychological presences of the events related to it" (Hayes & Strosahl, 2004, p. 650). Thus, in the present study, instructing participants not to feel emotions may have actually served to trigger them (e.g., if it is important not to think about how sad you are feeling, sadness becomes something to think about). This would explain why suppression was found to be ineffective for relieving either the intensity of sadness experienced or the unpleasantness of the emotive stimulus.

Another possible explanation for the present results is provided by Gross and colleagues (Gross, 1998a). According to Gross, suppression is a futile method of relieving emotions because it is a response-focused strategy, meaning it is used once the emotional response tendencies have already arisen. Thus, suppression simply seeks to mop up emotions, rather than prevent them. This approach is postulated to be somewhat hit and miss, and in acutely emotional contexts could be likened to putting a plaster on a gaping wound – a good deal of seepage is likely to occur.

Gross' (1998a) theory also provides clues as to why suppression appeared to impact negatively on memory. According to Gross, response-focused strategies call for a high level of cognitive investment, because they require continual evaluation of the current status of an emotional system (e.g., monitoring for the presence of emotional thoughts and feelings) in comparison with an ideal or desired level of functioning (e.g., the absence of emotion) and corrective action to reduce discrepancies as they arise. This active and ongoing process of self-regulation is purported to be cognitively taxing, and can deplete resources available for alternative activities; in the present case, encoding information to memory.

What is less clear is why these negative effects were restricted to verbal memory, while visual memory remained unimpaired, and may have even improved. Richards and Gross (2000) have speculated that suppression may increase the load placed on language centres needed to encode verbal information. As yet, this theory is in the

early stages of conceptualisation and, to my knowledge, no studies have tested its validity. However, Richards and Gross' supposition meshes well with Hayes and Strosahl's (2004) perspective that avoidant strategies like suppression are dominated by verbal rules and evaluations, and that preoccupation with these rules and standards serves to compromise an individual's ability to attend to and absorb "here-and-now" (Hayes & Strosahl, 2004, p. 650) experiences within the external environment.

Although the present results suggest suppression is a relatively futile method of regulating physiological or self-reported experiences of emotion, and may even have a debilitating effect on cognitive functioning, they do not elucidate how these immediate effects translate into the psychological and medical conditions (i.e., depression, anxiety, hypertension, diabetes, cardiovascular disorder) increasingly being linked to experiential avoidance in correlational studies. One possibility is that these initial effects trigger further psychological and behavioural changes, which over time may lead to impairment in particularly vulnerable individuals.

This interpretation is supported by Richards and Gross (2000), who noted the detrimental impact of suppression on memory has potentially far reaching consequences. They argue that the ability to attend to and remember emotionally evocative information is a vital skill and plays an integral role in diverse aspects of human functioning, including interpersonal, academic, and occupational facets. For instance, suppression during an emotionally charged argument with a partner could potentially decrease one's recollection of what was said, thereby increasing the likelihood misunderstandings will occur, and eventually leading to a general decrease in relationship satisfaction and psychological wellbeing.

Similarly, a student's tendency to suppress emotional thoughts and feelings about an upcoming exam could compromise their ability to recall important facts, and ultimately lead to poorer performance in the exam and decreased feelings of self-efficacy. Notably, suppressors scored 12% lower than acceptance participants on the memory test. In academic terms this is equivalent to the difference between achieving an A and a B grade, or a Pass and a Fail.

The way in which suppression plays a role in physical health and wellbeing is less clear. Although in the present study participants in the suppression condition did exhibit a slight increase in physiological arousal, relative to control participants, the magnitude of this increase was small. Furthermore, the increase was of a similar size to that observed for the alternative emotion regulation conditions (i.e., reappraisal and acceptance). This finding suggests increased physiological arousal may be a general consequence of emotion regulation, rather than an effect specific to suppression.

However, it is feasible that even if suppression does not directly impact on physical wellbeing it does so indirectly. As noted above, by failing to decrease either the intensity or unpleasantness of emotive situations, and inducing cognitive impairments, suppression may increase the frequency of situations where heightened physiological responses may occur (e.g., exam stress, marital arguments). Gross (1998a) suggests this increased frequency of emotional responses may, in turn, lead to a persistent state of physiological activity that exceeds metabolic demands, or lead to prolonged activation of the stress response. In vulnerable individuals, these effects could potentially compromise the integrity of the cardiovascular system and inhibit immune functioning (Gross, 1998a). In the long term, this could lead to a heightened risk of developing serious medical conditions like diabetes, sudden cardiac arrest, and cancer, which have recently been associated with experiential avoidance processes (Appels et al., 2002; Grassi & Cappellari, 1988; Penza-Clyve, 2000).

Extrapolating further, because suppression is so ineffective in relieving the subjective experiences of emotion, individuals with a natural tendency to suppress may turn to more toxic forms of experiential avoidance in a bid to decrease their suffering. Examples could include activities like drug and alcohol abuse or disordered eating, which are known to have a detrimental effect on physical health (Blackledge & Hayes, 2001).

Reappraisal.

Although the present findings suggest emotion regulation strategies that promote experiential avoidance of emotions have the potential to cause harm, they also support the view that not all methods of regulating emotion are inherently

maladaptive. In fact, methods of experiential avoidance that promote reappraisal of emotional situations may actually induce positive effects, at least on cognitive and experiential dimensions.

The finding that reappraisal was a more effective means of regulating emotion than suppression (in the context of the present study) is consistent with the supposition inherent in Gross' process model, that different emotion regulation strategies have different effects depending on their primary point of impact on the emotion generation process (John & Gross, 2004). Unlike suppression, which is used relatively late in the emotion generation process, reappraisal is used early on, before evocation of the emotional response tendencies, and serves to alter the trajectory of emotion. As such, reappraisal does not require the ongoing self-monitoring and corrective action required of suppression, meaning the detrimental effects on cognitive and subjective emotion are likely to be lesser than those observed for suppression (John & Gross, 2004). This would explain why reappraisal had little impact on memory, and actually led to a small decrease in subjective feelings of unpleasantness.

The present findings suggest the simple theory that emotional avoidance causes harm may warrant modification. Emerging theories should take into account findings that suggest the extent to which control-based approaches are adaptive versus maladaptive may depend on the type of strategy employed, and the point in the emotion generation process where the strategy exerts its primary effects.

Acceptance.

Findings pertaining to the impact of acceptance were most consistent with prior theory. The finding that acceptance served to increase the intensity of emotion experienced, while simultaneously decreasing the unpleasantness of the emotive stimulus, is consistent with the two core objectives of acceptance based interventions: (1) to motivate clients to fully experience their emotions, without judgement or evaluation; and (2) to turn "suffering into ordinary pain" (Eifert & Forsyth, 2005, p. 70). The present findings are concurrent with Hayes and Strosahl's (2004) supposition that controlling one's emotions is not the key to wellbeing,

instead it is eliminating the negative evaluations and judgements (e.g., "I shouldn't be feeling sad") surrounding an emotive situation that is important.

The ability of an emotion regulation strategy to maintain the integrity of the emotion itself, while decreasing the degree of distress associated with the emotive stimulus, may enhance an individual's ability to function adaptively. As noted earlier, emotions play an integral role in varied aspects of human living, including problem solving (Kring & Werner, 2004), social interactions (Keltner & Buswell, 1997), and preparing the body for necessary action (Parrott, 2002). Thus, if emotions are avoided or controlled important information may be lost (Parrott, 2002). For instance, if an adult attempts to suppress feelings of anger in response to witnessing the maltreatment of a child, they are unlikely to take action to prevent the reoccurrence of such a situation. Conversely, if this same individual allows themselves to experience and accept these emotions they may be more likely to take action to ensure the child is safe and the situation does not reoccur. Furthermore, the ability of acceptance strategies to alleviate the unpleasantness of the emotive stimulus means the action this individual is likely to take in response to such emotions is more likely to be rational and truly optimize the wellbeing of themselves or others (e.g., rather than attacking the perpetrator, he/she might choose call the authorities) (Hayes & Strosahl, 2004). This idea that acceptance-based strategies may possess adaptive value is concurrent with the ultimate goal driving acceptance based interventions (within an ACT framework), to improve the client's ability to function effectively in their everyday life and move toward valued goals, even while experiencing difficult emotions (Eifert & Forsyth, 2005).

The finding that acceptance served to enhance both verbal and visual facets of memory suggests that acceptance may indeed have adaptive value. The processes via which acceptance serves to enhance memory are difficult to explain because (as far as I am aware) this is the first study to assess the impact of acceptance on cognition, thus there is little theory from which to interpret results. However, authors like Eifert and Forsyth (2005) have implied that the emphasis of acceptance strategies on removing the screen of evaluations, judgements, and interpretations individuals place on their emotions, allows individuals to be more attentive and aware of their external environment, and less encapsulated by verbal rules and evaluations. By accepting

their emotions as they are, participants may free themselves cognitively, and conceivably enhance their ability to use the cognitive resources necessary to cope with information in their external world (including those needed to encode and later recognise it).

In discussing the theoretical and practical implications of the present study, it is important to note that the present findings may have implications for psychological intervention development and utilisation in New Zealand. However, the laboratory-based nature of the design, the inclusionary criteria used (e.g., the absence of physical or psychological disturbance), and the absence of statistically significant results means it is extremely difficult to suggest, with any confidence, what these implications might be (these limitations will be discussed in greater depth later).

Limitations and Suggestions for Future Research

The present study has several limitations that warrant attention. These have been broadly categorised into those associated with (a) statistical power, (b) measurement issues, (c) the experimental stimuli used, and (d) the external validity of the findings. This section also explicates how these limitations may be overcome and the present findings expanded on in future research.

Power.

The ability to draw robust conclusions from the present study was seriously limited due to insufficient statistical power. That is, the probability of the statistical tests used in this study yielding significant results for effects of small and medium magnitudes (given the sample size and alpha levels employed), was extremely low (less than 30% in all cases). This made the interpretation of non-significant results difficult because when power is inadequate null results are essentially ambiguous (Whittington, 1999). For instance, a non-significant result could mean either (a) there was no effect, or (b) an effect existed but the study lacked the sensitivity to detect it. For this reason, a decision was made in the present study to use effect sizes and trends (rather than significance criteria) as the basis for interpretation. However, it must be emphasised that a sole reliance on effect sizes and trends is not ideal, as the reliability of such interpretations is highly questionable (i.e., it is possible these

results will not be replicated in future research), hence robust conclusions regarding the validity of findings cannot be made (Gravetter & Wallnau, 2004).

There are several ways power could be increased in future research. Because power is a function of ES, N , and alpha (p) level, altering any or all of these factors has the potential to boost power (Cohen, 1988). With regards to ES, strategies can be used to reduce experimental noise (extraneous factors that may cause the sample ES to underestimate the true population ES) and hence increase chances of obtaining a strong effect (Whittington, 1999). However, utilising such techniques in no way ensures effects of the desired magnitude will be obtained (Whittington, 1999). In the present study, several strategies were put in place to decrease experimental noise, these included employing strict inclusionary criteria, randomly assigning participants to conditions, conducting individual sessions, standardizing the context and procedures, and utilizing powerful statistical significance tests. Yet, in spite of these efforts, small and medium effects were still obtained.

Another method of increasing statistical power is to boost sample size (Gravetter & Wallnau, 2004). Unfortunately, the increases required are often dramatic and for many researchers unrealistic (Whittington, 1999). For example, in the present study, an a priori statistical analysis indicated a sample of 180 would be necessary to provide sufficient power to detect medium effects ($f \leq .25$), while a sample of 1100 was required to detect small effects. Unfortunately, as is the case in many studies (Whittington, 1999), time constraints and financial considerations meant increasing the sample size to these levels was not a viable option.

An alternative way of increasing power in the future would be to adjust the alpha levels. In the present study, using the traditional family-wise error rate of .05, none of the effects obtained reached significance. However, had alpha levels been increased to .20 several significant effects would have been detected. Of course, there are disadvantages to this approach. For example, increasing the alpha level increases the chances of committing a type I error (falsely rejecting the null hypothesis) (Hair et al., 2006). Moreover, as Whittington (1999) and Stevens (1996) note this strategy may affect the researcher's ability to derive publishable data, as many journal editors are disinclined to move the alpha level beyond the standard .05

point. For these reasons, in the present study a decision was made to retain the traditional .05 family-wise error rate. However, in retrospect, lowering the alpha level might have been a more reasonable approach. Several well-known statisticians (e.g., Cohen, 1994; Stevens, 1996) argue that in studies involving small groups it is appropriate to adjust the significance criterion to a level that reflects consideration of the relative costs associated with committing a Type I versus a Type II error. Based on these recommendations, lowering the alpha level might be appropriate in future studies assessing the impact of acceptance on memory, as research in this area is currently in an exploratory phase and any potentially promising findings warrant attention.

Given the difficulties associated with increasing power in individual studies, many researchers argue that a more practical approach might be to combine the results of individual studies using meta-analytic techniques (Tabachnick & Fidell, 2006). This would increase the probability of detecting significant effects of small and medium magnitudes, if they do indeed exist, and reduce the likelihood that potentially informative findings would be lost due to a failure to reach significance. Plans are currently underway to conduct replications of the present study. This will allow more accurate evaluation of the reliability of the trends identified.

Measurement issues.

Several measurement issues warrant consideration. A particular concern is the lack of formal psychometric evidence for the subjective emotion measure (the DEQ) and the memory test. Because a standardised memory test was not available for the experimental film clip, a test had to be developed. A brief pilot study was conducted prior to the main study to assess the validity of the test, but unfortunately pragmatic considerations (time and finances) meant the sample was small ($N = 20$) and the analyses somewhat superficial. Future research is still needed to formally establish the validity of the memory test.

With regards to the self-report measure, although the DEQ appraisal scales have been used in a good deal of prior emotion research, to my knowledge, no formal psychometric data has been published. Unfortunately, this is the case with the majority of self-appraisal scales currently used in emotion research (Marcks &

Woods, 2005). A fact that has led several authors (e.g., Marcks & Woods, 2005; Purdon & Clark, 2000) to suggest a need to develop subjective emotion scales with sound psychometric properties. In the present study, in the absence of such data, a more robust approach might have been to include a concurrent measure of subjective experience.

The validity of the subjective emotion measure (the DEQ) may also have been compromised by its retrospective use. In the present study there was 2-minute delay between the end of the film and participants completion of the post-film DEQ. This retrospective method of assessment is the norm in emotion research and replicates procedures used by prominent researchers in the field (e.g., Demaree et al., 2004; Gross & Levenson, 1995; Kunzmann et al., 2005). However, the disadvantage of this approach is that it can introduce measurement error, because during the time period between emotion evocation and assessment the nature or intensity of emotions experienced may change, or one's memory of the emotions may be contaminated (Rottenberg et al., in press). One way of eliminating such confounds in the future might be to use techniques like dial rating methods, where participants use a dial to rate the level of emotion they are experiencing at pre-specified intervals both during the film and following the film. This technique is advantageous because it allows direct assessment of emotions as they arise and can be used over multiple time periods (Rottenberg et al., in press). However, there are disadvantages to this approach. For instance, the process of rating emotions as they arise may interfere with participants' ability to engage with an emotive stimulus. This is particularly likely in situations where the stimuli used are cognitively complex, or when the study involves assessment of cognitive aspects of functioning (e.g., memory) (Rottenberg et al., in press). For this reason, a decision was made not to use rating dial methods in the present study. In the context of a larger scale study, however, it would be prudent to pilot the impact of both direct and retrospective rating methods, and then base one's final decision on the relative advantages and disadvantages of each.

Future research may also benefit from utilising more sensitive and informative measures of physiological activity. The present study used period averages to represent participants' levels of physiological arousal during film and post-film periods. This is a common method of analyzing physiological data, and as

Rottenberg et al. (in press) note, it provides a useful summary statistic. However, sole reliance on such measures can obscure important information. Because emotions rise and fall rapidly, the time period from which averages are obtained is likely to incorporate both emotional and non-emotional epochs (Rottenberg et al., in press). This means the averages computed for a particular period can present a distorted or biased perception of physiological functioning during that time. For instance, the results of the present study indicated there were minimal differences in the heart rate responses of acceptance, suppression, and reappraisal participants. However, it is possible that differences did occur, but the analytic procedures used lacked the sensitivity to detect them. For example, acceptance participants may have exhibited a steep rise in emotion but plateaued quickly, while suppression participants may have exhibited a gradual rise that failed to plateau; yet analysis of mean responses would reveal no differences between these conditions.

A more effective approach in the future would be to collect multiple period averages (e.g., across 2-second intervals). This would identify trends in the data and provide information such as rise time, threshold, latency, and recovery time. Unfortunately, time constraints precluded analysis of such data in the present study. However, incorporating these analyses in future research would extend knowledge of how these emotion regulation strategies effect the physiological processing of emotion, and may better explicate the relationship between emotion regulation and physiological health.

Experimental manipulations.

One of the more relevant limitations of the present study concerns the effectiveness of the film stimulus used to evoke emotion. The experimental film clip used in this study was selected because it had been previously demonstrated to evoke an intense and discrete state of sadness in individuals of varied ethnicities (Gross & Levenson, 1995; Hagemann et al., 1999). However, pilot procedures conducted before the main study indicated the film did not elicit as intense or discrete feeling of sadness as reported in previous standardisation research (e.g., Gross & Levenson, 1995; Hagemann et al., 1999). This finding may explain why the effect sizes obtained in the main study were generally of a smaller magnitude and (at times) a different direction to those reported previously.

The reason for the film's lowered efficacy is unclear. One possibility is that the clip is simply too old. The experimental clip was derived from the 1979 motion picture "The Champ" (Lovell & Zeffirelli, 1979). Although the general themes of this movie (i.e., tragedy, loss) still have relevance, the clip is now 27 years old and its emotional potency may have decreased. Arguably, scenes of loss and tragedy depicted in film and television have become increasingly graphic and realistic over the last decade, and exposure to scenes of death via media avenues like the news is now commonplace. Frequent exposure to these scenes may have desensitised people to stimuli designed to evoke emotions like sadness, particularly within the context of film. Anecdotal comments made by participants during the debriefing phase of this study lend tentative support to this theory. Several participants noted that they expected the stimuli to be more disturbing and to involve real life scenes of death and tragedy.

The differential effects of the film in the present study may also be explained by cultural factors. The experimental clip had been previously standardised with individuals from varied cultural backgrounds (African American, Asian American, Hispanic, and German participants) (Gross & Levenson, 1995; Hagemann et al., 1999), but never on a New Zealand sample. It is possible that it simply takes more to evoke emotion in New Zealanders than in individuals of other cultures. In support of this perspective, some authors (e.g., King, 2003) argue that New Zealanders are a particularly reserved and stoic group when it comes to their emotions.

Whatever the reason for the diluted emotional effects observed in this study, the findings obtained suggest researchers should be cautious in assuming clips standardised in one cultural context will generalise to others. Further research is needed to develop more up-to-date standardised methods of evoking emotion that are appropriate for New Zealand based samples. The challenge will be in creating stimuli that are capable of evoking powerful emotions in an ethically sound manner.

A further limitation of the present study concerns the nature of the emotion regulation instructions, primarily their limited validation. Although the instructions were based on conceptualisations outlined in prior research and theory (e.g., Gross,

1998a; Levitt et al., 2004), and manipulation checks were put in place *during* the main experiment to assess their validity, no formal construct validation procedures were conducted *before* the main study. This is a potential limitation because the results of the manipulation checks indicated there were differences between instructional conditions in participants' reports of how easy they found the pre-film instructions to follow. For instance, reappraisal participants found their instructions significantly more difficult to follow than acceptance participants (although notably the mean ratings for both groups were on the easy side of the scale). Results of the manipulation checks also indicated there was a tendency for participants to use the strategies interchangeably, rather than in isolation, as was intended. For instance, participants in the reappraisal condition reported accepting their emotions a good deal of the time, while suppressors reported concurrent use of reappraisal strategies. This occurred in spite of the fact that participants in a given condition were not made aware of the alternative instructional conditions, and participants were requested not to discuss the nature of the study with others.

It is unclear why the emotion regulation strategies were used somewhat interchangeably. Perhaps the wording of the instructions was too broad and allowed multiple interpretations, or participants might simply have found it difficult to comply fully with instructions when these diverged markedly from their natural methods of responding to emotions, and unconsciously reverted to tried and true strategies. Alternatively, the manipulation checks employed may not have been a true and accurate measure of compliance. This is a possibility, as there was also limited construct validation of the manipulation checks. Whatever the reason, it seems possible that differences between the groups in their compliance with instructions may have altered or diluted the effects of these strategies. Potential confounds like these could be avoided in the future by conducting pilot research to establish the comprehensibility and perceived usefulness of instructions before conducting the main study.

External validity.

The external validity of the present findings was limited by the demographic characteristics of the sample, the laboratory based design, and the nature of the emotive stimulus. The sample recruited consisted of New Zealand psychology

students who were female, predominantly European, single, well-educated and both psychologically and physically healthy, thereby preventing the generalisation of findings beyond these groups. The importance of not making assumptions regarding the generality of findings to individuals with alternative demographic characteristics is highlighted by the findings of research by Keogh et al. (2005). They found that acceptance instructions were more effective in altering women's experiences of pain, than men's experiences.

The use of an experimental laboratory-based design raises particular issues regarding the validity of these findings for real life contexts. True experiments are often preferable to correlational designs as they allow greater control over variables and permit inferences of causation. However, the rigid and at times artificial nature of the laboratory means effects observed under these conditions may not always generalize to everyday contexts (Coolican, 1999). In the interests of enhancing external validity, an effort was made in the present study to create naturalistic conditions for evoking emotion. For instance, the laboratory was set up to resemble a living room and the lights were dimmed. In saying this, laboratory conditions can never fully replicate reality (humans are rarely attached to physiological equipment while watching a movie). Thus, the validity of the present findings beyond the laboratory should not be assumed.

The external validity of the present results is also limited by the decision to focus primarily on the emotion of sadness, and to use film as the evocative medium. There is no guarantee these results would be replicated in research exploring alternative emotive states and/or stimuli. Research conducted by Levenson et al. (1992) has suggested different emotion states are associated with different patterns of autonomic activity (e.g., heart rate acceleration was found to be greater for sadness than for disgust). Thus it is also conceivable that different emotions may interact with different regulatory strategies differently.

The above limitations highlight a need for further research that (a) examines the generality of the present findings to real life situations; (b) explores the impact of individual factors, like gender, age, culture, education, and health status; and (c) extends the range of emotive states explored and the type of stimuli used. Extending

the breadth and depth of inquiry will enhance understanding of the specific individuals and conditions for which these strategies are most effective.

It would be especially interesting to investigate the costs and benefits of these strategies for individuals with physiological or emotional profiles that diverge from the norm, for instance, individuals suffering from clinical disorders like major depression or dysphoria, or those with physiological characteristics, like hypertension, that place them at risk of cardiac difficulties. This may help further elucidate the connections between emotion regulation and physical/psychological functioning, and how these strategies contribute to the development, maintenance, prevention, or treatment of such problems.

It may also be pertinent to examine whether the benefits of acceptance for memory (identified in the present study) extend to individuals with mild neuropsychological deficits (e.g., mild traumatic brain injury, TBI). Individuals suffering from mild TBI often experience memory deficits accompanied by emotional difficulties (primarily depression or anxiety) (Snyder & Nussbaum, 2003). Hence an emotion regulation strategy (like acceptance) that improves their psychological status, while also enhancing their memory capabilities would be particularly useful.

Conducting research on the influence of individual differences in trait tendencies toward the use of avoidant versus non-avoidant regulatory strategies, and establishing whether these differences moderate the impact of emotion regulation on physiology, self-reported experience, or memory also represents a pertinent area of future inquiry. For instance, when people with high levels of trait experiential avoidance are instructed to use an incompatible emotion regulation strategy (e.g., acceptance), do they experience higher levels of physiological arousal than when using a strategy compatible with this trait (e.g., suppression)? Indeed, Gross and John (2004) have suggested a general tendency toward using a particular emotion regulation strategy may provide a practice advantage that makes it easier to employ that strategy when asked to do so, yet few studies have actually investigated these variables.

Future research focused on exploring the impact of these strategies on individuals of different ages also constitutes a salient area of future inquiry. The majority of participants in the present study were in the 18 to 30 age range, which precluded inclusion of age as a moderating variable. However, age is a salient avenue of further inquiry because only one study (that I am aware of) has explicitly explored age differences in the ability to regulate emotion and its effects (Kunzmann et al., 2005), and this study focused solely on the impact of suppression and amplification. Understanding the effect of these strategies in relation to sadness-based emotions for older adults may be particularly important, given that themes connected to sadness, such as loss, mortality, and regret, often become salient in later life. The generality of memory effects is of particular interest, as evidence suggests memory declines with age, but emotion regulation capabilities are unaffected (Kunzmann et al., 2005). Perhaps one way of enhancing the memory capabilities of older persons is to facilitate their use of memory enhancing strategies (e.g., acceptance), and decrease their use of memory inhibiting strategies (e.g., suppression). This hypothesis awaits investigation.

Investigating the impact of these strategies for individuals with differing cultural and spiritual beliefs may present another fruitful area of future research. Because acceptance-based interventions originated in the mediation practices used by Eastern religions like Buddhism, to some they may appear to contradict the values held by alternative religions, like Christianity. Acceptance interventions are based on the rationale that emotions are not inherently harmful; instead, it is the evaluations associated with them, and the subsequent attempts to avoid them, that cause harm. In contrast, biblical teachings suggest certain emotions (e.g., lust, envy, and jealousy) are inherently harmful, whether they are acted on or not. For example, Matthew 5.28 (King James Version) states that “whosoever looketh on a woman to lust after her hath committed adultery with her already in his heart” (p. 37). Thus, the benefits of acceptance for individuals with certain spiritual beliefs may be undermined by the guilt associated with accepting an emotion they have been taught is inherently unacceptable.

Additional Areas of Future Inquiry

Future research is also warranted that serves to extend the range of emotion manipulations used, broaden the types of dependent variables assessed, and explore the processes and boundary conditions that serve to mediate and moderate the impact of these strategies.

It would be interesting to vary the format or mode of delivery of emotion regulation instructions. Several authors have suggested that the impact of acceptance strategies may differ as a function of the form the emotion regulation instructions take (e.g., the length of instructions, whether training is provided, whether they incorporate metaphor) (e.g., Eifert & Heffner, 2003; Marcks & Woods, 2005). There is no conclusive agreement as to the most effective mode of delivering acceptance protocols, but some ACT theorists (e.g., Eifert & Forsyth, 2005) have suggested acceptance cannot be effectively engaged in using instructions alone, it must be experienced. This process is facilitated within an ACT model of therapy through the use of examples and metaphors. From this perspective, it seems that the brief instructions provided to participants in the present study may not have evoked acceptance in the true ACT sense (this may partially explain why the magnitude of effects obtained was smaller than those reported previously). However, no research to date has systematically assessed the impact of instructional form in a controlled way. Conducting such research may facilitate practitioners' ability to utilise acceptance techniques in a way that is optimally effective in promoting the psychological, physical, and cognitive wellbeing of their clients.

A related possibility that would extend the current knowledge base would be to assess the costs and benefits of specific combinations of emotion regulation strategies. As Eifert & Heffner (2003) pointed out, acceptance and control-based approaches to emotion regulation "are not mutually exclusive" (p. 309). This assertion is supported by the present finding that participants tended to use an overlapping range of techniques to regulate emotion. Thus, future research is necessary to establish the most effective combinations of strategies, and identify the point in the emotion generation process where each component is likely to have its optimal impact.

Future research would also be enhanced by extending the range of dependent variables studied. The present study was in many ways exploratory, in that the goal was to examine a variety of response systems, and identify the most promising areas of future inquiry. The effect sizes obtained for the memory variables in the present study suggest future research assessing the impact of acceptance, suppression, and reappraisal on cognitive functioning may be particularly fruitful. The present study solely focused on incidental recognition memory, and the specific processes mediating these effects were not assessed. Future research could build on these findings by investigating further aspects of cognitive functioning such as attention, explicit recall and recognition, procedural memory, and by attempting to delineate the processes mediating memory effects. Conducting such studies would assess whether the benefits of acceptance for cognition are global or restricted to specific areas of functioning.

Incorporating self-report measures that tap into the thought processes or cognitions mediating or moderating the impact of these strategies is also warranted. The trends observed in the present study suggest acceptance, suppression, and reappraisal strategies are not differentiated by their ability to reduce the intensity of emotions, but by the extent to which they serve to alter the unpleasantness of an emotive stimulus. This finding highlights a need to include in future research measures that not only address the type or intensity of emotions experienced, but also the more subtle flavours of emotions (e.g., the cognitions and level of distress associated with them). According to Eifert and Heffner (2005), emotions like sadness are not inherently harmful, but become so because of the verbal evaluative connotations associated with them (e.g., I am feeling so depressed I cannot leave the house). Thus, a salient measure of the effectiveness of an emotion regulation strategy may be to assess the particular cognitions connected to an emotion under different regulatory conditions.

The role cognitions play in emotion regulation could also be explored by assessing whether perceptions regarding the costs and benefits of regulating emotion moderate the effectiveness of a given strategy. In real life situations the costs and benefits of regulating emotion are likely to be more tangible than in an experiment. For example, failure to regulate feelings of anger toward an employee, child, or friend, is

likely to have more negative consequences than failure to regulate anger in an experiment. In experimental contexts participants may simply engage in emotion regulation because they are told to, rather than because they feel the need to – this could arguably change the effect of the strategy. Hence, in future it would be interesting to manipulate the perceived consequences of regulating emotion, and then assess its physiological, experiential, and cognitive consequences. This would expand knowledge regarding the conditions under which specific strategies are likely to be optimally effective.

Summary and Conclusions

The trends identified in the present study provide partial support for the view that the consequences of different emotion regulation strategies may vary depending on their emphasis on avoidance or control of emotions. Trends identified, via analysis of means and effect size statistics, indicated that suppression (an explicitly control-based method of regulating emotion) has little adaptive value. Not only did suppression fail to relieve the subjective components of emotion, it also served to heighten levels of physiological arousal, and degraded participants' ability to spontaneously recognise verbal information presented during the suppression period. Its one redeeming feature appeared to be a small enhancement of visual memory (relative to controls). These findings provide partial support for Hayes' (1999) theorem that attempts to control private emotional experiences are not the route to psychological and physical wellbeing, and that they may even be detrimental for some aspects of functioning.

However, findings pertaining to the impact of reappraisal (a more implicit control-based approach that seeks to alter the trajectory of emotion) suggest this theory may warrant slight modifications. Although, like suppression, reappraisal instructions led to a slight elevation in physiological arousal levels, reappraisal failed to induce the negative verbal memory effects found for suppression, and participants in this condition rated the emotive stimulus as more positive/pleasant. The finding that different methods of controlling emotion may have different effects is concurrent with Gross' (1998) supposition that different emotion regulation strategies have alternative effects depending on their primary point of impact on the emotion generation process. More specifically, they support the assertion that strategies that

seek to control the trajectory of emotion (before evocation of emotional response tendencies) have more salutary consequences than strategies that seek to inhibit emotional response tendencies once they have arisen.

Despite these findings, ironically, the trends observed for acceptance suggest strategies that dissuade individuals from attempting to control their emotions may be the most adaptive. Trends identified in the present study indicate that acceptance elicits similar effects to control-based approaches on a physiological level, and may even increase the intensity of emotions experienced. However, the benefits of acceptance strategies appear to lie in their ability to decrease the unpleasantness of an emotional stimulus and to enhance both visual and verbal facets of memory. Findings pertaining to the impact of acceptance provide tentative justification for the piloting of acceptance-based therapeutic techniques in the prevention and treatment of disorders for which sadness is a key component.

While the present study produced several results that were interesting and potentially informative, the implications derived from these findings are limited by the failure of effects to attain significance. The absence of statistically significant results raises questions regarding the reliability and hence validity of the findings, and thus precludes the formulation of solid research conclusions. More reliable estimates of population effects may be derived in the future by conducting replications of the present study using a larger sample size, or by integrating the results of several small scale studies in a meta-analysis.

As noted in the preceding section, the present results may be built on in future research by extending the range of emotions studied and the types of experimental manipulations used, incorporating more sensitive measures of physiological arousal, extending the range of self-report measures used, exploring the moderating impact of individual difference factors, conducting research in real life settings, and expanding the range of cognitive variables studied.

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Appendix A

Health Screening Questionnaire (HSQ)

The following questions pertain to your physical and psychological health. Please answer them as accurately as possible (circle your answer). Feel free to ask if something is not clear.

- Have you ever suffered from a psychological disorder (e.g., Major Depression, Alcohol Abuse/Dependence, Bipolar)? **YES / NO**

- Are you currently taking any of the following medications? **YES / NO**
 - Antidepressants

 - Antipsychotics

 - Anxiety Medications

- Are you currently receiving any form of psychotherapy? **YES / NO**

- Do you suffer from cardiovascular problems? **YES / NO**

- Have you ever suffered from a neurological disorder (e.g., stroke, head injury accompanied by loss of consciousness –greater than 30 minutes, epilepsy, brain tumour)? **YES / NO**

- Have you ever being diagnosed with a hereditary disease (e.g., Huntington's disease)? **YES / NO**

- Do you suffer from uncorrected deficits in vision or hearing (e.g., blindness, deafness, glaucoma)? If deficits are compensated for through the use of corrective eyewear or auditory aids please respond “NO” to this question. **YES / NO**
- Are you colour blind? **YES / NO**

Thank you for completing this questionnaire. Unfortunately, if you answered “YES” to any of the above questions you will not be eligible to participate in the study.

Appendix B

The Discrete Emotions Questionnaire (pre-film version)

Clip Number _____

The following questions refer to how you are currently feeling.

0	1	2	3	4	5	6	7	8
none								a great deal

Using the scale provided above, please indicate the amount of EACH emotion you are currently experiencing (write the appropriate number in the blank space provided below)

_____ amusement

_____ disgust

_____ relief

_____ anger

_____ embarrassment

_____ sadness

_____ arousal

_____ fear

_____ surprise

_____ confusion

_____ happiness

_____ tension

_____ contempt

_____ interest

_____ contentment

_____ pain

Are you currently feeling any other emotion? No Yes

If so, what is the emotion? _____

How much of this emotion are you feeling? _____

Discrete Emotions Questionnaire (post-film version)

Clip Number _____

The following questions refer to how you felt while watching the film.

0	1	2	3	4	5	6	7	8
none								a great deal

Using the scale provided above, please indicate the greatest amount of EACH emotion you experienced while watching the film (write the appropriate number in the blank space provided below).

_____ amusement	_____ disgust	_____ relief
_____ anger	_____ embarrassment	_____ sadness
_____ arousal	_____ fear	_____ surprise
_____ confusion	_____ happiness	_____ tension
_____ contempt	_____ interest	
_____ contentment	_____ pain	

- Did you feel any other emotion during the film? No Yes
 If so, what was the emotion? _____
 How much of this emotion did you feel? _____

- Had you seen this film before? No Yes

Appendix C

Memory Test

This is the final task of the experiment.

Instructions: Earlier you were shown a film clip of a young boy witnessing a man's death. The following questions refer to your recognition of information presented during the clip. Please circle the letter beside the statement that most accurately reflects what you saw or heard (only circle one answer per question).

Following completion of each memory item, using the scales provided, please rate how confident you feel about your answer. For example, if you are extremely confident your answer is correct you would circle number 6. If you are not at all confident your answer is correct you would circle 0 (see the example below).

0	1	2	3	4	5	6
Not at all Confident						Extremely Confident

Please record an answer for each and every question. If you are unsure have a guess. There is no time limit for this task. Complete it at your own pace.

Once you have completed the task, please indicate you are finished via the intercom, and then remain seated until further instructions are provided by the experimenter.

1. The central character in the film was a young boy. What was his name?

- a Billy
- b Tim
- c TJ
- d James
- e None of the above

Using the scale provided below, please rate how confident you are that the answer you just gave is correct (circle your answer).

0	1	2	3	4	5	6
Not at all Confident						Extremely Confident

2. What was the colour of the tee shirt the boy was wearing throughout the clip?

- a Grey
- b Black
- c White
- d Red
- e Green

Using the scale provided below, please rate how confident you are that the answer you just gave is correct (circle your answer).

0	1	2	3	4	5	6
Not at all Confident						Extremely Confident

3. What colour was the boy's hair?

- a Brown
- b Blonde
- c Black
- d Ginger
- e Red

Using the scale provided below, please rate how confident you are that the answer you just gave is correct (circle your answer).

0	1	2	3	4	5	6
Not at all Confident						Extremely Confident

4. The film also depicted an injured man. What was the location of the injured man's open wound?

- a Chin
- b Forehead
- c Nose
- d Eye
- e None of the above

Using the scale provided below, please rate how confident you are that the answer you just gave is correct (circle your answer).

0	1	2	3	4	5	6
Not at all Confident						Extremely Confident

5. As the injured man lay on the table what did his head rest on?

- a An item of clothing
- b Bag
- c Pillow
- d Towel
- e The bare table

Using the scale provided below, please rate how confident you are that the answer you just gave is correct (circle your answer).

0	1	2	3	4	5	6
Not at all Confident						Extremely Confident

6. What was the last phrase the boy said to the injured man before he died?

- a "You did it Champ"
- b "I'll always love you Champ"
- c "A Champ never dies"
- d "Don't leave me Champ"
- e "The Champ always comes through"

Using the scale provided below, please rate how confident you are that the answer you just gave is correct (circle your answer).

0	1	2	3	4	5	6
Not at all						Extremely
Confident						Confident

7. What colour was the injured man's hair?

- a Black
- b Brown
- c Blonde
- d Red
- e Grey

Using the scale provided below, please rate how confident you are that the answer you just gave is correct (circle your answer).

0	1	2	3	4	5	6
Not at all						Extremely
Confident						Confident

8. What was the relationship of the injured man to the young boy?

- a Uncle
- b Father
- c Coach
- d Grandfather
- e Friend

Using the scale provided below, please rate how confident you are that the answer you just gave is correct (circle your answer).

0	1	2	3	4	5	6
Not at all Confident						Extremely Confident

9. During the film, after the injured man appeared to die, a broad shot of the entire setting was shown briefly. During this shot, a man is depicted to the left of the screen (the viewers left) standing next to the table on which the dead man lies, holding an object across his midriff. Which of the following items was he holding?

- a Coat
- b Bag
- c Hat
- d Scarf
- e None of the above

Using the scale provided below, please rate how confident you are that the answer you just gave is correct (circle your answer).

0	1	2	3	4	5	6
Not at all Confident						Extremely Confident

10. The room in which the scene took place contained a single light. Where was that light located?

- a Directly above the table on which the man lay
- b On the left wall (your left)
- c On a coffee table situated in the corner of the room
- d On the wall directly behind the table
- e There was no light

Using the scale provided below, please rate how confident you are that the answer you just gave is correct (circle your answer).

0	1	2	3	4	5	6
Not at all						Extremely
Confident						Confident

11. Directly following the man's death, the boy is depicted standing in front of a man who has a towel draped around his neck. What colour was the towel?

- a Grey
- b Green
- c Brown
- d Red
- e White

Using the scale provided below, please rate how confident you are that the answer you just gave is correct (circle your answer).

0	1	2	3	4	5	6
Not at all						Extremely
Confident						Confident

12. After the injured man closes his eyes and dies, the boy approaches him again. What does he say to the dead man?

- a "Wake up wake up, don't sleep now, you gotta go home".
- b "Don't go, please don't go, I need you".
- c "You did us real proud Champ"
- d "Goodbye Champ"
- e None of the above

Using the scale provided below, please rate how confident you are that the answer you just gave is correct (circle your answer).

0	1	2	3	4	5	6
Not at all						Extremely
Confident						Confident

13. As the boy begins to realise the man is not coming back, he approaches three men. What was the name of the first man he approached?

- a Georgie
- b Johnnie
- c Bill
- d Bruce
- e Larry

Using the scale provided below, please rate how confident you are that the answer you just gave is correct (circle your answer).

0	1	2	3	4	5	6
Not at all						Extremely
Confident						Confident

14. Of the following statements, which one most accurately reflects what the boy said to this man?

- a "Don't cry"
- b "Wake him up"
- c "Help him"
- d "Do something"
- e None of the above

Using the scale provided below, please rate how confident you are that the answer you just gave is correct (circle your answer).

0	1	2	3	4	5	6
Not at all Confident						Extremely Confident

15. What was the name of the third man approached by the boy, following the injured man's death?

- a Roger
- b Peter
- c John
- d Jackie
- e Georgie

Using the scale provided below, please rate how confident you are that the answer you just gave is correct (circle your answer).

0	1	2	3	4	5	6
Not at all Confident						Extremely Confident

16. Of the descriptions provided below, which most accurately describes the appearance of the man referred to in question 15?

- a A full head of hair, wears glasses, between the ages of 15 and 40
- b A full head of hair, between the ages of 40 and 65, without glasses
- c Bald, between the ages of 40 and 65, without glasses
- d Bald, between the ages of 15 and 40, with glasses
- e None of the above

Using the scale provided below, please rate how confident you are that the answer you just gave is correct (circle your answer).

0	1	2	3	4	5	6
Not at all						Extremely
Confident						Confident

Appendix D

Standardised Instructions for Participants in the Pilot Study

Hi, what follows are standardized instructions regarding what to expect during this session. The study you are participating in involves establishing the validity of a series of questionnaires designed to assess feelings and perceptions in response to an emotionally arousing film clip.

During this session you will be shown a brief film clip. Following this clip, you will be asked to complete a series of questionnaires asking you about the intensity of certain emotions experienced during the clip, and your general perceptions of what was seen. All experimental instructions will be provided via the television monitor.

Prior to starting this experiment you will be provided with a series of booklets numbered 1 to 3. These contain the questionnaires for this study. It is **very important** that you do not open these booklets until instructions on the television monitor indicate you may do so.

If you have any questions or concerns feel free to ask me.

Appendix E

Information Sheet (Pilot Study)

My name is Sarah Malthus, and I am a graduate student in the Psychology Department at Massey University (Palmerston North). I am currently undertaking research toward completion of a Masters degree, for which I am seeking participants.

The study in which you are invited to participate involves establishing the validity of a series of questionnaires designed to assess feelings and perceptions following exposure to an emotionally arousing film clip. This study is essentially a pilot project, which will be used to select measures for a larger study - investigating the impact of various emotion regulation strategies on physiology, emotional experience, and cognition. This research will be conducted under the supervision of Dr Patrick Dulin who may be contacted at the School of Psychology, Massey University, Private Bag 11 222, Palmerston North.

Participation is currently being sought from 10 female undergraduate students within the School of Psychology at Massey University (Turitea campus).

Participation is subject to meeting pre-specified inclusionary criteria. Prior to participating in the study, all volunteers will be asked to complete a Health Screening Questionnaire (pertaining to physical and psychological health). If you are affected by psychological disorders, cardiovascular problems, hereditary diseases, uncorrected visual/hearing deficits, neurological disorders, or are currently receiving psychotherapy – unfortunately you will not be eligible to participate. These criteria are in place to ensure the health and safety of all involved.

Participant Involvement

- All data collection sessions will be conducted at the experimental laboratory located at The School of Psychology, Massey University. The time requirement for this session is 30 – 40 minutes.
- During this session you will initially be asked to complete a demographic questionnaire pertaining to general information (i.e. gender, age, ethnicity and

handedness). You will then be exposed to a brief film clip designed to arouse an emotional state. Following this, you will be requested to complete a series of questionnaires pertaining to the intensity of specific emotions experienced (i.e. sadness, anger) during the clip, and your general perceptions of what was seen.

- In return for participating in this study, you will be provided \$10 to cover travel expenses/time. This can be obtained by filling out a payment slip provided with your final questionnaires.
- Although it is not anticipated there will be any personal distress or harm resulting from participation, some participants may experience mild emotional discomfort. If any distress or discomfort is experienced, the details of support individuals/agencies that can be contacted are provided at the bottom of this form.
- No student will be disadvantaged by this research, as neither grades or academic relationships with departments/schools or staff with whom you interact will be affected by refusal or agreement to participate
- All data obtained from this study will be confidential. Data will be identified as a code only and will not be attached to any particular individual. All information obtained will be securely stored following completion of data collection procedures, and destroyed after the 5-year holding period outlined in the Massey University Policy on Research Practice, Section 2.2.
- A summary of project findings can be obtained by filling out the appropriate section at the bottom of the participant consent form. A summary will be sent out upon research completion.

Your Rights

You are under no obligation to accept this invitation. If you decide to participate, you have the right to:

- Decline to answer any particular question
- Withdraw from the study at any time
- Ask any questions about the study at any time during participation;
- Provide information on the understanding that your name will not be used unless you give permission to the researcher
- Be given access to a summary of the project findings when it is concluded.

If you are interested in being involved in this project, please approach me to collect a Consent Form and Health Screening Questionnaire. If after reviewing this information you wish to participate in the study, please contact me (on the number provided below) to arrange a convenient time to attend a data collection session. Your completed Health Screening Questionnaire and Consent Form will be collected at the start of this session.

If you require any further information or have any concerns regarding this study, please feel free to contact me on [REDACTED]

If any distress or discomfort is experienced as a result of participation in this study, please contact either myself, Dr Patrick Dulin (supervisor) on 3569099 ext 2060, Dr Shane Harvey (supervisor) on 3569099 ext 7171, or the Massey University Student Counselling Service on 3505935.

This project has been reviewed and approved by the Massey University Human Ethics Committee, Palmerston North Application 05/102. If you have any concerns about the ethics of this research, please contact Dr John G O'Neill, Chair, Massey University Campus Human Ethics Committee: PN, telephone 06 350 5799 x 8635, email humanethicspn@massey.ac.nz

Appendix F

Frequency and Percentage of Correct Responses for Individual Memory Items in the Pilot Study

Item number	Frequency of correct responses (0 – 5 range)	Percentage
1	4	80
2	5	100
3	4	80
4	4	80
5	1	20
6	2	40
7	4	80
8	2	40
9	3	60
10	4	80
11	3	60
12	3	60
13	2	40
14	1	20
15	2	40
16	2	40

Appendix G

Exit Questionnaire

Instructions: The following questions refer to your perception and understanding of instructions presented directly prior to viewing the **second** film clip. Please record an answer for each and every question.

1. Using the scale provided below, please indicate how useful the instructions provided prior to the film were in helping you deal with any emotions that arose during the film (circle your answer).

0	1	2	3	4	5	6	7	8
very helpful								very unhelpful

2. Using the scale provided below, please indicate how easy you found it to follow the instructions provided for viewing the film (circle your answer).

0	1	2	3	4	5	6	7	8
very easy								very difficult

3. Using the scale provided below, please indicate your level of agreement with the following statements (write the appropriate number in the blank space provided).

0	1	2	3	4	5	6	7	8
totally disagree								totally agree

- a) _____ While watching the film, I pushed away or got rid of feelings and emotions as they emerged.
- b) _____ While watching the film, I thought about what I was seeing in an objective detached manner.
- c) _____ While watching the film, I allowed myself to experience and accept emotions that emerged
- d) _____ While watching the film, I allowed myself to react in a natural way.
4. This study is interested in how people manage their emotions. While watching the film clip, did you use any other methods of managing your emotions than those already described in question 3 (circle your response)? **YES / NO**

If you responded "YES" to the above question, please provide a brief description of the other method/s you used to manage your emotions.

Appendix H

Information Sheet (Main Study)

My name is Sarah Malthus and I am a graduate student in the Psychology Department at Massey University (Palmerston North). I am currently undertaking research toward completion of a Masters degree, and I am inviting undergraduate students within the School of Psychology at Massey University to participate. My research involves comparing the costs and benefits of various emotion regulation strategies for physiology, emotional experience and cognition. I am working in collaboration with another graduate student Daniel Kerr on aspects of this project. Both Daniel and I will have access to the information participants provide. This research will be conducted under the supervision of Dr Patrick Dulin, who may be contacted at The School of Psychology, Massey University, Private Bag 11 222, Palmerston North.

Participation is sought from 80 female undergraduate students. This number is required to obtain statistically significant results.

Participation is subject to meeting pre-specified inclusionary criteria. Prior to participating in the study, you will be asked to complete a Health Screening Questionnaire. If you are affected by psychological disorder/s, alcohol dependence/abuse, cardiovascular problems, hereditary diseases, uncorrected visual/hearing deficits, neurological disorders, or are currently receiving psychotherapy – unfortunately, you will not be eligible to participate. These criteria are in place to ensure the health and safety of all involved.

Participant Involvement

- Data collection sessions will be conducted individually in the Experimental Laboratory located at The School of Psychology, Massey University. The time requirement for this session is 1 to 1 ½ hours.

- At the start of this session you will be seated in-front of a television screen and a series of physiological sensors will be attached. These are designed to assess heart rate and skin conductance levels.
- During the session you will be shown 2 brief film clips. Prior to viewing each clip, you will be requested to complete a questionnaire asking you to rate how you are feeling across a variety of dimensions (i.e. anger, sadness). You will then be provided instructions regarding how you should view the clip.
- Following presentation of each clip, you will be also be asked to complete a series of questionnaires pertaining to the emotions you experienced during the film, compliance with instructions, familiarity with the film, and general perceptions.
- In return for your participation, you will be provided \$10 to cover travel expenses/time. This can be obtained by filling out a form provided with your final questionnaires.
- Although it is not anticipated that there will be any personal harm or distress resulting from participation, some individuals may experience mild emotional discomfort. If any distress or discomfort is experienced, the details of support individuals/agencies that can be contacted are provided at the bottom of this form.
- No students will be disadvantaged by this research, as neither grades nor academic relationships with departments/schools or staff will be affected by refusal or agreement to participate.
- All data obtained from this study will be confidential. Data will be identified as a code only. Although these codes will initially be attached to a list of participant's names (throughout the experimental procedures), this information will be destroyed directly following completion of the data collection phase.

- All information will be securely stored following the study, and destroyed after the 5 year holding period outlined in the Massey University Policy on Research Practice, Section 2.2.
- It is possible that the results of this study will be published in a scientific journal; however, your identity would not be disclosed.
- A summary of the project findings can be obtained by filling out the specified section at the bottom of the Participant Consent Form. A summary will be sent to you upon completion of the research.

Your Rights

You are under no obligation to accept this invitation. If you decide to participate, you have the right to:

- Decline to answer any particular question;
- Withdraw from the study at any time
- Ask any questions about the study at any time during participation;
- Provide information on the understanding that your name will not be used unless you give permission to the researcher;
- Be given access to a summary of the project findings when it is concluded

If you are interested in being involved in this project, please approach me to collect a Health Screening Questionnaire and Consent Form. If after reviewing this information you wish to participate in the study, please contact me (on the number provided below) to arrange a convenient time to attend a data collection session. Your completed Health Screening Questionnaire and Consent Form will be collected at the start of this session.

If you require further information, or have any queries/concerns regarding this study, please feel free to contact me on [REDACTED].

If you experience any distress or discomfort as a result of participation in this study, please contact either myself, Dr Patrick Dulin (supervisor) on 3569099 ext 2060, Dr Shane Harvey (supervisor) on 3569099 ext 7171, or the Massey University Student Counselling Service on 3505935.

This project has been reviewed and approved by the Massey University Human Ethics Committee, Palmerston North Application 05 /102. If you have any concerns about the ethics of this research, please contact Dr John G O'Neill, Chair, Massey University Campus Human Ethics Committee: PN, telephone 06 350 5799 x 8635, email humanethicspn@massey.ac.nz

Appendix I

Participant Consent Form

This consent form will be held for a period of five (5) years

I have read the Information Sheet and have had the details of the study explained to me. My questions have been answered to my satisfaction, and I understand that I may ask further questions at any time.

I agree to participate in the study under the conditions set out in the Information Sheet.

Signature: **Date:**

Full Name – printed

Postal Address:

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

Please indicate if you would like to receive a summary of the results of this study
YES / NO.

If you have any concerns or questions regarding this project, please feel free to contact Sarah Malthus on [redacted] [redacted]

Appendix J

Standardised Instructions (Main Study)

What follows are standardised instructions regarding what you expect during this session. The study you are participating in involves comparing the costs and benefits of various emotion regulation strategies.

At the start of this session you will be asked to complete a series of brief questionnaires to provide us with some general information about you.

Once you have completed these measures, physiological sensors will be attached to your left earlobe and the fingers of your non-dominant hand. You may attach these sensors yourself under the experimenter's guidance. It is important that once the sensors are attached you try to keep that hand as still as possible.

You will then be provided a series of booklets numbered 1 to 7. These contain the remaining questionnaires for this study. It is **very important** that you do not open these booklets until you are instructed to do so.

During the remainder of the session you will be shown some brief film clips. Before and after each clip you will be requested to complete questionnaires asking you about the intensity of certain emotions experienced during the film, and your general perceptions of what was seen. Experimental instructions for this phase of the study will be provided via the television monitor. The experimenter will not be in the room at this time, and will not be able to observe you.

Please complete all of the questionnaires. Once you have completed the experimental tasks- indicate you are finished via the intercom, then remain seated until the experimenter returns.

If you experience any distress during the study, or wish to withdraw at any point, you can signal the experimenter by saying "stop" into the intercom.

