IN THE MOOD TO FORGET: PARADIGMATIC AND INDIVIDUAL DIFFERENCES IN REMEMBERING AND FORGETTING NEGATIVE SELF-RELEVANT MEMORIES

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By

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ABSTRACT

Although forgetfulness is a common and naturally occurring phenomenon, research suggests that it can be intentionally induced using several experimental paradigms. For some individuals, the ability to forget negative thoughts, images, or memories is problematic. That is, the inability to forget may be a source of significant psychological distress (e.g., post-traumatic stress, obsessive-compulsiveness, and depressed mood) that contributes to the maintenance of symptoms of various mental health disorders. The *schema-activation hypothesis* from Beck's (1987) Cognitive Theory of Depression suggest that memories should be more readily brought to mind because they are more readily available through associated activation. Thus, negative memories may be difficult to inhibit (forget), for individuals who are depressed compared to non-depressed counterparts.

Indeed, suppression effort (the intentional mental effort to not think about something) often leads to an increase in the very cognitive content targeted for forgetting. For individuals who experience depression or dysphoria, suppression is not effective because the negative cognitive content, which is the hallmark the depressed mood state only serves to maintain or exacerbate the mood state. This raises the question of whether there are alternatives to suppression-like paradigms that may be more efficacious for those who are dysphoric or depressed. Investigating the efficacy of induced-forgetting of negative memories may provide researchers and clinicians with additional avenues to explore the therapeutic

potential of induced forgetting as an intervention or preventive strategy in combating depressed mood states.

The purpose of the present study was threefold: first, this study examined whether individual differences (e.g., mood state) in a person's ability to call to mind (remember) negative self-relevant memories would affect memory generation time. Second, the implications of differences in mood for the efficacy of two experimental forgetting paradigms – Directed Forgetting (DF) and Retrieval Induced Forgetting (RIF) were explored. Finally, individual differences in mental control (i.e., perceived mental controllability, mental control strategies, and rumination as a coping response) were examined in terms of their ability to predict who would be better at remembering and forgetting.

University students (N = 103) with high and low levels of symptoms of dysphoria were asked to generate a set of 32 negative memories using cue words. After rating their memories for clarity and negative valance, each set of memories was subject to either a Directed Forgetting or Retrieval-Induced Forgetting procedure. Participants also completed self-report measures of mental control and rumination.

Individuals who were dysphoric were similar to those who were non-dysphoric in the amount of time it took to generate a set of 32 negative memories. These results failed to support the tenets of the Schema Activation Hypothesis of Beck's (1967) Cognitive Theory of Depression. Subsequent analysis revealed that the act of generating negative memories was mood-inducing, which may have

negated the effect of mood on generation time. In terms of the effect of mood on induced-forgetting paradigm efficacy, the analysis yielded several null findings. The insufficient power prohibited the ability to detect small effects.

Dysphoric individuals evidenced deficits in forgetting for the directed-forgetting but not the retrieval-induced forgetting paradigm, but only when separate analysis of individual paradigms was undertaken. In this case, the effect of mood on forgetting approached significance for the directed-forgetting paradigm but not the retrieval-induced forgetting paradigm. This suggests that inducing forgetting for those who are dysphoric is more likely to be successful if there is no instruction to "forget." Finally, it was predicted that poor perceived mental control, a tendency to ruminate, and the use of mental control strategies would correlate with induced-forgetting. Results suggest that individuals who perceive themselves as poor at controlling mental content, and ruminate about their internal experience of sadness are impaired on recall of negative autobiographic memories when asked to forget them. In contrast, mental control variables were not related to the degree of forgetting using retrieval-practice methodology.

The results of this study have implications for future research designed to further explore the therapeutic value of induced-forgetting, particularly for the RIF paradigm. That is, the presence of a retrieval-induced forgetting effect for those who are dysphoric could prove to be a beneficial coping strategy to combat unwanted negative memories. It may be important to study the longitudinal value,

as well as explore the potential benefits for other psychologically distressing phenomena in which negative memories are a part (e.g., post-traumatic stress).

That cognitive factors, such as mental control and ruminative coping, do not share a relationship with degree of forgetting in the RIF paradigm also bodes well in demonstrating a possible therapeutic advantage for RIF compared to DF. Researchers are advised to consider mood and mental control variables in terms of their potential effects on forgetting paradigm efficacy when selecting their methodology in studies of intentional forgetting. This is particularly important when using a university sample of participants. It is often the case with experimental research, that a university sample is used. Given the higher rates of dysphoria and self-reported depressive symptoms that tend to typify university students and therefore, may be higher than in community-based samples, researchers are cautioned to consider the implications of dysphoria on research outcomes when testing induced-forgetting paradigms.

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DEDICATION

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CHAPTER 1: IN THE MOOD TO FORGET: PARADIGMATIC AND INDIVIDUAL DIFFERENCES IN REMEMBERING AND FORGETTING NEGATIVE SELF-RELEVANT MEMORIES

Is forgetfulness a bad thing? Forgetting is a common and naturally occurring phenomenon, which is generally viewed as a negative cognitive event. However, research has suggested that it can be intentionally induced in laboratory settings (see MacLeod, 1998 for a review) and this raises an interesting question as to why one would want to intentionally induce a cognitive phenomenon perceived as negative. Some individuals may be unable to forget negative thoughts, images, or memories. This inability can become problematic, and may actually maintain or exacerbate the resulting psychological distress (e.g., post-traumatic stress, obsessive-compulsiveness, and depressed mood). Indeed, the American Psychiatric Association (APA; 2000) recognizes negative thoughts, images, and memories at the symptom level of many mental health disorders (e.g., Post-Traumatic Stress Disorder, Obsessive-Compulsive Disorder and Major Depressive Disorder). Thus it would seem that for some individuals, ridding the mind of distressful negative cognitions may prove important to the reduction of psychological distress.

Depression and dysphoria are particular psychological issues in which negative cognitions often hallmark the flow of conscious thought (Clark & Rhyno, 2005). Because negative thoughts, images, and memories are associated with a decline in mood (Wenzlaff, 2005), an individual who experiences

depression or dysphoria is more likely to need to exert greater mental control in an effort to inhibit or suppress negative cognitions. Wegner (1994) theorized that trying hard not to think about something serves, paradoxically, to increase the accessibility and frequency of thoughts targeted for suppression. Wegner called this process the *Ironic Process Theory* (1994).

Subsequent research has found that greater effort to suppress is more likely than not to lead to an increase in the very cognitions one is trying to suppress (Wenzlaff & Wegner, 2000) – a phenomenon called *rebound effect*. The result then, of the *ironic processes* of thought suppression, is the exacerbation of depressive symptoms (Rude, Wenzlaff, Gibbs, Vane, & Whitney, 2002) and the possibility of a resulting clinically depressed state (Rude, Valdez, Odom, & Ebrahimi, 2003). This raises the interesting question of whether there is a way to rid the mind of negative cognitive content that does not involve an explicit instruction to "not think about it."

There is a plethora of research on the risk and vulnerability factors associated with a depressed mood state. Numerous studies have been conducted addressing assessment issues (e.g., Reynolds & Kobak, 1998) and treatment outcomes (see Hollon, Haman, & Brown, 2002 and Weissman & Markowitz, 2002 for complete reviews of treatment efficacy issues). Further, theoretical models of depression assert various mechanisms of the causes, course, and outcomes. Research on the nosology and phenomenology of depression over the last half a century has been contradictory, suggesting disagreement among researchers on

the relevance of specific symptoms that constitute the disorder. This disagreement has given rise to a host of therapeutic interventions (e.g., pharmacological, cognitive, behavioural, and interpersonal) that target different aspects of depression. However, most researchers and practitioners agree that although somatic symptoms (e.g., sleep disturbance, loss of energy, and appetite disturbance) are an important part of the depressed individual's experience, so too are the psychological or subjective aspects of the disorder (e.g., inability to concentrate or focus; negative thinking, and feelings of worthlessness) (Clark, Beck, & Alford, 1999). Indeed, Clark, Beck, and Alford (1999) admonished that cognitive phenomena have been largely neglected in the study of depression and dysphoria.

A great deal of research has highlighted the important role of cognition in the onset and maintenance of mood disturbance (see Clark, Beck, & Alford, 1999 for a review). Among this research is the Cognitive Theory of Depression (Beck, 1967). Thus, the present study employed this theory with a specific focus on the *schema activation hypothesis* and the *mood-congruent memory bias* (both of which are discussed in subsequent sections of the present chapter) as a theoretical foundation. With this in mind the present study aimed to elucidate relationships among dysphoric mood, individual cognitive differences in mental control, and aspects of memory (e.g., remembering, and forgetting).

The primary purpose of the present study was to evaluate the effect of dysphoric mood on two aspects of memory: 1) the differential ability of

individuals who are dysphoric versus those who are non-dysphoric to generate negative memories and 2) the subsequent ability of these same individuals to then be induced to forget. This was done by directly comparing two different experimental forgetting paradigms in terms of the ability to induce successful forgetting of a specific type of cognition – negative autobiographic memories. Specifically, this study examined the relative efficacy of a forgetting paradigm in which individuals receive explicit instructions to either forget or remember a portion of their memories compared to a forgetting paradigm that does not rely on explicit instruction to forget. In addition, several key cognitive factors known to be associated with depression and dysphoria were also examined to determine which factors, if any, would best predict aspects of induced-forgetting and generation of negative memories.

The organisation of the first chapter contextualizes the present study within the phenomenology of depression in terms of the nature of the problem of depression and how it is conceptualized. Consequently, the chapter begins with a review of depression and dysphoria, which provides the context for an operational definition of dysphoria. Next, Beck's (1967) Cognitive Theory of Depression is described and the elements of the theory most significant to aspects of memory function are examined in light of what might be predicted about aspects of the act of remembering and forgetting. The literature on induced-forgetting is then examined, with particular attention paid to forgetting self-relevant memories. Once the aforementioned contexts have been established,

an overview of the importance of studying forgetting in the context of dysphoria follows. Attention is then given to some of the cognitive factors related to depression in order to examine how they might relate and thus, help to predict successful remembering and forgetting. The chapter concludes with a description of the rationale for the present study, the research questions that this study addressed, and the specific hypotheses that have been evaluated.

1.1 When Dysphoria Becomes Depression

Prolonged sadness may lead to the onset of increasingly more severe symptoms of dysphoria, which then could ultimately lead to clinical depression. Studying the affect of dysphoria on induced-forgetting may be an important addition to our current knowledge on depression for several reasons. First, the reported rates of depressive symptoms and major depression have risen over the past several years (Statistics Canada, 2003). Thus, it is essential to find ways to ameliorate mild to moderate symptoms of dysphoric mood before they become severe. Second, we now recognize depressive deficits and disorders in children and thus, the age of onset may be earlier than previously thought. Perhaps the earlier preventive strategies can be identified and implemented, the less vulnerable individuals may be to depression through adulthood. Third, depressed mood and major mood disorders results in many economic and psychosocial costs. Finally, relapse rates for depressive episodes are high despite the apparent efficacy of Cognitive-Behavioural Therapy (CBT) and

pharmacological intervention. Induced-forgetting may provide researchers with an additional avenue to explore possible techniques to aid in treatment.

Statistics Canada (2003) reported that over 4 percent of the population age 12 and over have experienced symptoms associated with depression in the past year. Thus, there is a fairly high rate of dysphoria. An additional 7.1 percent of the population is likely to experience a depressive episode at some point in their lives (Statistics Canada, 2003). This is a significant increase in the percentage of individuals at risk for depression from the 5.2 percent reported in 1995. The World Health Organization (2004) predicted that depression will become the second leading cause of disability, next to work-related accidents, worldwide over the next 2 decades.

While the prevalence rate of clinical depression in preschool children is reportedly less than 1 percent (Kashani & Carlson, 1987), for school age children the rate is estimated to be between 2 and 8 percent (Costello, Angold, Burns, Stangl, Tweed, et al. 1996). At the onset of adolescence, the prevalence rate increases dramatically (8.3 to 18.5%: Birmaher, Ryan, Williamson, Brent, Kaufman, Dahl, et al. 1996). In addition, it is at the onset of puberty that the gender ratio of 2:1 in rates of depression for females and males, respectively, begins to emerge and carries through to adulthood (Nolen-Hoeksema & Girgus, 1994). The Canadian 12 month prevalence rate for major depressive disorder (MDD) in adults ranges from 5.5 to 13.2 percent for women, and 3.4 to 7.5 percent for men (Beaudet, 1996; DeMarco, 2000).

Kolvin and Sadowski (2001) reported that 15 to 40 percent of adolescents experience mild (dysphoria) to moderate depressed mood. Similarly, parent reports suggested that 20, 40, and 50 percent of pre-school, primary school-aged, and secondary school-aged children, respectively, experience mild to moderate levels of dysphoria (Kolvin & Sadowski, 2001). In one study, 27 percent of a university–aged student sample was found to experience mild to moderate levels of depressed symptoms (Rhyno, Clark, & Purdon, 2003). These rates, contextualized in the view of the dysphoria - depression continuum (this concept explained on p. 10), highlight the growing concern about the projected increases in reported rates of depression and dysphoria over the next 20 years.

The economic impact of these staggering rates to the healthcare system is estimated in the billions of dollars (Statistics Canada, 2003). In addition, psychosocial outcomes for early onset depression are particularly grim. The outcomes include a higher rate of suicide attempts, recurrence of depression, alcohol and substance abuse, lower educational and career achievements, and various other psychological and social impairments (Weissman, Wolk, Goldstein, Moreau, Adams, et al. 1999). The increasing rate of reported depression coupled with decreasing age at which we recognize the presence of depression, make the study of depression a timely and important endeavour.

Treatment efficacy and high relapse rates are also of paramount concern in depressive disorders. Gitlin (2002) reported that 35 to 40 percent of depressed individuals fail to respond to pharmacological intervention. In contrast to

pharmacological interventions, Cognitive-Behavioural Therapy (CBT) and Interpersonal Therapies (IPT) have also demonstrated comparable treatment efficacy to medication (e.g., Blackburn & Moore, 1997; Gaffan, Tsaousis, & Kemp-Wheeler, 1995; Jarrett, Basco, Riser, et al. 1999). The combination of pharmacological and psychological intervention often produces efficacious treatment outcomes. While up to 60 percent of individuals seeking treatment for depression benefit from current interventions, some individuals do not. Response to treatment may depend in part on whether symptoms are mild, moderate, or severe. Further, the relapse and recurrence rate for clinical depression, as reported by Boland and Keller (2002) from the Collaborative Depression Study conducted in 1973, are staggering in terms of the short-term and long-term recurrence rates. For example, after 2 years the rate of recurrence was 25 to 40 percent; after 5 years, the recurrence rate was 60 percent; after 10 years, 75 percent; and after a period of 15 years the reported recurrence rate was 87 percent.

Although statistics Canada reports an increase in rate of depression, there is some question about whether this reflects a true increase (i.e., more people are depressed today than were depressed in years past). It is possible that the increase is due to the normalization of a dysphoric state. Specifically, perhaps more people are willing to report their mood state and depressive symptoms. Such willingness to report may be due to the influence of a recent influx of drug

commercials and other media that “normalize” dysphoric mood, making it a more socially acceptable phenomenon today compared to 10 to 20 years ago.

Alternatively, an increase in reported rates may reflect the growing trend in society today towards pathologising what may otherwise be normal sadness. There appears to be a growing message that individuals need to be happy, that happiness is normal, that feeling sad is bad, and thus, advertising appears to be oriented towards the elimination of negative affect (including sadness). One particular therapeutic model, Acceptance and Commitment Therapy (ACT: Hayes & Strosahl, 2004) differs from traditional cognitive therapeutic approaches in an important way. As an alternative to teaching an individual to better control thoughts, feelings, sensations, memories and other private events, ACT schools individuals in how to notice, without negative evaluation, accept, and even embrace private experiences, including emotional experiences that are unwanted (e.g., Hayes, Strosahl, Wilson, 2003; Hayes & Spencer, 2005). The tone of ACT sets a new precedent that is counter intuitive to the obvious “feel good” agenda that appears to be promoted within the main stream culture (that negative emotions are a normal part of experience and do not need to lead to mental health issues). This raises the distinct possibility that rather than normalize dysphoria as the common cold of mental health, society has in turn, sent a strong message that sadness is abnormal.

It is also important to note that the rise in reported rates of depression and depressive symptoms does not necessarily mean “clinical depression.” Rather, it

likely reflects the varying degrees of dysphoria, because statistics come from census self-reports and are not based on clinical interviews or other standardized tests that assess clinical depression. This highlights the importance of operationalising the construct of depression (an operational definition is provided in a subsequent section). It is to the issue of what the definition of depression and dysphoria is that attention is now turned.

1.2 Depression and Dysphoria

What do we mean when we say "depression"? The answer to this question has been the focus of much debate and influences how depression is understood and studied. Clarification of the definitional properties of depression aid in understanding the perception that reported rates of depression and depressive symptoms are on the rise in the general population. The impact of depression in terms of its overall economic and psycho-social costs depends, in part, on how it is defined.

Sadness is a normal and common emotional experience for most individuals across the lifespan. When sadness is prolonged and accompanied by a specified set of somatic, cognitive, and subjective symptoms, such as those specified in the Diagnostic and Statistical Manual of Mental Disorders-Text Revision (DSM-TR; American Psychiatric Association, 2000), it becomes a more serious mental health problem. In fact, over the past decade or so, depression has become the most common cause of disability facing Canadians (Patten & Ruby,

2008). Whether it is the experience of a few symptoms of depression or the manifestation of a full blown clinical depressive disorder, depression results in significant costs to an individual's personal and social world (Weissman et al., 1999), and to the economy (Statistics Canada, 2003). Because of these costs, it is important to conduct research that may contribute to an understanding of this disorder, and to help offset the negative effects of depression. An increased understanding has the potential to contribute to the efficacy of assessment and treatment for those who experience depression. Thus, to understand the phenomenology, the next section begins with a brief examination of what is meant when using the word "depression" in empirical investigations.

1.2.1 Phenomenology and Conceptualisation

Depression and dysphoria can be described as an affective state marked by persistent feelings of sadness and hopelessness, loss of interest, fatigue, a disturbance in appetite and, for many individuals, suicidal thoughts (APA, 2000). In children, irritability, aggression, and psychomotor retardation may also be indicative of a depressed state (Kolvin & Sadowski, 2001). In its clinical form, depression is diagnosed when five or more of nine depressive symptoms (including either depressed mood or loss of interest) have been present for a 2-week period, representing a significant change from the way in which an individual usually functions (American Psychiatric Association, 2000). Thus, the absence of any single symptom (e.g., clients evidence 4 of the 9 symptoms) from the list of symptoms that must be present in order for clinical depression to be

diagnosed, by definition, implies that it is not clinical depression but rather sub-clinical depressed mood. But is depression really an all or nothing phenomenon?

Studies of depression typically take one of two conceptual views. The first of these defines depression by categorizing individuals as either depressed or non-depressed in terms of their scores on self-report symptom checklists (e.g., Beck Depression Inventory-II; BDI-II). Alternatively, mood-induction is sometimes used with non-clinical samples to induce a depressed mood state analogous to the mood of a clinically depressed individual. The second conceptual approach restricts the sample population to those individuals who meet the full diagnostic criteria for depression as defined in the DSM IV - TR (American Psychiatric Association, 2000) as evidenced through appropriate diagnostic interviewing and measurement techniques by a qualified diagnostician (e.g., Structured Clinical Interview for DSM Diagnosis, SCID; Spitzer, Robert, Gibbon, & Williams, 1997).

The first of these two conceptual approaches typifies the view that clinical depression lies at one end of a continuum of severity, with mild depressed mood or sub-clinical depression, often referred to as dysphoria, at one end and Major Depressive Disorder (MDD; clinical depression) at the other. This dimensional conceptualisation suggests that there is continuity between dysphoria (whether it is determined by symptom checklists or mood-induction procedures) and the clinically diagnosable disorder, MDD. The second conceptual approach suggests that clinical depression is qualitatively and thus, categorically, different from

manifestations of dysphoria. That is, there is discontinuity between dysphoria and "true" depression; you are either depressed or you are not. The researcher must choose between these two conceptualisations, and this choice determines how research in the area of depression unfolds. Taking a categorical versus a dimensional view has implications for sample selection, measurement, and generalisability of research findings. Therefore, a brief review of the research in support of each of these discrepant conceptualisations is worthwhile.

Several arguments for a discontinuous view of dysphoria and clinical depression have been postulated over the years. For example, Gotlib and Hammen (1992) suggested that findings from studies of dysphoric individuals are not relevant to a clinically depressed population because individuals who show mild to moderate symptoms of depression, as evidenced on a depressive symptom scale such as the Beck Depression Inventory, do not go on to meet the diagnostic criteria for clinical depression (see also Coyne, 1994). Similarly, it has been suggested that the same risk factors associated with clinical depression do not correlate with dysphoric mood (e.g., Coyne & Downey, 1991). For example, poverty, chronic stress, and minor life events correlate more strongly with dysphoria than clinical depression (Coyne & Downey, 1991). Coyne (1994) also argued that incidence and prevalence rates of mild depressed mood and dysphoria are drastically different than rates of clinical depression. In addition, the symptoms manifested in clinical depression are said to be distinctively different from the symptoms of dysphoria (e.g., Buchwald & Rudick-Davis, 1993;

Clark & Watson, 1991). For a more complete review of the arguments and empirical support for a discontinuity view of depression see Clark, Beck, and Alford (1999).

Flett, Vredenburg, and Krames (1997) reviewed several studies purported to support a categorical view of depression and found methodological and statistical issues (e.g., correlational comparisons between dichotomous and continuous variables). Where differences between depressed and dysphoric groups were found, one explanation is that differences between dysphoria and clinical depression are differences in kind rather than degree. There are however, alternative explanations and interpretations for those differences. For example, in their review of two studies cited in support of a discontinuity view of depression and dysphoria, Flett and colleagues noted that differences in correlates between continuous (e.g., scores on a depression inventory) and dichotomous variables could be the result of low statistical power resulting in restriction of range or measurement error. They concluded that no definitive conclusions could be drawn from some of the research presented as support for a discontinuous conceptualisation of depression and dysphoria.

The DSM has historically taken a categorical approach to the classification of mood disorders, however, in looking across symptoms within each category it is clear that there is homogeneity in symptoms among various depressive syndromes (for a full critique of the classification of depressive disorder in the DSM see Clark, Watson, & Reynolds, 1995). Mood disorders within the DSM

may be less distinct than their categorical representation would imply. Indeed, in the latest edition of the DSM (APA, 2000), the authors acknowledge the limitation of a categorical approach, which has been a DSM tradition. The DSM text revision clearly states that there is more often than not, heterogeneity among client symptom presentation and clinicians are admonished to exercise a sufficient degree of clinical judgment when more difficult diagnostic cases fall outside the boundaries of stated symptoms. In addition, the text revision of the DSM recognizes the existence of symptoms that may be insufficient to meet the full diagnostic criteria for the presence of clinical depression but may warrant clinical attention. The pursuit of a dimensional approach to the classification of mental disorders is ongoing and the American Psychiatric Association encourages the pursuit of research oriented towards a common language of continuity that could be used in future revisions of the DSM to aid in a dimensional representation of mental disorders: one that will neither hinder communication among professionals nor stymie the research process that aids in advancing our knowledge and understanding of psychiatric problems.

In addition to symptom homogeneity, the empirical research comparing severity of depressive symptoms combined with comparative studies of clinically and non-clinically depressed individuals clearly supports a dimensional conceptualisation of depression. For example, Gotlib et al. (1995) used a longitudinal approach to determine if the severity of depressive symptoms could distinguish non-clinical from clinical samples in psychosocial

functioning. Gotlib et al. found that adolescents with elevated depressive symptoms, who failed to meet diagnostic criteria for depression, were not significantly different in aspects of psychosocial functioning than clinically depressed teens. In addition, Clark, Cook, and Snow (1998) reported a pattern of linear progression of symptomatology in their study comparing the severity of symptoms across samples of depressed psychiatric in and outpatients, patients with sub-clinical depressive symptoms, and healthy controls. These results highlight the importance of symptom severity and intensity in depression and further support the dimensional approach to conceptualizing depression.

At the phenomenological level, depression and dysphoria are believed to "represent extreme or excessive forms of normal cognitive, emotional, and behavioral functioning" (Clark, Beck, & Alford, 1999, p. 22). The study of depression at the level of dysphoria then may provide valuable insight into the phenomenon of depression in terms of the onset, maintenance, and treatment of the clinical disorder. But is dysphoria really a milder sub-clinical form of depression?

Since 1987 several authors have raised concern over methodological approaches to the study of depression (see Kendall, Hollon, Beck, Hammen, & Ingram, 1987). Specifically, it has been argued that measures used to assess depression at the symptom level are tapping into more than just sub-clinical levels of depression (Haaga & Solomon, 1993). Haaga and Solomon suggested that measures of depressive symptoms used in research to group individuals

into mood categories often lack the specificity necessary to draw direct conclusions about MDD. Thus, researchers are admonished to not only use the broader term dysphoria but instead to acknowledge that dysphoria by definition, while correlated with aspects of MDD, also taps into other constructs such as anxiety and general distress (Clark & Watson, 1991).

As the debate over conceptualisation continues, what can be concluded is that clinical depression and dysphoria have some shared dimensional features (e.g., Ruscio & Ruscio, 2000). Indeed, Ingram and Siegle (2002) suggested that there is utility in investigating depression at the symptom level (e.g., negative affect). For the purposes of the present study, the term dysphoria is used with an understanding that it is the broader construct of negative mood state (with shared features of the nosology of depression, anxiety, and distress). With this in mind then, Beck's (1987) Cognitive Theory of Depression is now reviewed.

1.3 Beck's Cognitive Theory of Depression

From its original conception in 1967, Beck's Cognitive Theory of Depression is subsumed under the umbrella of information processing approaches to understanding psychological disorders. Beck's theory incorporates the structure of cognition, the process of cognition, and the products that result from the interplay between structure and process, as dictated by personal experience. Thus, the Cognitive Theory of Depression (Beck, 1967, 1987) reflects a more dynamic and malleable cognitive system than the static system an information-processing model might imply. At its core, the Cognitive Theory of

Depression proposed by Beck is predicated on the idea that dysfunctional or faulty cognitions (Ingram & Holle, 1992) lead to mood disturbances.

Beck (1967; 1987) proposed that the origins of depressive symptoms are rooted in what he called an *activating event* (i.e., a life event that signifies the loss of a personal resource(s) such as the loss of a relationship or a job). That is, dysfunctional beliefs lie dormant until some stressful life event activates them (see Figure 1). As Segal and Shaw (1986) argued, a stressful life event activates a system in which a negatively biased pattern of processing information begins the cycle of depressive symptoms. Unique to each individual is a set of *orienting schemas*, which are "relatively enduring internal structures of stored generic or prototypical features of stimuli, ideas, or experiences that are used to organize new information in a meaningful way thereby determining how phenomena are perceived and conceptualized" (Clark et al., 1999, p. 79). Once an activating event occurs, individuals try to make sense of its meaning using the orienting schema. For some individuals, orienting schemas consist of a heightened sensitivity to negative stimuli and an over-inclusive focus on the self. It is the value that individuals place on the experience that determines whether or not negative cognitive schemata are activated and the extent to which they will subsequently influence processing (Beck, 1987). *Cognitive structures (or the ways in which we are organized)* refers to the schema driven "cluster of interrelated cognitive-conceptual, affective, physiological, behavioural, and motivational schemas organized to deal with particular demands placed on the organism" (Clark et al.,

1999; p.88) that share a reciprocal relationship with the *cognitive products* they produce.

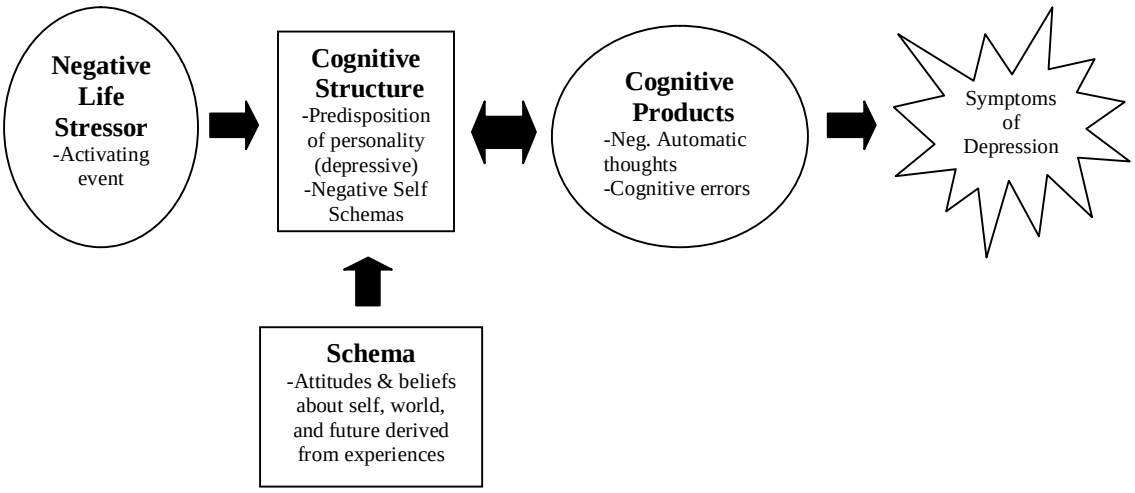


Figure 1. Causal chain of Beck's cognitive model of depressive symptom onset

For example, an individual who is depressed is likely to have a pre-dispositional orientation toward the negative and negative self-relevant schemata (i.e., the cognitive structures). These cognitive structures give rise to negative appraisal, perspectives, and negative automatic thoughts (i.e., the cognitive products). Consistent production of negative cognitive products serves to reinforce cognitive structures. The outcome of this reciprocity is depressive symptoms, which also reinforce the negative cognitive products. Thus, the goal of cognitive therapy is to reduce symptoms by breaking the cycle of negative thinking (for a comprehensive review of the Cognitive Therapy of Depression see Clark, Beck, & Alford, 1999).

According to Beck's (1987) Cognitive Theory of Depression, faulty cognitive processes are the hallmark of the depressed mood state, both at the dysphoric and clinically depressed levels. As Clark et al. (1999) reported, the Cognitive Theory of Depression supports the idea that depression is a continuum on which cognitive processes vary in degree rather than kind and as such, the faulty cognitive processes associated with dysphoria are the same as those associated with clinical depression, although perhaps faulty to a lesser degree. Thus, the Cognitive Theory of Depression is subsumed under a dimensional conceptualization and much of the research in support of this theory has come from studies that have examined dysphoria, used mood-induction analogous to a depressed mood state, and clinical populations.

From Beck's (1967) Cognitive Theory of Depression come nine descriptive hypotheses. They are briefly reviewed here. First, the negativity, exclusivity, and content-specificity hypotheses stipulate that negative self-referent thinking characterize all forms of depression at the expense of positive self-referent thought (Clark, Beck, & Alford, 1999). Second, the primacy, universality, and severity / persistence hypotheses specify that negative cognition will influence behaviour regardless of the specific type of depressive disorder and will vary in degree in accordance with the severity of the depressive episode (Clark, Beck, & Alford, 1999). Finally, the selective processing, schema activation, and primal mode hypotheses suggest that negative self-referent thinking will be evident in attention, encoding, retrieval, and evaluation of stimuli (Clark, Beck, & Alford,

1999). Because the focus of this present research is mood and memory, the selective processing hypothesis and the schema activation hypothesis are of primary importance and thus, they are more extensively reviewed.

1.3.1 Selective Processing Hypothesis

The Cognitive Theory of Depression (Beck, 1987) stipulates that individuals who are vulnerable to depressed mood selectively attend to negative information and thus, there is an increase in the accessibility of negative schema about the self, world, and future (Beck, 1987). Specifically, the selective processing hypothesis is defined as the automatic tendency for individuals who are depressed to attend to the negative aspects of an experience at the expense of any positive features (Clark, Beck, & Alford, 1999). It has also been suggested that this bias is only evident when individuals are processing highly self-relevant information (Clark, Beck, & Alford, 1999).

Selective processing of information has a direct impact on both encoding and retrieval aspects of memory. That is, if depressed individuals are prone to attend to the negative, then the negative aspects of a given experience are more likely to be the ones most strongly encoded and thus, more readily retrieved from memory. One of the fundamental assumptions of cognitive psychology is the link among cognitions. Therefore, it is not surprising that the preferential recall of negative mental content (see Delgleish & Watts, 1990, Mineka & Nugent, 1995 for reviews) likely triggers the activation of associated negative cognitions not directly related to a particular experience (Wenzlaff, 2005) but associated by

virtue of meaning (e.g., negativity) and emotion (Bargh & Tota, 1988; Blaney, 1986).

In general, individuals who are in a depressed mood state are likely to pay more attention to things that are negative (see Ingram, Miranda, & Segal, 1998 for a review). This includes thought content. When experiencing negative cognitions that capture attention, individuals are more likely to make negative attributions or judgments about these thoughts (e.g., Wenzlaff & Grozier, 1988). Because thoughts are interconnected it is highly likely that negative cognitions will activate other associated cognitive content (Wenzlaff, 2005), which inevitably will be negative (Dozois & Dobson, 2001).

There is a strong relationship between depression and chronic thought suppression (e.g., Rhyno et al., 2003; Wenzlaff, Meier, & Salas, 2002; Wenzlaff, Rude, & West, 2002). That is to say that many individuals who are depressed engage in an ongoing struggle to inhibit thoughts, images, and memories that ultimately result in the unintended effect of intensifying these thoughts. The preferential retrieval of negative thoughts, images, and memories by individuals who are depressed or dysphoric is an example of the *mood congruent memory bias* (MCMB) (e.g., Bargh & Tota, 1988; Blaney, 1986, Fogarty & Hemsley, 1983; Teasdale & Taylor, 1981). Watkins (2002) provided a specific definition, stating that, “the tendency for depressed individuals to recall more negative or unpleasant material than non-depressed controls” constitutes a MCMB (p. 381). Parrott and Spackman (2000) suggested that in MCMB, non-dysphoric or non-

depressed individuals preferentially recall more positively-valenced cognitions than negative ones. While a MCMB has been produced in analogous experimental situations (e.g., mood-induction of non-depressed participants; Mayer, McCormick, & Strong, 1995), Parrott and Spackman (2000) suggest that a mild to moderate pre-existing level of depression or dysphoria must be evident in order for the MCMB to be sustained.

Evidence also suggests that personal meaning is an important component in the MCMB phenomenon. For example, Bradley and Matthews (1983) demonstrated a MCMB using personally–relevant adjectives in which dysphoric participants recalled more negative self-descriptors than neutral or positive ones. Along similar lines, a preferential recall of past negative events was demonstrated for individuals who were depressed or dysphoric (Teasdale & Russell, 1983). These studies provide evidence in support of the select attention hypothesis and the MCMB specific to depressed mood state. What then, explains this occurrence? One possible explanation lies in the accessibility of negative cognitions as a result of the MCMB. Beck (1987) predicted the heightened accessibility of negative cognitive content during depressed mood states and it is to this aspect of the Cognitive Theory of Depression that attention is now turned.

1.3.2 Schema Activation Hypothesis

The schema activation hypothesis refers to that which characterizes disorders of affect and is defined as an increase in an individual's ability to access negative information, particularly, when in a depressed mood state and

when the information is relevant to the self (Clark, Beck, & Alford, 1999). Results from studies on mood suggest that negative mood states, such as depression, are associated with poor performance on executive function tasks (mental flexibility and control); particularly on the ability to inhibit responses (see Veiel, 1997 for a review). Indeed, the most commonly reported symptoms of depression are deficits in memory function, attentional processes, and inhibitory control (Clark, Beck, & Alford, 1999).

Although many clinically depressed individuals report problems in concentration and memory, neuropsychological assessment sometimes reveals no significant impairment in attention (e.g., Bornstein, Baker, & Douglass, 1991; Brown, Scott, Bench, & Dolen, 1994; Grant, Thase, & Sweeney, 2001; Nelson, Sachs, & Strakowski, 1998); or executive functions (e.g., Fossati, Amar, Raoux, Ergis, & Allilaire, 1999; Ilsley, Moffoot, & O'Carroll, 1995; Smith, Brebion, & Allilaire, 1994) that are due to the effect of dysphoric or depressed mood. In contrast, there are many methodologically comparable studies that provide evidence for deficient executive and attentional functioning (see Ottowitz, Darin, Dougherty, & Savage, 2001, for a review) related to a depressed mood state. Clearly the findings from the empirical literature on the neuropsychological deficits in depression (e.g., memory, attention, and inhibition) are mixed.

Despite the contradictory findings from neuropsychological research, the previous section provided evidence to indicate that depressed individuals consistently demonstrate a propensity to attend to the negative aspects of their

experience (e.g., Gotlib, Krasnoperova, Yue, & Joormann, 2004; Hertel, 2002) and thus, generate the mood-congruent memory bias for negative thoughts and memories (Watkins, 2002). If individuals in a depressed mood state selectively attend to negative thoughts, memories, or external stimuli (e.g., words), particularly when such information is perceived as highly self-relevant (Watkins, 2002), then increased accessibility to these negative cognitions should be evidenced. Indeed, several studies have demonstrated that when compared to controls, there is an increase in accessibility (i.e., the speed or ease with which negative information can be retrieved) to negative material in the context of a depressed mood state, including clinical depression, naturally occurring depression, and experimentally induced-mood (e.g., Fitzgerald, Slade, & Lawrence, 1988; Parrott, 1991; Teasdale & Taylor, 1981; Strauman, 1992).

Several studies have provided preliminary support for the schema activation hypothesis. These include studies asking participants to rate trait-adjectives (e.g., Segal & Gemar, 1997) and complete sentence stems (Teasdale, Taylor, Cooper, Hayhurst, & Paykel, 1995). However, several criticisms of this body of research suggest that rating trait-adjectives is not an accurate indication of the content that constitutes schema (Segal, 1988; Segal & Vella, 1990). In addition, studies that adopt word-list methodology may be somewhat artificial to the actual mental processes likely experienced. That is, the reality of mental activity is not found in word lists or sentence stems. Thus, this body of research, while somewhat supportive of Beck's (1967, 1987) Cognitive Theory of

Depression, appears to lack serious ecological validity to the mental experiences of those who are dysphoric or depressed.

1.3.3 Autobiographic Memory Tasks

It has been argued that autobiographic content is a more analogous representation of the schema that is purported to hallmark meaningful cognitive content of depressed and dysphoric individuals (e.g., Reiser, Black, & Abelson, 1985; Williams, 1996). Thus, using autobiographic memories to assess the assertions of the Cognitive Theory of Depression (Beck, 1967, 1987) potentially addresses the issue of ecological validity.

Rubin and Wenzel (2005) reviewed the literature on the use of autobiographic memories in research. They suggested that the word-cue method (using cue words to elicit a memory) is the best way to evaluate memories in terms of memory specificity, retrieval latency, affective tone, and its relation to psychopathology. Subsequent research found that reaction times for the word-cue method is not confounded by age differences (Rubin & Schulkind, 1997), gender differences (Rubin, Schulkind, & Rahhal, 1999), nor vividness, pleasantness, and emotional significance (Conway & Haque, 1999; Jansari & Parkin, 1996). Thus, the word-cue method has been a popular choice among clinical researchers (Wenzel, 2005).

In one of the first known studies of retrieval of personal memories, Lloyd and Lishman (1975) demonstrated that depressed individuals took less time to generate negative memories in response to neutral cue words than the time taken

to produce positive memories. In fact, these authors reported that the more severe the self-reported depressive symptoms, the less time it took for recall of negative content. However, an evaluation of studies using autobiographic content can be criticized for methodological limitations such as the inability to show cause and effect.

Because of the correlational nature of Lloyd and Lishman's (1975) groundbreaking study, subsequent research adopted a more quasi-experimental approach using mood induction procedures that produced similar results. However, these studies have also been criticized for methodological concerns relating to the use of an all female sample and the neglect of a true clinical population (Ingram & Holle, 1992). In addition, Williams (1997) suggested that depressed individuals tend to recall more general and less specific autobiographic events than non-depressed individuals raising the question of whether the results from autobiographic studies reflect true differences in accessibility or are an artifact of an unequal comparison.

In the depressed state, mental content is likely to be mostly negative (Blaney, 1986; Renaud & McConnell, 2002). Further, Fitzgerald, Slade, and Lawrence (1988) argued that the primary difference between dysphoric and non-dysphoric memory recall was not necessarily in the accessibility of negative memories but rather in the number of positive memories recalled (with dysphoric individuals recalling fewer positive memories than non-dysphorics). This argument is interesting in the context of depression if individuals who are

depressed are primed to the negative and thus are likely to have significantly more negative mental content. Interestingly, previous studies on forgetting using autobiographic memory have adopted a methodology that includes positive, neutral, and negative memories. In the absence of testing the effects of depressed mood on forgetting, this strategy makes sense. However, given the heightened accessibility of negative mental content during dysphoria and likely, the general lack of available positive mental content, the present study is the first to adopt a methodology that includes only the generation and forgetting of negative memories.

As Fogerty and Hemsley (1983) suggested, there is a positive correlation between the recall of negative memories and the intensity of the depressed mood. This finding is consistent with a continuity view of depression and dysphoria. In addition, time to generate memories was operationalised in terms of the speed of generating a single memory averaged over multiple trials. That is, the natural flow of associated cognitions was interrupted with the starting and stopping of a single thought in order to capture generation time. The stream of conscious thought is continuous (James, 1950) and thus, intentional interruption of the flow of thought during a memory generation task hinders the ability to understand the implications of such studies for theory. What can be concluded from these findings then, is that the studies investigating the schema activation hypothesis are somewhat hampered by methodological concerns. The

underlying theme that runs through these studies is the potentially harmful effects that negative mood plays in the retrieval aspect of memory function.

The focus thus far has been on the role of the retrieval aspect of memory that is relevant to the Cognitive Theory of Depression (Beck, 1987). However, as Dalgleish and Watts (1990) suggested, the heightened availability of negative autobiographic content, as demonstrated through memory retrieval experiments, may be necessary to understanding depression. They also argue that that demonstrating the heightened accessibility of negative thoughts, images, and memories, is not a sufficient index of the nature of memory disturbance that is so often associated with the depressive experience. That is, depressed patients do not typically present with complaints that their negative memories are readily available. More often, it is reported that negative memories and thoughts intrude on consciousness and depressed individuals are unable to rid their minds of this troublesome material (Delgleish & Watts, 1990). It is at this juncture that attention is redirected to a subsumed aspect of memory function believed to be fundamental to understanding the relationship between mood and memory: the function of *forgetting.*

1.4 Forgetting

Every day people of all ages experience instances of forgetfulness; children forget their books for school or to brush their teeth before bed, and adults forget where they put their keys or a close friend's birthday. Ponds, Commissaris and Jolles (1997) reported that in a sample of 1971 individuals aged

25 to 85 years, 39% reported being forgetful. In the absence of identifiable neurological impairment, everyday forgetfulness in children might be attributed to the yet-to-be developed cognitive capacity for memory storage, encoding difficulties, or the efficiency in using retrieval strategies (Dempster, 1978, 1981). In contrast, everyday forgetfulness in the elderly might be attributable to the natural diminishing cognitive processes such as diminished working memory capacity (Salthouse, 1992) and processing speed that tend to typify the aging process (Smith & Earles, 1996). Regardless of age then, everyday occurrences of forgetting represent unintentional yet normal memory failure that is to be expected as a natural occurrence in normal information processing for all ages.

Over four decades of investigation into forgetting suggests that forgetting can be induced through experimental paradigms. For example, forgetting has been induced by the active retrieval practice of competing information (e.g., Anderson & McCulloch, 1999; Anderson & Spellman, 1995) and by explicit instructions to forget versus to remember target material (Macleod, 1989; Wegner, Schneider, Carter, & White, 1987). These paradigms are referred to as the *retrieval-induced-forgetting* paradigm (RIF; Anderson, Bjork, & Bjork, 1994), and the *directed-forgetting* paradigm (DF; MacLeod, 1989), respectively. In RIF, retrieving some things can actually facilitate the forgetting of other material stored in memory. Comparably, directing individuals to forget some items and remember others also induces forgetting (DF). For the purpose of the present study then, everyday instances of forgetting (unintentional) are distinguished

from what will be called induced-forgetting (that which is intentionally produced.)

Research on induced-forgetting has produced a plethora of findings demonstrating consistency of experimenter induced-forgetting effects. This is especially true with regard to forgetting word list items (e.g., MacLeod, 2002; MacLeod & Macrae, 2001; Smith & Hunt, 2000). In RIF, repeated retrieval practice of some words from a list induces significantly more forgetting of unpracticed words from the same list when compared to a baseline control condition (Anderson, Bjork, & Bjork, 1994; 2000). Similarly, in DF an explicit instruction to forget the targeted to-be–forgotten words from a list produced better recall of targeted to-be-remembered words compared to a control group that does not receive a "forget" instruction (e.g., Anderson & Green, 2001; Anderson & Neely, 1996; Bjork & Bjork, 1996). The consistency in these findings is robust and contributes to the validity and reliability of the methodology under which the induced-forgetting effect occurs. Before exploring induced-forgetting paradigms in more detail, attention is drawn to a brief review of potential causes of intentional forgetting.

1.4.1 Potential Causes of Induced Forgetting

Although it is not the central focus of the present study, it is helpful to contextualize the research on forgetting within a framework of underlying causes of this phenomenon. Increasingly, interest in induced-forgetting has focused on understanding the causal mechanisms that underlie induced-

forgetting and the possible conditions under which the forgetting effect is reduced (e.g., inattention to the target; relative strength of targets; inhibitory mechanisms). Is induced-forgetting simply the result of attentional resources being directed to certain targets and not others at the encoding phase, which therefore results in items not being encoded in the first place?

Evidence suggests that individuals do indeed encode words that were targets of a forget instruction, as demonstrated on tests of recognition following a forgetting induction experiment (e.g., Basden, Basden, & Gargano, 1993; Davis & Okada, 1971; MacLeod, 1989; Zoellner, Sacks, & Foe, 2003). These experiments support the idea that the words were, in fact, encoded because participants in these studies had substantially higher rates of recognition than controls. While induced-forgetting effects do not appear to be the result of a lack of encoding, what remains unclear is whether the level at which individuals process material (e.g., more elaborate meaningful rehearsal strategies during encoding), called a level of processing approach, accounts for differences among individuals. What can be said is that encoding has likely occurred because of statistically significant recognition test scores. Whether deeper more meaningful encoding influences the amount of induced forgetting that occurs has not been studied.

Is induced-forgetting the result of the relative strength of some items on a list compared to other items? Relative strength in the context of memory refers to the durability of specific memory traces in the brain. The stronger the memory, the longer it can be remembered. Similarly, the more elaborate a

rehearsal strategy used, the stronger the memory. In addition, typical graphs of the forgetting curve show that humans tend to halve their memory of newly learned knowledge in a matter of days or weeks unless they consciously review the learned material. If relative strength accounts for induced-forgetting effects, then we would expect that stronger items (e.g., items that are more familiar and more strongly associated in with other items in the memory network) would be recalled before weaker items. However, several studies using forgetting paradigms with output order as a dependent variable have found the opposite effect (e.g., Brainerd, 1995; Brainerd, Reyna, Howe, & Keversham, 1991). Thus, a less likely candidate for explaining induced-forgetting is the relative-strength argument.

Another theoretical perspective attributes induced-forgetting to inhibitory mechanisms (see Neath & Surprenant, 2003 for a review of several theoretical perspectives). Indeed, Anderson (2003) argued that forgetting is an adaptive evolutionary process because it makes use of inhibition to facilitate the selective retrieval of information – often a necessary process to enhance our survival (e.g., needing to selectively retrieve threatening information about a past experience at the expense of other information related to the same situation). Much of the empirical evidence appears to support this view (see Anderson, 2003 for a review of experimental evidence; see also Groome & Grant, 2005). This raises the question of what happens to our ability to forget when inhibitory control is under developed or compromised in some way, as is evidenced in some

psychological disorders (e.g., Depression, Anxiety, and Obsessive-Compulsive Disorder). Further, it is of interest to understand what cognitive factors may contribute to poor inhibitory control over thoughts that one would rather not think about or remember.

Some studies suggest that individuals who engage in passive self-focus (rumination) during a depressed or dysphoric mood evidence poor performance on tasks assessing cognitive flexibility and mental control (e.g., Davis & Nolen-Hoeksema, 2000; E. Watkins & Brown, 2002). Indeed, poor inhibition and cognitive inflexibility associated with depressive states might lead one to speculate that induced-forgetting will be poorer for depressed individuals than for controls, a point elaborated further in a subsequent section of this chapter. This may be particularly important when we consider that for depressed individuals, being able to forget some things might prove therapeutic. In addition, poor mental control and ineffective cognitive coping responses to mood may represent specific cognitive vulnerability factors that exacerbate negative mood states and prohibit effective cognitive inhibition.

Relatively little attention has been given to understanding how individual differences facilitate or limit the application of forgetting paradigms to psychological disturbances in which emotional valence is of central importance. In addition, few studies have explored the potential practical and applied significance of forgetting for thought disorders such as depression. If science and practice are to converge, it is important to develop a more comprehensive

understanding of the phenomenon of forgetting. Whether mood-congruent memories (MCMs) are subject to induced-forgetting is not known. However, what is clear from the Cognitive Theory of Depression is that issues of appraisal and mental control associated with depressed mood may also be individual difference factors that affect an individual's ability to forget MCMs.

To this end, researchers have begun to explore the application of the forgetting paradigms to more complex cognitions such as impression formation (Macrae & MacLeod, 1999) and memories for naturally occurring eyewitness accounts (MacLeod, 2002). In addition, researchers have expanded forgetting paradigms to include more complex materials (see Levy & Anderson, 2002, for an overview). For example, Barnier, Hung, and Conway (2004) demonstrated a RIF effect for autobiographic memories. Further, a handful of studies investigated the relationship among mood states, rumination, and possible deficits in forgetting negatively valenced words (e.g., Hertel & Gerstle, 2003) but failed to consider the aspect of self-relevance of material. Finally, one study has produced evidence for the application of RIF to other populations (e.g., children; Ford, Keating, & Patel, 2004). However, these initial investigations are limited in their failure to take into account the interrelation among emotional valence, self-relevance, and individual differences. As well, the current body of literature is plagued with mixed results. Thus, the contributions of the present study add to the knowledge of induced-forgetting in several ways, as follows: by focusing on self-relevant negative memories, using different paradigms, and considering the

context of mood. In addition, this is the first study to consider a number of other cognitive factors associated with what paradigm works, for whom it works best, and what other factors may contribute to degree of impairment.

Taken together, the results of previous studies that attempt to extend forgetting paradigms beyond the confines of simple word lists do not provide an understanding of under what real life circumstances induced-forgetting provides potential benefits. It is important to gain insight into the effects of mood state and individual differences in induced-forgetting if we are to further evaluate the utility of forgetting for disorders such as depression, where forgetting might prove more difficult but beneficial.

1.5 Paradigms of Induced-Forgetting

1.5.1 The Directed-Forgetting Paradigm

The Directed Forgetting (DF) paradigm has its roots in the experimental work investigating short-term memory (Brown, 1954). In directed forgetting, participants are given instruction to either remember or forget a target item from a list of items. That is, some items are selected as to-be-remembered (R items) and an equal number are designated as to-be-forgotten (F items) (MacLeod, 1998). Two distinct methods for directed-forgetting induction have emerged; the list-method and item-method (see Golding, 2005 for more complete descriptions).

In the standard list method of directed forgetting, participants are provided with a list of words followed by instruction to forget the list. Several

researchers have argued that the specific instruction given immediately after the first list has been shown is important to inducing the forgetting effect for this paradigm (e.g., Golding & Hauselt, 1994; Golding, Sego, Hauselt, & Long, 1994; Golding Ellis, Hauselt, & Sego, 1998). Participants must believe that F items are of no value and thus, treat these items as to-be-forgotten items (Golding, 2005). That is, participants must be convinced by the experimenter's instruction that the stimuli designated as to-be-forgotten, as indicated by a forget instruction will not be asked for during a future recall task. Without a convincing instruction a DF effect is less likely to be demonstrated.

In the item-method of directed forgetting, the instruction to remember or forget is introduced after each word (usually as the words "remember and forget" or as symbolic letters "RRRR and FFFF") as oppose to each list of words. Again equal numbers of items are deemed R items and F items. In addition, prior research suggests that an unrelated task follow the presented words as a delay before recall to eliminate the effects of short-term memory (Golding, 2005).

MacLeod (1998) explains that there are basically two ways to examine the directed forgetting effect. One way is what MacLeod refers to as a cost/benefit analysis. In cost/benefit analysis, R items are compared to both F items and an additional R list with no "forget" instruction (usually a baseline control group). The cost/benefit analysis only takes into consideration the R items from the list (MacLeod, 1998). The other way to evaluate the directed-forgetting effect is what the author refers to as the remember-forget (R-F) difference. This method

examines the difference in performance between the to-be-remembered (R) and to-be-forgotten (F) items. According to MacLeod, this is a common method when the baseline control group is not methodologically feasible. The R-F difference has become the preferred measure of the directed-forgetting effect. A forgetting effect then, is evidenced when recall or recognition for to-be-remembered items (R) is better than for to-be-forgotten items (F) when participants serve as their own controls.

Investigation into the differences in efficacy of either method of a directed-forgetting paradigm suggested that for word stimuli both list and item methods produced the directed-forgetting effect for recall (Badsen, Badsen, & Gargano, 1993). Badsen and Badsen (1996) studied the effects of list versus item method for different types of material subjected to a directed forgetting paradigm. For general knowledge, the item-method yielded more forgetting. Further, participants in their study were asked to judge whether a particular item was part of the study list, and to indicate whether they knew this for sure or were basing their judgment on word familiarity. Directed-forgetting was observed with the use of the item-method but not the list-method for judgments based on familiarity. Interestingly, Badsen and Badsen found no DF effect for judgments based on assured knowledge. They concluded that the efficacy of one method over another may largely depend on the material used in the DF paradigm. This finding has particular implications for the present study on self-relevant memories associated with depressed mood. Specifically, mood-congruent

memories have not been the subject of induced-forgetting and thus, it is important to explore the differences between the list versus item-method of DF.

The mechanisms believed to underlie the DF item- versus list-method are presumed to be somewhat different. For the item method, differential rehearsal has been cited as the underlying mechanism for the DF effect (e.g., Allen & Vokey, 1998). For example, in the item-method, participants are aware that they will receive either a forget instruction or a remember instruction. Therefore, until the instruction is given, it may be that participants do not invest effort in encoding, pending instruction to forget. In contrast, encoding in the list-method is presumed to begin at the outset because participants will not be aware of the instruction until after many words have been presented. Thus, inhibition remains the prevailing explanation for the DF effect using the list method (Bjork, Bjork, & Anderson, 1998; Kimball & Bjork, 2002; MacLeod, 1999). It is important to note that more recent studies of forgetting have suggested that inhibition may be too simple an explanation for induced-forgetting than has been suggested here (see Anderson, 2005 for alternative points of view). Since underlying mechanisms may be different, the present study compared both methods in terms of the effect dysphoria might have on each.

The implication from the preceding discussion is that we might expect that mood state may not influence performance on the DF task that uses the item-method in the same way or to the same degree compared to the effects of dysphoric mood using the list-method. That is, underlying mechanisms for

induced-forgetting paradigms may contribute to performance because of the associations between depression and poor cognitive inhibition. If inhibition is the causal mechanisms for a DF effect, then a group of individuals with known deficits in inhibitory control are likely to perform more poorly than they might on a task in which the causal mechanism is not inhibition. That being said, the causal mechanisms of induced-forget paradigms are beyond the scope of the present study. Thus, attention is turned to an alternative forgetting paradigm - RIF.

1.5.2 The Retrieval-Induced-Forgetting Paradigm

The RIF paradigm (Anderson, Bjork, & Bjork, 1994) induces forgetting using the act of remembering. That is, remembering some things actually facilitates the forgetting of other material stored in memory. This occurs particularly in the context of repeated rehearsal and recall of target words-pairs (e.g., Anderson & Bell, 2001; Macleod, 2002). Specifically, the retrieval-induced paradigm consists of three phases and produces three components. First, participants are presented with a set of category-exemplar word pairs (e.g., fruit-apple and fruit-banana or flower-rose and flower-daisy) and are given time to study the pairs. A second phase is introduced where participants practice retrieving (Rp+ component) some of the exemplars from a related category but not others (Rp- component). Finally, individuals are tested on their cued-recall or recognition of practiced, unpractised but related, and unpracticed exemplars (NRP component).

Two difference scores exemplify the RIF effect, a retrieval practice effect, and a forgetting effect. The practice effect is demonstrated when Rp+ is greater than NRP (the within subjects baseline). The forgetting effect of RIF is demonstrated when what was recalled from Rp- falls substantially below what was recalled from NRP. Thus, a direct statistical comparison of RIF to DF necessitates the RR / NRP components and RF / Rp- components become synonymous with each other. These component effects have been demonstrated using a separate control group for comparison or by using a within subjects design where participants serve as their own control group. Because others have argued that the underlying mechanisms of induced-forgetting may differ (Anderson, 2005) depending on the paradigm used (e.g., in DF-item it is argued that rehearsal may explain the effect), it may also prove interesting to compare DF effects and RIF using RIFs practice effect components, in addition to directly comparing the forgetting effect components.

The consistency of findings in the literature that support an induced-forgetting effect for word lists raises the questions of whether other material, such as emotional material, would yield similar results using induced-forgetting. It is to this issue that attention is now turned.

1.5.3 Forgetting, Emotion Valence, and Self-Relevance

The DF paradigm has been generalised to other material such as situational stories (Radvansky, 1999) and stereotypes (Macrae, Bodenhausen, Milne, & Ford, 1997). More recently, the DF paradigm has been extended to

emotionally valence material (words) (e.g., Dumont, 2000) and mood state (e.g., Power, Dalgleish, Claudio, Tata, & Kentish, 2000). For example, Power et al. (2000) conducted a series of experiments to understand the forgetting ability of depressed and non-depressed individuals for positive and negative words. Depression was operationalised in terms of scores on a self-report measure. Using the list-method, results suggested that although directed-forgetting occurred the differential effects of emotional valence and mood state were negligible. Power et al. (2000) questioned the findings in terms of the role of self-relevance in emotional states. Their subsequent study required that participants process the words to make them self-relevant. Results suggested that non-depressed controls recalled more positive than negative items despite being instructed to forget. The depressed group, however, demonstrated no bias for the recall of negative words, recalling them equally as well as positive words even when self-relevant. Thus, Power et al. concluded that although emotional valence and mood had minimal effects on directed forgetting, the degree of self-relevance of the material might be important. However, the degree to which these findings represent a cause and effect relationship is currently unknown because the mood groups were defined using self-report continuous measures.

Finally, Power et al. (2000) extended DF to clinically depressed samples. In this case, both emotional valence and mood state impacted the efficacy of DF. Specifically, they found that depressed patients recalled more negative than

positive words when instructed to forget. Thus, it would appear that at the clinical level of depression, DF became ineffective.

Other studies highlight the potential importance of self-relevance of material in terms of its forget-ability. For example, Macrae and Roseveare (2002) demonstrated that when material is self-relevant, it is resistant to forgetting. In their study they asked participants to imagine the purchases of a gift by themselves, a friend, or an unspecified other. Retrieval-induced-forgetting was found for the "friend" and "other" condition but not for the "self" condition. Macrae and Roseveare suggested that self-relevance then, may hinder forgetting. However, it is important to point out that in the aforementioned studies, the imagined or induced self-relevance as defined in these studies is not necessarily analogous to the self-relevance of negative mood congruent memories associated with depression and dysphoria. Indeed, it is suggested here that autobiographic memories, particularly those of negative emotional valence, provide the most stringent test of the utility of forgetting paradigms to depressed individuals.

Barnier, Hung, and Conway (2004) provided the first test of whether truly self-relevant material (autobiographic memories) is subject to RIF. Forty participants generated their own memories (positive, negative, and neutral) to experimenter-presented memory cues. These memories were then subjected to a RIF paradigm. Results support the RIF effect for autobiographic memories. That is, more practiced memories (Rp+) were recalled than unpracticed memories from the same category (Rp-) and when compared to a category of unpracticed

memories not directly related (NRP), the number of memories recalled from Rp- was significantly less. Of notable importance here is the highly self-relevant nature of autobiographic memories. Whether or not mood state, particularly in relation to the MCMB for negative memories, would yield similar results remain an important question and a specific aim of the present study.

1.5.4 Suppression and Forgetting

What is the significance of thought suppression to induced-forgetting? The idea that individuals could be prompted to rid their minds of distressing thoughts and memories seems quite plausible based on the work of cognitive psychologists. However, from the "white bear" studies conducted in the mid to late 1980's researchers found that participants who were instructed to forget thoughts about a "White Bear" had a higher frequency of white bear thought intrusions when later asked to express their thinking, than they did before pre-suppression instructions were given (Wegner, Schneider, Carter, & White, 1987). This finding seems to contradict the findings just reviewed on forgetting.

In an attempt to understand the cognitive mechanisms that contribute to the maintenance and exacerbation of a depressed mood, clinical psychology has focused on the mental control efforts individuals employ when depressed (e.g., Wegner & Smart, 1997; Wenzlaff & Wegner, 2000). According to the *ironic process theory,* suppression involves two processes: one that diverts attention away from the mental activity that an individual wishes not to focus on – in other words a process that distracts by trying to think about something else, and a second

system that monitors mental activity, that is a system that vigilantly searches for any trace of the thought or thoughts (Wegner, 1994). Individuals who are depressed are more likely to engage in chronic thought suppression efforts (Wenzlaff, 2005), the result of which is the rebound effect. While some researchers found no rebound effect for depressive thoughts (see Purdon, 1999 for a review), others have demonstrated consistent rebound effects, particularly for depressed and dysphoric individuals (e.g., Roemer & Borkovec, 1994; Wegner & Gold, 1995; Wenzlaff, Wegner, & Roper, 1988; Wegner & Smart, 1997; Wenzlaff & Wegner, 2000).

One explanation given for the apparent inconsistency in findings is that the instruction used in different studies may have influenced the outcome of suppression efforts (e.g., "do not think about" versus "think about anything you like"). In addition, evidence also suggests that rebound effects after instructions to suppress are more likely when participants are under a more substantial cognitive load (e.g., Wegner & Erber, 1992). Lavy and van den Hout (1990) found that suppression tends to cause an increase in the number of occurrences of the very thought the individual is trying to suppress. As was previously mentioned, this resurgence of unwanted intrusive thought is supported by a considerable amount of evidence (e.g., Wegner & Gold, 1995; Wegner, Schneider, Carter, & White, 1987; Wenzlaff, Wegner, & Roper, 1988). In the first meta-analysis of the rebound effect in suppression, Abramowitz, Tolin, and Street (2001) concluded that rebound does occur. However, the degree of rebound was found to be

contingent on whether the target suppression material was familiar to the individual. What then, are the implications of thought familiarity to memory accessibility and induced-forgetting?

Kelley and Kahn (1994) suggested that when individuals are suppressing thoughts with which they are familiar, rebound is less problematic. Therefore the differentiation between thoughts that are familiar (i.e., participant generated thoughts) and those that are experimenter generated (i.e., White Bear) are important factors for outcomes of individual effort to suppress. In addition to thought familiarity, other thought properties contribute to successful thought suppression, including the emotional valence of stimulus material (Parkinson & Rachman, 1981), and the perception of how controllable the thoughts were (Clark, Purdon & Byers, 2000; Purdon & Clark, 2001). Finally, an individual's perception of how well thoughts can be controlled also affects suppression outcome (e.g., Forrester, Wilson, & Salkovskis, 2002; Wilson & Chambless, 1999). In the basic paradigm for directed-forgetting, participants are subject to some form of instruction to suppress (e.g., "think versus no think"; or "forget versus remember"). Could it be that failure to consistently find a differential directed forgetting effect for depressed samples is the result of rebound? The answer to this question remains elusive; however, we might expect that applying a forgetting paradigm to depressed samples that does not require instructions to suppress target material (such as a RIF paradigm) would eliminate any question of potential rebound influencing performance.

The next section begins with a discussion of the importance of the present research in terms of its contribution to basic cognitive research and the potential impact it may have on the field of clinical psychology, particularly for depressive disorders. The cognitive factors that increase vulnerability and risk to depressed mood, particularly rumination (Nolen-Hoeksema, 1991) and mental control (Clark & Rhyno, 2005) are then presented. The chapter concludes with the research questions and hypotheses specific to the current investigation.

1.6 The Importance of Studying Induced-Forgetting of Negative Memories

Instances of forgetting are usually conceptualized as unwanted, incidental events and thus, involuntary cognitive failures. How is this different from induced-forgetting? Groome and Grant (2005) addressed this question by assessing the relationship between everyday cognitive failures and RIF. Their results suggested an inverse relationship between the magnitude of a RIF effect and everyday cognitive failures as measured by the Cognitive Failures Questionnaire (CFQ; Broadbent, Cooper, Fitzgerald, & Parks, 1982). Groome and Grant compared the RIF scores of 40 normal individuals to their scores on the CFQ and found that those who demonstrated a strong RIF effect (forgot substantially more words than those in a control condition) reported fewer cognitive failures. Induced-forgetting provides us with a means of filtering out information that is irrelevant or not needed. It would seem then, that in some circumstances, the ability to forget certain material would prove beneficial to an individual's psychological health. Forgetting, as a coping strategy, would allow

individuals to rid their minds of distressful or threatening events. This may be particularly important for memories that are negative and emotionally laden. For the sake of basic research on forgetting, identifying the effects of individual differences such as mood state on forgetting may help elucidate the boundary conditions under which we might expect to find an induced-forgetting effect. In addition, a direct comparison of experimental paradigms will help to identify how similarities and differences in procedures affect outcomes, informing future research on the underlying mechanisms of forgetting paradigms.

Findings supporting a bias in depression towards negative memories give rise to the idea that negative memories might be the most important target of induced-forgetting. However, a consequence of a mood congruent memory bias leading to more accessibility to negative memories might be that negative memories are more resistant to forgetting, particularly if memories have significant relevance to self. This also raises the question of whether one induced-forgetting paradigm is more effective for negative memories than another or whether it depends on the state of mood (e.g., whether or not an individual is depressed).

From an applied perspective in clinical psychology, research on the ability to induce the forgetting of negative memories might provide a means by which practitioners can facilitate symptom stabilization as a preventative strategy to combat negative mood states before they spiral downward to more serious mood disorders and may also inform intervention and treatment of depression.

Further, understanding the relationships between cognitive vulnerability factors for depression as they influence induced-forgetting may also identify the aspects of cognition that are the best target of intervention. In addition, other psychological disturbances in which unwanted cognitions and negative memories have been identified as vulnerability or maintenance factors (e.g., Obsessive-Compulsive Disorder; Salkovskis, 1989) may serve as an appropriate target for further investigation of forgetting paradigms. Finally, the results of the present research may aid in the development of alternative treatment regimes. As previously discussed, high rates of depression also reflect the need to evaluate those factors that place individuals at greater risk for developing depression. It is to the issue of cognitive factors associated with depression that attention is now turned.

1.7 Cognitive Factors Associated with Depression

Despite sadness being a normal experience for most individuals, what puts people at risk or makes them vulnerable to persistent sadness that may ultimately lead to clinical depression? This section begins by delineating potential risk factors associated with depression and then moves into a more in-depth review of specific cognitive factors associated with depressed and dysphoric mood states. The possible implication of cognitive vulnerabilities on induced-forgetting effects is also discussed.

Much of the research on vulnerability and risk for depression to date has focused on psychosocial and biological factors (Kovacs, 1997). For example,

biological factors such as having a first-degree relative with depressive disorder are associated with an increase in the likelihood of experiencing depression (American Psychiatric Association, 2000). In addition, stressful life events (e.g., Kovacs, 1997); low self-esteem (e.g., Goodyer, 1999); and depressotypic attribution style (i.e., the tendency to attribute failure to internal sources and success to external factors) (Lewinsohn & Essau, 2002) have also been implicated as increasing individual vulnerability for depression. Cognitive factors such as a tendency towards negative cognitions (e.g., Garber & Hilsman, 1992), poor cognitive coping strategies (Nolen-Hoeksema, 1991; Wells & Davies, 1994), and poor mental control ability (e.g., negative appraisal of and loss of mental control over distressing thoughts (Beevers, Wenzlaff, Hayes, & Scott, 1999; Edwards & Dickinson, 1987) have been identified as potential vulnerability factors for the development of mood disorders. Since mood effects memory, then the presence of specific vulnerability and risk factors may also predict the efficacy of induced-forgetting.

To this author's knowledge no study has yet, examined whether the individual cognitive risk or vulnerability factors associated with depression impedes susceptibility to forgetting paradigm effects. These factors may play an important role in the application of forgetting paradigms to individuals who are susceptible to depression. Further, the contribution of determining the risk factors in identifying those who might be successfully induced to forget will aid in the future development of prevention strategies and may also provide insight

into the specific targets of intervention. What follows then, is a more in-depth review of cognitive vulnerability for depression with particular attention given to those cognitive factors most likely to affect forgetting.

1.7.1 Cognitive Risk Factors in Depression

Several cognitive-based perspectives have been offered as explanations for why individuals may be vulnerable to depression. First, the Cognitive Vulnerability Model (Beck, 1987; Clark, Beck, & Alford, 1999) proposes that some individuals have increased susceptibility to depression because of enduring negative mental content (mental representations) about self, world and future. When negative self-referent schemas are triggered by negative life events, negative content is readily accessible and thus, increases in number and frequency. Consequently negative thoughts become harder to control because individuals attach greater meaning to them. Second, in the previous examination of the work of Wegner (1994), individuals may be susceptible to depression because they use ineffective thought control strategies in a futile effort to suppress their negative thoughts – called ironic processing (Wenzlaff, 2005).

As previously discussed, the literature on thought suppression studies reveals that the very act of engaging in intentional suppression of unwanted cognitions leads to a paradoxical increase in the very thoughts the person is trying not to think (Wenzlaff & Wegner, 2000). A depressed mood persists and may develop into clinical depression because ineffective control strategies ensure the persistence of negative thoughts. Third, several researchers have suggested

that the ways in which people cope with thoughts that make them sad or depressed are often ineffective (e.g., Nolen-Hoeksema, 1991; Wells & Davies, 1994). Thought control strategies that involve appraisal of a particular thought or punishing the self for having a particular thought (e.g., telling yourself that something bad will happen if you continue to have the thought) have been strongly associated with emotional vulnerabilities such as those indicated by higher depression scores (Reynolds & Wells, 1999; Wells & Davies, 1994). Finally, Nolen-Hoeksema and Morrow (1993) suggested that individuals are vulnerable to depression because when faced with a depressed mood, they use a coping style that ensures the perpetuation of a negative mood state. Some people turn their attention away from negative thoughts in an attempt to redirect their focus to other tasks; a coping style called distraction (Nolen-Hoeksema, 2001). Other people direct their attention towards their thoughts and feelings during a depressed mood; a coping style called rumination (Nolen-Hoeksema, 2001). Women tend to engage in more rumination and subsequently experience depression more often than men (Nolen-Hoeksema & Jackson, 2001). A more detailed discussion of suppression and rumination follows.

These perspectives suggest that a predisposition for negative mental content, the propensity for adopting a maladaptive coping strategy, and poor efforts to exercise some degree of mental control over distressing thoughts in the context of depressed mood may be additional sources of individual differences in successful induced-forgetting. The following section begins with a general

discussion of the concept of mental control followed by a more detailed look at rumination, perceived mental control, and thought suppression in terms of the relationship between depression and dysphoria and the possible implications for induced-forgetting.

1.8 Mental Control and Depression

What is mental control and what is its role in depression? In general, any process or strategy used in an attempt to control the activity of one's own mind is mental control. Wegner and Pennebaker (1993) suggested that mental control be defined in a number of ways, including: a) as an attentional activity; b) as a coping strategy; and c) as a psychological defense. It is possible that the concept of mental control as a psychological defense has its conceptual roots in the earlier works of Sigmund Freud. With his conceptualisation of defense mechanisms, Freud suggested that the drive to relieve psychic distress manifests itself in the form of defensive mechanisms – of which the most widely known is repression. Defined in terms of psychological defense then, mental control can be viewed as less willful and more unconscious.

While it is true that some attentional processes are more automatic and thus, outside our own awareness, mental control as an attentional activity suggests that people can voluntarily attend to or ignore what is on their mind. Mental control can also be understood as a response to distress (Wegner & Pennebaker, 1993). With the onset of a depressed mood state, most people will inevitably make some attempt to rid themselves of that mood. That is,

individuals may respond to depressed mood with some mental activity they believe will alleviate the distress. These attempts represent some effortful mental intervention aimed at reducing the negative thoughts, memories, or images that exacerbate and prolong negative mood states.

Attempts to control mental activity may take the form of a behavioural action (e.g., engaging in sports, or watching TV); cognitive activities (e.g., habituation, replacing current cognitive content with different thoughts); or a combination of both behavioural and cognitive action (e.g., speaking to a friend about distressing thoughts). For the purposes of the present study, the focus is on cognitive-based activities. The literature conceptualizes cognitive activities under three global categories of mental control: habituation, dismissal, and distraction. Each of these is discussed in turn.

Habituation. Habituation refers to the desensitization of negative cognitions through repeated exposure. Parkinson and Rachman (1980) attempted to determine if individuals could habituate to negative cognitions. Rachman (1981) hypothesized that normal unwanted intrusive thoughts become clinical obsessions as a result of the failure to habituate to the thoughts. Sixty participants were asked to form target thoughts and images before and following habituation training. The pre-training scores were used as base-line measures. They found a significant decrease in discomfort, intensity, stressfulness, unacceptability, latency and resistance for the training group compared to a

group of controls. They concluded that some people are, in fact, able to habituate to normal unwanted thoughts.

Likierman and Rachman (unpublished but cited in Rachman, 1981) extended the study of habituation to determine whether distressing thoughts that were subject to habituation would evidence lasting effects. Their results, while similar to the Parkinson and Rachman (1980) study, suggested that the positive effects of habituation (i.e., decreased distress associated with the negative cognitions) might be short-lived. Habituation strategies then may provide short–term benefits as a means of mental control. An example of a habituation strategy is *rumination*, however, ruminating on sadness, which is further elaborated in a subsequent section, can have specific negative consequences.

From a clinical perspective, the most popular example of a habituation intervention is the *prolonged exposure therapy* (Foa, Rothbaum, Riggs, & Murdoch, 1991; Falsetti, Monnier, & Resnick, 2005) used to treat PTSD and other trauma-related difficulties. Prolonged exposure therapy involves the elaboration by clients of their traumatic experience while the therapist facilitates the control of emotional responses to the memory. Prolonged exposure is currently supported by the APA as an evidenced-based intervention.

Dismissal. A dismissal strategy refers to the ability to ignore or remove at will unwanted thoughts from the stream of consciousness. One example of a dismissal strategy is the technique called *thought stopping*. Thought stopping can

be accomplished by a variety of techniques. For example, when thinking about something that you do not want to be thinking about, you might say to yourself "stop." Thought stopping is a control strategy that is used frequently in the general population with some success (Freeston et al., 1991). From a clinical perspective, thought stopping strategies are often employed as part of a cognitive behavioural intervention plan for clinically depressed patients with varying degrees of success. The effectiveness of dismissal as a mental control strategy is subject to a number of mitigating factors. In their study of the functional properties of unwanted intrusive thoughts, Parkinson and Rachman (1981) interviewed 60 participants about their unwanted intrusive thought experiences. They asked participants to describe (among other things) how easy it was to dismiss their unwanted thoughts. Results indicated that dismissability was impaired when the thought intensity was rated as particularly strong. Specifically, the more intense an unwanted cognition the more difficult it was to dismiss.

There is also evidence that a dysphoric mood state and the amount of distress associated with a thought also contribute to decreases in controllability (Rachman, 1981). Several studies have assessed the impact of mood state on the dismissability of unwanted thoughts (e.g., Purdon & Clark, 2001; Wenzlaff, Wegner, & Klein, 1991). In two experimental paradigms, Parkinson and Rachman (1980) induced a happy or sad mood prior to the request to remove a target unwanted thought. In the dysphoric mood state, individuals found it

harder to dismiss the thought. Clark (1986) proposed that the content of the thought or image influences the degree of dismissability. Specifically, thoughts highly relevant to self are more difficult to dismiss than other thoughts that are self-irrelevant. Clark (1986) also makes a distinction between positive and negative self-relevant thoughts and positive and negative self-irrelevant thoughts. Negative thoughts generally, and particularly those that are self-relevant, increase the time it takes to dismiss the thought (Clark, 1986).

Two explanations exist as to why dismissal is problematic for some people and not others. First, Rachman (1981, 1993) suggested that the emotionality that the thoughts evoke (intensity of the emotion) impede dismissal ability. That is, the intensity of mood evoked by cognitive content affects the ability of an individual to forget unpleasant thoughts. Second, it may be that a dysphoric mood state makes more pleasant or positive thoughts less accessible (Teasdale & Taylor, 1981). This highlights the importance of the self-relevance and emotional valence of material for depressive disorders and the role these two factors might play in the efficacy of induced-forgetting paradigms.

Distraction. Any cognitive activity (e.g., positive thought substitution) or behavioural activity (e.g., hobbies, music, or reading) that redirects attentional resources away from the negative thoughts and onto something else may be considered a distraction strategy. Wang, Clark, Markowitz, and Purdon (2000), found in their sample of 50 students, that physical and mental distractions were the most frequently used control techniques (62% and 78%, respectively). In their

sample of 125 students, Freeston et al. (1991) reported that approximately 55 percent of individuals tried to replace the unwanted thoughts with another and 30 percent engaged in a distracting activity. As previously noted, one specific cognitive distraction strategy that has received significant empirical attention is suppression. Worry, defined as replacing one negative thought with another negative thought (Wells & Davies, 1994) would be considered a cognitive distraction strategy. However, as the preceding review of findings from the literature on suppression suggests, trying to suppress a thought by replacing it with another thought has a paradoxical effect on mood.

What is clear from the preceding review on cognitive coping and mental control is that mental strategies for dealing with negative cognitions have potential consequences for individuals who are depressed. Indeed, the failure of mental control strategies to regulate thoughts and mood often comes with significant costs to physical and emotional well-being (for a review see Wegner & Pennebaker, 1993). There may also be psychological costs associated with perceptions about failure to mentally control thoughts and subsequent mood. The concepts of perceived mental control and rumination are now reviewed.

1.8.1 Perceived Mental Control.

From the preceding discussion we can see the potential importance of mental control to a study on retrieving and forgetting of negative memories. Both the emotional valence and self-relevance of memories may make them more difficult to dismiss. Further, if the paradoxical effect of attempts to mentally

control thoughts results in an increase in mood intensity that might also impede induced-forgetting attempts. One important aspect of mental control that warrants discussion is the degree to which our perceptions about our ability to effectively control cognition affect our mood and thus, may also affect induced-forgetting outcomes. That is, if individuals perceive poor ability to control mental content, then perhaps poor perceived ability to control mental content will be indicative of less induced-forgetting.

A full understanding of how the individual appraisal of mental control abilities affects cognitive processes is hampered by both a lack of research on how poor perceptions of mental control influence depressed mood and by few measures designed to assess perceived mental control. The detrimental effects of negative appraisal on mood state have been documented in several studies (see Clark, Beck, & Alford, 1999 for a review). The Control of Unwanted Thoughts Scale (CUTS) was developed as a subjective measure of control over unwanted cognitions and the appraised consequences of mental control failure (Rhyno, Clark, & Purdon, 2003). Initial psychometric assessment suggested that the instrument reliably assessed perceived mental control in a sample of 545 undergraduate students. Although this research is largely based on thoughts, images, and memories that are identified by individuals as unwanted, it is reasonable to postulate that individuals who believe they have poor mental control abilities might have deficits in forgetting. Indeed, in their sample, high scores on the CUTS (indicating poor perceived control) were associated with

higher scores on a symptom checklist for depression (r = .53; Rhyno et al., 2003). In addition, poor perceived mental control accounted for a significant portion of the variability in depression scores and was a statistically significant predictor of depressive symptoms. Thus, perceived mental control is a plausible individual difference factor for retrieval and forgetting success. Since depression and negative mental content share a close association, the preceding section provided a general overview of the idea that attempts to control negative thought through attentional processes often produce the unwanted effects of prolonged or intensification of mood states. Next, is a discussion of rumination conceptualized as both an attentional process and coping strategy.

1.8.2 Rumination

Several theoretical perspectives have advanced our current understanding of rumination and its role in depression. Rumination can be conceptualized as a symptom of the depressive state itself (Robinson & Alloy, 2003) or as a reaction to the onset of a depressed mood state (Nolen-Hoeksema, 1991). As a symptom of depression, research has suggested that rumination in this context precedes the onset of a depressed mood. As a coping response, rumination is thought to occur in response to the onset of a depressed mood. It is rumination as a response to mood that is of interest in the present study.

Ruminative coping, according to Response Styles Theory (RST; Nolen-Hoeksema, 1987), refers to a particular response strategy. The RST posits that the ways in which people respond to a depressed mood may exacerbate the

symptoms of depression and prolong the negative mood state. Rumination in response to a depressed mood (experimenter induced or naturally occurring) has been associated with increased depressive symptoms over time (Nolen-Hoeksema & Davis, 1999; Nolen-Hoeksema, Larson, & Grayson, 1999), prolonged depressed mood state (Nolen-Hoeksema & Morrow, 1993), the onset of a future depressive episode (Just & Alloy, 1997; Roberts, Gilboa, & Gotlib, 1998), and prediction of further deterioration of the course of a depressive disorder (Kuehner & Weber, 1999). These effects have been demonstrated through correlational and experimental investigation. However, an important caveat is the measurement issues associated with several studies on rumination and depression.

Rumination has typically been assessed using the Ruminative Responses Questionnaire (RRS), a self-report subscale of the Response Styles Questionnaire (RSQ). The RRS is a 22-item inventory believed to represent those thoughts and behaviours indicative of ruminative coping. Some research suggested that rumination, as it is defined by and measured with the RRS, embodies a gender stereotype indicative of how women and girls are expected to behave (Strauss, Muday, McNall, & Wong, 1997). Others have suggested that rumination, as measured by the RRS, is actually tapping depressive phenomenology itself because of the overlap of items from the RRS and measures of depression (e.g., Conway, Csank, Holm, and Blake, 2000; Cox, Enns, & Taylor, 2001). As is often the case, studies of rumination and depression have used the Beck Depression

Inventory (BDI) to assess depressive symptoms and as a result of large correlations between the BDI and RRS, which make findings vulnerable to misinterpretation due to multicollinearity. The correlation between RRS and BDI items has been reported to be between .48 and .56 (Butler & Nolen–Hoeksema, 1994; Nolen-Hoeksema, 2000).

The RRS has also undergone extensive psychometric analysis (Bagby & Parker, 2001; Cox, Enns, & Taylor, 2001). For example, Bagby and Parker (2001) used factor analysis to extract two distinct factors, self-focus and symptom focus, suggesting a two-component model of rumination. Further, Bagby, Rector, Bachiochi, and McBride (2004) investigated the stability of the RRS two-component model and found that both the self-focus and symptom-focus aspects of the RRS were stable measures of "a reliable individual difference variable that prolongs and exacerbates depressed mood" (p. 534). However, the RRS captures behavioural aspects of rumination (e.g., sharing one's feelings with friends) that far extend the construct beyond the internal realm central to the concept of mental control.

Conway, Csank, Holm, and Blake (2000) developed the Rumination on Sadness Scale (RSS) that seems to fit with the concept of mental control as a cognitive rather than behavioural entity. In three studies assessing the psychometric properties of the RSS compared to the RRS, Conway et al. provided evidence for the reliability and validity of the RSS (see Luminet, 2004 for a complete review). Rumination was redefined as "recurrent thoughts concerning

one's present distress and the circumstances surrounding the sadness" (Conway et al., 2000, p.404). Subsequent use of the RSS reveals that the tenets of RST of depression appear to hold, at least for adult populations (e.g., Conway, Mendelson, Giannopoulos, Csank, & Holm, 2004). Before reviewing the literature on rumination, it is important to consider the definition of rumination in terms of its relationship to other related constructs (e.g., worry).

Rumination can be distinguished from other cognitive constructs such as worry, negative automatic thoughts, and mental problem-solving activities. Several features characterize worry and worrisome thoughts: a) worries involve thinking about and anticipating pending threat whether real or imagined; b) worries are more akin to mental images; c) worries contain more verbal content; and d) worries are of shorter duration. In contrast, ruminative thoughts are usually focused on the past and are of longer duration (e.g., Nolen-Hoeksema, 2004; Papageorgiou & Wells, 2004). This suggests that ruminators focus attention on events already stored in memory rather than anticipating events to come. Nolen-Hoeksema and her colleagues (1993) suggested that worriers tend to take action against pending threat, whereas ruminators may think about their situation but they fail to act in any way to alter the outcome.

Nolen-Hoeksema (2004) also distinguished between Beck's negative automatic thoughts and rumination. According to Nolen-Hoeksema (2004), negative automatic thoughts are a set of distorted cognitions, whereas rumination is a set of behaviours and thoughts representative of a particular

style or response to mood. Nolen-Hoeksema (2004) referred to rumination as an attentional style that focuses on the negative aspects of self. While negative automatic thoughts may be the by-product of rumination and other cognitive events, they remain distinct phenomena. In addition, rumination is a passive process. That is to say that there is no active thought or behaviour on the part of the ruminator to change his or her current situation. In contrast, the problem-solving process is viewed as an active process in which a person engages with the intent to resolve a given problem or situation.

Papageorgiou and Wells (2004) suggested that rumination, while sharing a number of features with worry and negative automatic thoughts, is different from other constructs on a number of dimensions (e.g., duration, content, and time frame focus). As well, normal ruminative thinking can be differentiated from the more pathological forms of rumination such as depressive rumination (Papageorgiou & Wells, 2004). This is evidenced in the research findings of Nolen-Hoeksema and Morrow (1993), who found that rumination in the absence of depressed mood state has virtually no negative impact on aspects of mood (i.e., no exacerbation of mood). Would the same be true of the effect that rumination has on an individual's ability to forget? To answer this question, attention is now drawn to the literature on rumination and memory.

1.9 Rumination and Memory

The RST of depression suggests that there are several ways in which rumination exacerbates the symptoms associated with a depressed mood state

(for a detailed review see Nolen-Hoeksema, 1991). Of particular importance is the relationship between rumination and memory. Based on the evidence from various studies on memory and information processing, Nolen–Hoeksema (1991) suggested that rumination interferes with one's ability to process thoughts effectively, particularly if those thoughts are emotionally laden and self-focused. Rumination heightens the accessibility of negative memories, making them more salient and thus readily available, which may reduce the efficacy with which an individual is able to inhibit them or shift to more positive or external thoughts in an effort to improve mood state.

One experimental study, which provides some indirect evidence that rumination activates more negative memories and therefore might negatively influence the ability to shift attention to something else, comes from Lyubomirsky, Caldwell, and Nolen-Hoeksema's (1998) study on executive functioning and mood. These researchers induced a depressed mood on half of a sample of undergraduate students. Dysphoric ruminators recalled more negative memories during both a free and cued recall task. In addition, dysphoric groups who ruminated reported that negative memories occurred at a higher frequency than positive memories and generated more spontaneous negative memories when engaged in rumination (Lyubomirsky et al., 1998). These findings provide experimental evidence for a causal effect for the increase in activated negative self-relevant memories.

In addition to the activation of negative memories is the question of the effects of rumination on the cognitive capacity to control such memories. Neuropsychological systems, of which memory is one, play an important role in the ability to process information. While neuropsychological deficits such as impaired attentional processes share a relationship with depression, only a handful of studies has investigated neuropsychological deficits associated with depression in the context of rumination (e.g., Teasdale, Green, & Hilary, 2004; Watkins & Teasdale, 2001). One study was not specific to neuropsychological function but rather used general concentration on school-related tasks as its dependent measure (Lyubomirsky, Kasri, & Zehm, 2003). Findings suggested that rumination does impair one's ability to concentrate on academic tasks. In this context then, impairment in concentration, a feature of depressive disorders, is affected by the response style employed. Poor concentration or inability to attend may impede the ability of individuals to follow instructions to forget.

In a more direct examination of neuropsychological functioning, Davis and Nolen-Hoeksema (2000) asked dysphoric and non-dysphoric ruminators to complete a number of tasks designed to assess working memory (Digit Span), general intellectual ability (Vocabulary subtest of the Wechsler Adult Intelligence Scale), and cognitive flexibility (WCST). Notably, the measures selected by Davis and Nolen-Hoeksema are recognized as appropriate measures of the constructs. Results indicated that dysphoric ruminators experienced significantly more difficulty in tasks requiring cognitive flexibility than their non-dysphoric

ruminator counterparts (Davis & Nolen-Hoeksema, 2000). While this study assessed a limited sample of attentional and executive functions, it provides initial support for the relationship between maladaptive cognitive responses to depression (rumination) and neuropsychological deficits in the context of depressed mood. Further, it demonstrates that rumination may be strongly associated with poor inhibitory control, a mechanism believed to underlie induced-forgetting.

The remaining studies assessed the effect of both adaptive and maladaptive response styles on specific deficits in random number generation (e.g., Watkins & Brown, 2002) and autobiographical memories (e.g., Lyubomirsky, Caldwell & Nolen-Hoeksema, 1998; Park, Goodyer, & Teasdale, 2004; Teasdale, Green, & Hilary, 2004). For example, Watkins and Brown (2002) compared non-depressed and depressed adults on their performance of random number generation on experimentally induced rumination and distraction. Results suggested that when ruminating, depressed individuals showed marked impairment in a number generation task. Watkins and Brown suggested that rumination may better account for specific deficits in the executive system than the depressive symptoms themselves. It is argued here that random number generation is not an adequate reflection of executive function. However, Watkins and Brown raised an interesting hypothesis regarding the role of response style in relation to depression and neuropsychological deficits.

The finding that experimentally induced ruminating in response to a depressed mood impairs the ability to retrieve positive memories is quite robust. In addition, evidence suggesting neuropsychological deficits are possible outcomes of depressed mood and ruminative coping may help to predict what might happen for individuals participating in induced-forgetting paradigms. Indeed, rumination appears to be a critical factor in the maintenance of depressive disorders. The evidence reviewed in the preceding paragraphs suggests that rumination has deleterious effects on mood states, particularly for women and starting at adolescence. Underlying rumination is cognitive inflexibility that may involve poor inhibitory control and perseveration. This raises the question of whether a ruminative coping style predicts deficits in induced-forgetting or whether a wide variety of coping responses make individuals more vulnerable to the inability to suppress negative memories.

1.10 Rationale for the Present Study

The primary goals of the present study were three fold. First, the present study aimed to investigate how mood state affects the ability of individuals to both retrieve and then forget self-relevant negative emotional memories. Second, this study explored whether one forgetting paradigm worked more effectively than another for dysphoric versus non-dysphoric individuals by directly comparing forgetting paradigms in terms of their relative efficacy in achieving forgetting effects for negative memories. A third goal was to expand current knowledge of induced-forgetting by examining which cognitive factors (e.g.,

perceived mental control, mental control strategies, and rumination) were more strongly associated with, and best predict, the ease of retrieval of autobiographic memories and individual susceptibility to induced-forgetting of the same.

What is clear from the preceding evaluation of the relationship between mood and memory contextualized in Beck's (1987) cognitive model of depression is the opportunity to re-evaluate the schema activation hypothesis by addressing some of the methodological concerns (e.g., a more ecological operationalisation of accessibility and controlling for specificity versus generality of memories) from the existing body of literature. In addition, this study sought to determine if the very act of generating negative memories is in and of itself detrimental to mood and thus a plausible explanation for a lack of difference in generation time. Therefore, the present study is in part a replication of past research. In addition, the results of this study provide further evidence in general of the tenet of schema activation and cognitive theory by adopting a more ecologically valid method of assessing memory accessibility. The Cognitive Theory of Depression predicts that dysphoric mood will increase the accessibility of negative memories and thus, the time to generate these memories should be quicker for individuals who score high on a measure of depressive symptoms.

The preceding review of the literature also revealed several gaps in the current knowledge about induced-forgetting, mood, and mental control. First, while autobiographic content of an emotional nature has recently been used in both the RIF (Barnier, et al., 2004) and DF (Joslyn & Oaks, 2005) paradigms with

success, a comparison of efficacy of one paradigm over another is not possible at an empirical level. In his review of the literature on forgetting, Anderson (2005) compared DF and RIF at the theoretical level in terms of procedural differences, underlying causes of forgetting effects, and the relationship between these two paradigms. Thus, this study makes an important contribution to current knowledge about efficacy of forgetting paradigms using autobiographic material by making a direct empirical comparison of methods.

Second, although previous research has suggested deficits in forgetting emotional material for depressed and dysphoric individuals (e.g., Hertel & Gerstle, 2003), other studies have found no such effect (e.g., Dumont, 2000). A predicted deficit in forgetting is consistent with the Cognitive Theory of Depression (Beck, 1967, 1987) and the schema activation hypothesis. The present study contributes to the understanding of how mood state might affect the efficacy of individual forgetting paradigms. In addition the aforementioned studies used emotionally valenced words and thus, a further contribution lies in the use of self-relevant autobiographic content.

Third, previous research on the forgetting of autobiographic content has typically included content that is both positive and negative. Since depression and dysphoria are hallmarked by a mood-congruent propensity for increased accessibility of negative mental content, an assessment of forgetting in the context of all negative content may be particularly important for intervention. For example, if a depressed client struggles to access positive information, it

might be important to know that induced-forgetting of some negative mental content can occur at the expense of other negative content in the absence of any available positive content, at least until clients have had the opportunity to alleviate their dysphoria. Thus, the present study eliminated the use of positive or neutral material.

Finally, as forgetting is a cognitive process, it is possible that mental control and cognitive coping strategies share a relationship with memory processes such as forgetting paradigms. However, the extent of these relationships has not yet been examined. Thus, the results of the present study potentially expand on the cognitive products offered by Beck's (1987) Cognitive Theory of Depression and may offer insight into viable areas of further research into faulty cognitive processing that may ultimately lead to the onset or maintenance of depressive symptoms.

Addressing the gaps in our current understanding of autobiographic retrieval, induced-forgetting, depression, and cognitive risk factors are particularly important for several reasons. First, the findings from the studies of dysphoria may provide valuable insight into the phenomenon of depression and the onset, maintenance, and treatment of the clinical disorder itself. In addition, support for predictions about schema activation, the efficacy of forgetting paradigms in the context of mood, and individual differences in forgetting promises to inform preventative strategies for reducing the likelihood that repeated episodes of dysphoric mood will lead to the onset of full-blown clinical

depression. Finally, a study that combines the elements of self-relevance as is the case with mood-congruent memories, mood, and negative emotional valence will elucidate more clearly how these constructs, the very constructs believed so essential to the maintenance of dysphoric mood, facilitate or impede induced-forgetting.

1.10.1 Research Questions and Hypotheses

Question 1: What is the nature of the mood-memory relationship in terms of accessibility of negative memories?

Hypothesis 1: Non-dysphoric individuals will be slower than the dysphoric group in terms of the time it takes to recall a set of negative autobiographic events.

***Question 2*:** Is RIF a superior paradigm to induce the forgetting effect even when participants are dysphoric?

Hypothesis 2: There will be a significant 3-way interaction among instruction, mood, and paradigm in which RIF will produce the largest forgetting effect for individuals who are dysphoric. The forgetting effect of DF will depend on whether participants are dysphoric.

Question 3: Does mood state differentially affect forgetting or does it depend on the specific forgetting paradigm employed?

Hypothesis 3: There will be a 2-way interaction between mood state and forgetting paradigm. That is, the effect of mood state on the amount of forgetting will depend on the paradigm used. It is expected that the

amount of forgetting will be highest for non-dysphoric individuals in the RIF paradigm compared to both non-dysphorics in the DF paradigm and dysphorics in the RIF and DF paradigms. It is also predicted that a DF effect will not be demonstrated for the dysphoric group compared to their non-dysphoric counterparts but that RIF will produce a significant forgetting effect for the dysphoric group.

Question 4: Does the affect of mood state on the amount of negative memories forgotten depend on the instructions given?

Hypothesis 4: There will be a 2-way interaction between mood and instruction condition. The within-subjects scores for amount of forgetting for the non-dysphoric group will be higher in the remember condition (RR and NRP) than in the forget condition (RF and Rp-) compared to the dysphoric group.

Question 5: Will the forgetting paradigms evidence a forgetting effect with RIF yielding a forgetting effect greater than DF?

Hypothesis 5: There will be a 2-way interaction between forgetting paradigm and instruction condition. That is, the amount forgetting produced by each paradigm will depend on the instruction condition. The percentage of memories recalled will be highest in the remember instruction condition (RR and NRP) compared to the forget instruction condition (RF and Rp-) and will be greater for RIF than either DF method.

Question 6: Are negative autobiographic events subject to induced-forgetting effects? Similar to the findings of Barnier et al. (2004) and Joslyn and Oakes (in press) that autobiographic memories are subject to both DF and RIF the following prediction is made:

Hypothesis 6: There will be a main effect for instruction. The amount of memories recalled from the to-be remembered category will be higher than the amount of memories recalled from the to-be-forgotten category.

Question 7: Does mood state affect the efficacy of induced-forgetting of negative memories?

Hypothesis 7: Mood state will affect the amount of forgetting that occurs. The amount of forgetting will be higher for the non-dysphoric group than the dysphoric group.

Question 8: Given the rebound effect commonly found in dysphoria and depression, does the forgetting paradigm affect the amount of forgetting that will occur?

Hypothesis 8: There will be a main effect for forgetting paradigm. The forgetting paradigm used will affect the amount of forgetting that occurs. The RIF paradigm will produce the greatest amount of forgetting compared to either DF-item or DF-list, which should produce similar amounts of forgetting.

Question 9: Will the same results comparing DF and RIF be found when the practice effect components (NRP and Rp+) of RIF are used in analyses instead of the forgetting effect components?

Question 10: What is the relationship between cognitive vulnerability factors in depression and an individual's ability to generate and then to forget negative memories using induced-forgetting?

Hypothesis 9: Higher scores indicating poor perceived mental control over cognitions will be associated with faster memory generation time.

Hypothesis 10: High scores on self-report rumination will be associated with faster memory generation time.

Hypothesis 11: There will be a significant relationship between the mental control strategies and the amount of time to generate a set of memories. No specific predictions are made as to which strategies are correlated with generation time or the direction of the association between strategy and generation time.

Hypothesis 12: Lower scores indicating poor perceived mental control over cognitions will be associated with lower forgetting rates.

Hypothesis 13: High scores on self-report rumination will be associated with lower rates of forgetting.

Hypothesis 14: There will be a significant relationship between the mental control strategies and the amount of forgetting. No specific predictions are

made as to which strategies are correlated with forgetting or the direction of the association between strategy and forgetting.

Hypothesis 15: Low scores indicating poor perceived mental control over cognitions will not benefit from retrieval practice in RIF.

Hypothesis 16: High scores on self-report rumination will be associated with no benefit of retrieval practice in RIF.

Hypothesis 17: There will be a significant relationship between the mental control strategies and the RIF practice effect. No specific predictions are made as to which strategies are correlated with practice or the direction of the association between strategy and the RIF practice effect.

CHAPTER 2: METHOD

2.1 Participants

Participants were recruited from several sources. First, 111 participants were recruited from the psychology participant pool during fall and winter terms, and they received one bonus mark for each half hour of research participation. The total participation time was 2 hours. The study was posted on a secure web page (http://usask.sona-systems.com/). Participants signed-up to participate after reading a description of the study (several studies are posted simultaneously) and then selected from a number of pre-scheduled appointment times.

Second, 4 students from an introductory-level spring and summer psychology class participated in exchange for course credit with the permission and agreement between the instructor and the researcher. Research participation by students enrolled in summer classes is often encouraged to permit a broader understanding of the research enterprise. In addition, it provides students enrolled in summer classes with the opportunity to earn 1 bonus mark for each half-hour of participation that they would not otherwise earn because they are taking classes outside the regular school terms.

Finally, 3 participants were recruited from the community through word of mouth about the study. They expressed an interest in participating and ethics approval was obtained. However, these participants were deemed inappropriate to include in analyses because of the potential distinction of a community-based

sample from that of a university sample and the fact that these participants were over the age of 60 years. Given the potential confounding effects of aged-based changes in memory, it was decided that participant data from these individuals should not be included in final analyses.

The resulting group of participants was a convenience sample of 115 undergraduate students enrolled in a mid-western Canadian University. Following informed consent (see Appendix A), several participants were excluded from the study as follows: one participant was excluded because s/he was not fluent in English and failed to comprehend the instructions; 1 additional participant indicated that s/he was currently under the care of a mental health professional, and thus s/he was excused from further participation without penalty in order to avoid the potential harm to these individuals regarding the processing of negative memories; 7 participants opted to discontinue the study after 30 minutes because they only needed 1 additional bonus point to meet the required 5 for their introductory psychology course; an additional 3 participants evidenced significant psychological distress during the initial phase of the study and thus, were excused from the study. The researcher secured immediate psychological services for these 3 individuals. An additional 40 appointments were posted for student participation sign-up. However, no students volunteered over the remainder of the summer session in exchange for course credit. As the primary researcher would be unavailable for the fall and winter terms, and a degree of clinical skill was needed during the memory generation

phase of this study, participant recruitment was halted until preliminary results were evaluated to determine the need to proceed with recruitment.

The resulting sample size for analysis was 103 participants. Ninety-two participants continued through to complete the second phase of the study (representing 89 percent of the phase 1 participants). Of the 103 participants used in analyses associated with phase 1, 74 percent were female and the mean age was 20.4 years (SD = 3.22). Ninety percent of participants indicated that English was their first language and the remaining 10 percent reported fluency in English. Fifteen percent of participants reported that they had been previously treated for a mental health problem with 7.8 percent reporting current treatment for school related difficulties. Of the 103 participants, 6.8 percent reported that they had participated in a study about remembering word pairs. Participant demographics from the first phase of this study were comparable to demographics in the second phase.

2.2 Design

The study took place in two phases: a memory generation phase (phase 1), and an induced-forgetting phase (phase 2), each of which is described in the procedure section. In the memory generation phase, a quasi-experimental between-subjects design in which the between-subject variable was mood with 2 levels (non-dysphoric and dysphoric) was used to examine group differences on several variables. First, dysphoria was measured and subsequent scores used to categorize individuals as either dysphoric or non-dysphoric. Three variables

measuring mood state were examined (sadness, positive, and negative affect). Sadness, positive, and negative affect were measured before memory generation and after memory generation to determine the effect of the memory generation task on aspects of mood state. Generation time (the time to generate a predetermined set of 32 negative memories) was also measured.

Finally, 3 variables were measured to ensure that groups did not differ in terms of how negative, clear, and old their memories were. These same variables were then used to provide a means of methodological control over memory characteristics among each induced-forgetting paradigm. That is, for the DF paradigm all memories were distributed among designated to-be-forgotten or to-be-remembered categories such that clarity, negativity, and age ratings were equal between the two categories. For the RIF paradigm, the same procedure was used to distribute memories equally according to negativity, clarity, and age among the Rp+, Rp-, and NRP categories of the paradigm. This was designed to ensure that differences in paradigm efficacy could be attributed to paradigmatic differences and not differences in memory characteristics.

The induced-forgetting phase of the present study was designed as a 2 (condition) by 2 (mood) by 3 (forgetting paradigm) mixed factorial design (see Table 1 below). Using prior research as a guide (e.g., Barnier et al. 2004; Joslyn et al., 2005), it was decided that a sample of 20 participants per cell should be adequate to demonstrate the forgetting of autobiographic events. Given the moderate to large size of the effects obtain in previous studies, and typical cell

sizes of 15 to 25 participants, 20 participants per cell was deemed adequate to demonstrate an effect if one existed. Using a mixed factorial design in which there was one within-subjects variable, a total sample of 120 participants were required.

Table 1. Diagrammatic representation of the research design for Phase 2.

		Paradigm		
Mood	Instruction	DF-Item	DF-List	RIF
Non Dysphoric	Exp. Condition	S_1	S_2	S_3
	Baseline Condition	S_1	S_2	S_3
Dysphoric	Exp. Condition	S_4	S_5	S_6
	Baseline Condition	S_4	S_5	S_6

N = 120; n = 20.

For the purpose of demonstrating a forgetting effect, there was 1 within-subject variable (Instruction) in which participants served as their own controls with 2 levels: experimental (E) and baseline (B) condition. The baseline condition was the proportion of words remembered when told to remember (RR) for DF or the unpracticed unrelated list of memories in RIF (denoted as NRP). The experimental condition was the number of words remembered when told to forget (RF) or the related but unpracticed list of memories in RIF (denoted by Rp- for RIF). There were also two between-subjects independent variables: mood state with 2 levels: non-dysphoric and dysphoric. These groups were formed using a second CES-D scale administered during this second phase following cut-off scores of lower than 16 to indicate non-dysphoric and 16 or higher to

define the dysphoric group; and forgetting paradigm with 3 levels: directed forgetting–item (DF-item) method, directed forgetting–list (DF-List) method, and retrieval induced-forgetting (RIF) method. The dependent variable was the total number of memories remembered.

Additional variables measuring various aspects of mental control including: perceived mental control, different mental control strategies (e.g., distraction, punishment, worry, social control, and appraisal), and rumination on sadness, were examined in terms of the relationship among these aspects of mental control and memory, including, accessibility (operationalised as the time to generate), directed-forgetting effect (RR-FF) in the case of DF, and degree of impairment (NRP minus Rp-) in the case of RIF.

2.2.1 Analytic Strategy

According to Tabachnick and Fidell (2007), a meaningful regression solution can only be achieved with an adequate sample size. The authors suggest that in order to test the multiple correlations, a sample size > 50 + 8m (where m is the number of predictors) is required. Further, to test the individual predictors, Tabachnik and Fidell also indicate that the sample size should be >104 + m. For the present study, there were 10 predictor variables. In order to test the multiple correlations, sample size of more than 130 would be deemed sufficient to provide meaningful correlations and a sample size of 114 is adequate to test the individual predictors. The authors also advise that a more stringent sample size calculation be used when anticipating anything other than large effects.

Therefore, the present study utilized the mixed factorial ANOVA, t-tests with a Bonferoni correction, and Pearson correlations to evaluate hypotheses. Although an ANOVA approach is not without its constraints, one of which is using continuous variables in a dichotomous fashion, the ANOVA adequately addresses the questions of group differences and is deemed an appropriate analytic strategy for this study.

Finally, while not the best methodological strategy, it is common practice within research in medicine, psychology, and other behavioural sciences (Altman, 2006) to construct groups based on a single continuous measure of demographic and psychological construct (i.e., age, anxiety). This is often done at the expense of power and the present study acknowledges this cost.

2.3 Materials

Demographics. Participants completed a demographic questionnaire (see Appendix B) providing information to questions about age, gender, and exclusion criteria (e.g., "Are you currently under the care of a mental health professional?") as a way of describing the sample. In addition, participants answered questions about personal preferences (e.g., TV show that made them laugh and whether or not they would watch it again). These items were then used with other demographic information to generate 4 filler items at the beginning and 4 at the end of each list of personal memories in order to control for primacy and recency effects on a recall task in phase 2 (Ashcraft, 2006). The demographic questionnaire also included a place for participants to provide a

personalized code in order to match data collected in phase 1 to data for phase 2 without being able to identify participant names with data.

2.3.1 Mood State

2.3.1.1 Dysphoria. To classify participants as dysphoric and non-dysphoric, the Centre for Epidemiologic Studies Depression Scale (CES-D; Radloff, 1977) was used. The CES-D is frequently used to assess the existence and severity of symptoms of depression as listed in the Diagnostic and Statistical Manual of Mental Disorders-4th - Text Revision (DSM-IV TR; American Psychiatric Association, 2000) in non-clinical samples (e.g., the general population). The CES-D consists of 20 self-report statements with scores on each item ranging from 0 (rarely or none of the time) to 3 (most or all of the time). Participants are asked to consider each statement as it relates to the way they have felt for the past week. Scores can range from 0 to 60. Administration time is approximately 5 minutes. Cut-off guidelines suggest that total scores of 16 or more evidence clinically significant depressive symptoms (Radloff, 1977). For the present study, participants with scores of 16 or higher were categorized as dysphoric while scores less than 16 were scored as non-dysphoric.

The CES-D is appropriate for adult and adolescent populations (Radloff, 1991). The CES-D has also been used with undiagnosed samples and is acknowledged as a good research tool for studies assessing dysphoria as analogous to sub-clinical depressed mood states (Hann, Winter, & Jacobsen, 1999; Radloff, 1991). The CES-D is a reliable instrument with coefficient alphas

ranging from .89 for patients and .90 for healthy individuals (Hann, Winter, & Jacobsen, 1999). Satisfactory test–retest reliability over a 2- to 8-week period ranged from .51 to .67. For the current sample the coefficient alpha was .88.

2.3.1.2 Sadness. Mood state was also examined using a single item question (e.g., How sad do you feel right now?, see Appendix F) designed to identify a simple emotional state. Participants responded to the question on a 5 point Likert scale (1 = not sad at all and 5 = extremely sad). This measure was generated by the researcher.

2.3.1.3 Positive and negative affect. Positive and negative affect was assessed using the PANAS (see Appendix G). This measure was included as an additional means to assess mood inducing effects of the memory retrieval task and induced forgetting on negative or positive mood states. The PANAS is a self-report measure of the degree to which one experiences a number of mood state descriptors (Watson & Clark, 1988). The scale contains 20 adjectives to which participants assign a rating (based on a 5 point Likert scale where 1 = very slightly or not at all and 5 = extremely). The scale consists of ten positively valenced (PA) words and 10 negatively valenced (NA) words. Thus, two orthogonal subscales are scored independently and represent a minimum score of 10 and maximum score of 50 for PA and NA, respectively. Higher scores indicate the presence of the respective positive and the negative affective experience indicative of the words. The PANAS has reported acceptable reliability (e.g., Crawford; & Henry, 2004; Watson, Clark, & Tellegen, 1988) and

the coefficient alphas for pre and post assessment for the present sample was .78 and .80, for phase 1 and .79 and .80 for phase 2, respectively.

2.3.2 Memory Generation Cues

A list of 30 common negative words served as the source for finding 8 cue words for each participant, which were subsequently used to elicit negative memories (see Appendix H). The 30 words were drawn from a larger list of words with known negative valence from previous research on emotion and memory (see Barnier, Conway, Speyer, Mayoh, & Avizmil (in press); Cloitre, 1998; Myers, Brewin, & Powers, 1998). The decision to select from 30 possible cues was made to ensure that cues could be individualized to each participant. That is, while the cue word "failure" may elicit memories for some participants, it may not for others. Thus, the experimenter could select different words when participants reported that no memory had been evoked by a given cue word. The memory cues were presented verbally in random order and responses from participants in the form of a 5 to 15-word description were recorded on a memory record form (see Appendix I).

The decision to have participants generate 32 memories was based on several factors. First, previous research in DF indicted that 20 to 48 items (see MacLeod, 1998 for a review), which could then be divided equally among instruction conditions, would be sufficient to avoid floor and ceiling effects. Similar to DF research, the only 3 studies of RIF using autobiographic memories utilized a memory set of 20 (Joslyn & Oakes, 2005) to 30 (Barnier et al., 2004).

Subsequent pilot work prior to conducting the present study suggested that 32 memories would yield optimal results in terms of avoiding possible floor and ceiling effects.

2.3.3 Memory and Cue-word Characteristics

Participants rated each memory generated by a memory cue for emotional valence (to ensure that participants judged each memory to be at least somewhat negative) using a 2-item self-report scale (see Appendix J). In addition participants provided their age (in years) at the time the memory occurred. The measure of clarity and negativity was researcher generated based on the previous work of Barnier et al. (2004). The cue-words used to generate memories were also rated by participants in terms of how negative each cue word was using the same negativity scale (see Appendix K).

2.3.4 Memory Generation Time

The time to generate a total of 32 memories was tracked using a standard stop watch with hours, minutes, and seconds. Time was rounded to the nearest second. Generation time began after the first memory elicitation cue was presented and included the time it took for the researcher to prompt participants to be specific in their memories (e.g., If participants said, “I felt like a failure for 6 months,” the experimenter responded with, “provide a specific time and place when you felt like a failure”). The total time to generate the set of 32 memories was recorded.

2.3.5 Mental Control

2.3.5.1 Perceived mental control. To assess the degree to which individuals perceive they have good mental control over cognitive content, the Control of Unwanted Thoughts Scale (CUTS; Rhyno, Clark, & Purdon, 2003) was used (see Appendix C). The CUTS is a 40–item self-report scale designed as an indicator of poor mental control by assessing individual beliefs about mental control abilities. Participants respond to each item by circling the appropriate Likert value representing the extent to which they agree or disagree with each self-statement (4 = strongly agree and 0 = disagree/not applicable). Higher scores indicate poorer perception of mental control. The CUTS is a newly developed measure with a reported reliability alpha of .97 for college samples (Rhyno, Clark, & Purdon, 2003; 2004; 2005). The alpha coefficient for this study was .95.

2.3.5.2 Mental control strategy. To assess the specific mental control strategies individuals in the present study tended to adopt, the Thought Control Questionnaire (TCQ; Wells & Davies, 1994; see Appendix D) was used. The TCQ is a 30-item self-report measure of mental control strategies in which participants respond to each item on a Likert scale (1 = never, and 4 = almost always) as to the frequency they use each technique described in each item (see Appendix D). The CUTS and TCQ are highly correlated instruments (Rhyno, Clark, & Purdon, 2003). The TCQ measures strategies that can be used to control unpleasant and unwanted thoughts. The TCQ consists of 30 items which yield 5 subscales:

distraction (e.g. “I do something that I enjoy”; alpha = 0.82), social control (e.g. “I ask my friends if they have similar thoughts”; alpha = 0.81), worry (e.g. “I focus on different negative thoughts”; alpha = 0.78), punishment (e.g. “I punish myself for thinking the thought”; alpha = 0.69), and re-appraisal (e.g. “I try to reinterpret the thought”; alpha =0.67). The distraction subscale reflects both cognitive and behavioral distraction, while the social control subscale reflects seeking social validation about the thought by speaking with others. The Worry subscale is indicative of invoking alternative cognitions to worry about as a means to cope with negative thoughts. Items on the Punishment subscale reflect the use of self-criticism as a coping strategy. Last, the Reappraisal subscale contains items describing adaptive methods for coping with distress produced by unwanted thoughts. The internal consistency appears good, with alphas ranging from .64 to .79 across the five subscales (Reynolds & Wells, 1999; Wells & Davies, 1994). Subscale scores range from 6 to 24 with higher scores indicating the more preferred mental control strategy. No full-scale score is used. The TCQ demonstrated good reliability with individuals aged 18 to 75 years from a normative sample (Reynolds & Wells, 1999). The coefficient alpha for the present study ranged from .67 to .81 (see sub-scale coefficients noted above).

2.3.5.3 Rumination. To assess the extent to which participants ruminate in response to a sad mood, the Rumination on Sadness Scale (RSS; Conway, et al. 2000) was used (see Appendix E). The RSS is a 13-item self report measure of the tendency to ruminate on sadness. Participants are asked to respond to each item

in terms of the degree to which each statement applies to them. Each item is rated on a 5-point Likert scale where 1 = not at all and 5 = very much. Higher scores indicate the tendency to ruminate. Alpha coefficients for previous samples of healthy adults and college samples were .90 and .91, respectively (Conway, et al., 2000). The reliability for the present sample was .89.

2.4 Procedure

2.4.1 Memory Generation Phase

All participants were provided with a document outlining the purpose of the study, expectations of participants, and participant rights (see Appendix A). Participants indicated informed consent by signing the consent form and were also provided with their own copy. Participants then completed the demographic questionnaire. Participants were thanked for their participation, debriefed, and compensated accordingly if they indicated they were currently seeing a mental health professional and did not wish to continue. This exclusionary criterion was in place to minimize the potential risk that participating in a study on negative memories might somehow interfere with ongoing treatment. Next participants completed the CES-D, the single item mood check, and the PANAS. Once the self-report measures were completed, participants engaged in a memory retrieval procedure using the cue-word free association method (Crivitz & Schiffman, 1974). Instructions were given as follows:

"I am going to say out loud some cue words one at a time from this list. After I say each word, I would like you to try to think of a specific memory that somehow relates to the cue word I have said. By specific memory, I mean a specific event or experience that happened to you on a given date or time in a specific place. It can be as recent as yesterday or as far back in your childhood as you can remember. Once you have the memory in your mind, I want you to tell me about it in a sentence. I am not interested in how your memory relates to the cue word. The cue words are there to help you generate specific memories. Please tell me if you are unable to think of a specific memory for any word and we will try the next word. For example, I might say the word 'failure' to you. After I say failure, you might think for a second and say,' picking up my geology paper and seeing the 'F' marked in red.' I am going to repeat the words several times and each time I do I would like a different memory for the same word. For example, the next time I say failure, you might say,' trying out for the football team and not making the cut.' Any questions? Okay, the first cue word is ____"

A timer was set after the delivery of instructions, questions from the participant, and delivery of the first cue word. The memory exemplar description was recorded on the memory record sheet by the researcher and re-read to the participant to confirm accurate reflection of the memory. Once the memory was recorded participants were asked to select one word (a personal word – e.g., "exam") that would help them remember the event. This word was also recorded on the record sheet. Following each specific memory generated, participants

were asked how old they were when the memory happened. In addition, participants were given a self-report 5-point Likert scale with instructions to rate their memory for its degree of negative affect ("how negative was this memory?"; 1 = extremely negative, 5 = not very negative at all) and the clarity of the memory ("How clear in your mind is this memory?"; 1 = not very clear, 5 = extremely clear) (Barnier et al., 2004).

The process of cue word, memory exemplar generation, rating for negativity and clarity of each specific memory, and providing an approximate age continued until participants had generated 4 specific memories to 8 words on the cue word list. The timer continued to track time until all 32 specific memories were generated and rated. Participants were not told that memories were to be negative nor that they must generate a certain number of memories to control for any affect that knowing how many memories they would have to generate or prior knowledge of valence (negative tone of memories) might have on their mood or on performance. At the end of this process, participants completed another single-item mood check and the PANAS. Finally, the cue words used to generate memories were rated by participants for the degree of negativity (e.g., "How negative was the word _____?" 1 = very negative, to 5 = not very negative at all).

If participants were unable to generate an initial memory to a cue word presented for the first time, a subsequent cue word was used. To control for the possibility that memories may not be specific enough across all groups,

participants were prompted to provide details if the initial reporting of a memory was deemed too vague or non-specific by the researcher (e.g., when participants did not provide a memory from a specific time or place in their lives). Participants were reminded of their scheduled appointment for phase 2, which was to occur within 3 to 7 days of participation in phase 1. This delay was based on the minimum requirement of 3 days to reproduce memory sets into a power point presentation (see description below) and based-on participants own schedule of availability.

2.4.2 Induced-forgetting Phase

Individual sets of memories were then prepared according to DF-item, DF-list, or RIF procedures using a power point presentation format in 24 or 28 font so that the presentation of memories fit the width of the screen on no more than two lines. Participants provided the researcher with their individualized code from Phase 1 and then, the corresponding power point presentation was presented. Prior to presentation of the induced-forgetting paradigm, informed consent from Phase 1 of the present study was reviewed. Participants then completed a measure of depressive symptoms (CES-D) at the beginning of the second phase followed by measures of sadness and general negative and positive mood (PANAS). Participants were then engaged in one of three induced-forgetting procedures.

In all conditions participants were told that they would be shown combinations of the cue word – personal word – and memory exemplar on a

computer screen (e.g., “illness”- “food” – “I got food poisoning”). These combinations were an individualized list of the personal negative memories elicited by the same participants from phase 1. An additional 8 non-memory combinations were added as filler items designed to control for the primacy and recency effects that typically occur in recall tasks (Ashcroft, 2006). Filler items were taken from the demographic questionnaire.

Combinations (e.g., “illness”- “food” – “I got food poisoning”) were presented on a 19-inch flat screen computer monitor in a quiet laboratory. The following instructions were provided to each participant in the RIF paradigm:

> *You will now be presented with the cue – personal word – memory exemplar pairings elicited during the previous phase of the study. The pairings will appear and remain on screen for 10 seconds, followed by a blank screen for 2 seconds. Your task is to study these pairings and attempt to form a connection between the cue, personal word and memory exemplar. Any Questions? As each pairing appears on the screen,* ***I will read it out loud****. Try to form a connection in your mind.*

After completion of the presented list of combinations for study, participants in the RIF paradigm condition engaged in *retrieval-practice.* Individuals were told that they would be presented with some of the memory cue-personal exemplar pairs and would be asked to retrieve (say out loud) the correct personal memory example (e.g., “illness” – “food” – “????”). This retrieval practice process continued for three consecutive trials (all participants

demonstrated 100 percent accuracy in retrieval on the first trial and on all subsequent trials).

The portion of the list selected for retrieval practice for RIF was generated based on previous ratings of negativity obtained during phase 1 to ensure even distribution of negativity, clarity, and age of memory across Rp+, RP-, and NRP categories. Participants were given 12 seconds from the time each item appeared on the screen to report the correct memory before the next category cue-personal exemplar pair appeared. The participant indicated that the correct exemplar had been retrieved by saying "yes" at which time the experimenter asked for the memory phrase. Participants continued for three retrieval-practice trials. After completing the RIF retrieval practice, participants were given the distractor task (see Appendix L) in which they were asked to spend the next three minutes crossing out all of the vowels in a visual search task. Finally, the cue words were presented on screen, randomly one at a time, and participants were asked to recall (write down) all the personal words and memory exemplars associated with each cue. Primacy and recency were also controlled by presenting 4 filler cues at the beginning of the recall task followed by the target cue words, followed again by 4 filler cues. Each word was presented on the screen and remained for 60 seconds at which time a bell sounded indicating that the next cue word had appeared.

For participants in the DF-item paradigm, the following instructions were given:

You will now be presented with the cue – personal word – memory exemplar pairings elicited during your last visit. The pairings will appear and remain on screen for 10 seconds. After each pairing you will be instructed to either ***REMEMBER*** *or* ***FORGET*** *the pairings you just saw. The word* ***REMEMBER*** *or* ***FORGET*** *will appear on the screen following each pairing presentation. If a FORGET cue appears then you should forget those pairings but if a REMEMBER cue appears you will need to remember the pairings for a test of recall at the end of the experiment. Any Questions? As each pairing appears on the screen, I will* ***read it out loud.***

Each DF-item combination (e.g., "illness"- "food" – "I got food poisoning) appeared for 10 seconds and was then followed by a cue to either "forget" or "remember." The "forget" or "remember" instruction remained on the screen for 2 seconds before the next combination appeared. Participants were then given a filler task (visual letter search; see Appendix L) for three minutes. Upon completion of the filler task, participants were then given a sheet of paper and told that the cue words would now be presented on the screen one at a time and they were to provide all of the personal word-memory exemplar pairs associated with each cue word that they could remember regardless of whether they were previously told to remember or forget. The cued recall task was the same as for the RIF procedure outlined previously.

The procedure for the DF-list method was similar to the DF-item method with one exception. The initial instructions were as follows:

You will now be presented with the cue–personal word–memory pairings that were elicited during your last visit. Your task is to study the pairings so that you can remember as many as possible. The pairings will appear and remain on screen for 10 seconds, followed by a blank screen for 2 seconds. Any Questions? As each pairing appears on the screen, I will ***read it out loud.***

After a block of 16 pairings were presented the researcher was prompted to give the following instruction when a blank screen appeared with a small x in the bottom right hand corner of the screen:

I am sorry but I just realized that I gave you the wrong list of pairings to study! Forget that list. I'll start a new list that is the one you are suppose to remember. I'm so sorry for all your work. Forget what you saw and try now to remember this next list of pairings.

The cued-recall procedure was the same as for the DF-item method. For all induced-forgetting paradigms, each cue word was presented one at a time on the computer screen for 60 seconds. Participants were asked to write down all personal words and memories that they could regardless of any previous instructions to remember or forget (in the case of DF paradigms). A chime sounded to indicate that the next cue word appeared. Participants were instructed to take their best guess if unsure that a specific person word-memory matched a given cue word. Participants then completed post measures of positive and negative affect (PANAS) and the single item mood measure for sadness.

Further, all participants completed the self-report measures of mental control (CUTS, TCQ, RSS). All self-report measures were presented in a packet in which the order of presentation was randomized to control for possible order effects. In addition, half of the participants completed the measures before the induced-forgetting task and half completed the measures after the induced-forgetting task and all post mood measures. Finally, when participants had completed the study, they were thanked for their participation, debriefed verbally and given a written debriefing form (see Appendix M) to take with them.

CHAPTER 3: RESULTS

3.1 Data Preparation

Prior to analysis, the data were screened for missing values. Any cases with more than 10% of their total data missing were excluded from further analysis. Two cases met this criterion reducing the sample for analysis to 103 participants. For cases with less than 10% missing data, of which there were 6, mean substitution was used (Tabachnik & Fidell, 2007). Next, data were screened for outliers using the procedures recommended by Tabachnik and Fidell (2007). A score was considered a univariate outlier if the z-score was more than 3 standard deviations from the mean and it was discontinuous from other scores as depicted in a histogram. No univariate outliers were present in the data. Normality was evaluated through examination of the skewness and kurtosis of each variable, and all variables met the criteria for this assumption.

3.2 Preliminary Analyses

Before conducting analyses to evaluate the hypotheses stated in Chapter 1, preliminary analyses were conducted on gender and memory characteristics (age, negative valence, and clarity) for the purposes of determining group differences that may result in alternative explanations for predicted results. Although not a specific prediction of the present study, it is well established in the literature that women experience depression twice as frequently as their male counterparts (e.g., Nolen-Hoeksema, 2001). While there is utility in investigating gender differences in depression at the symptom level, Clark and Beck (1999) argued that

vulnerability and risk of depression may be different for men and women and therefore, they suggest that gender differences should be evaluated in studies of depression and dysphoria. Where gender differences are found, Clark and Beck (1999) advise the use of separate analyses by gender. To determine if differences on any of the variables under investigation in the present study were influenced by gender, independent sample t-tests with unequal N assumed comparing males and females were performed on each measure of mood state. Alpha was adjusted using a Bonferroni correction to .004 for 12 comparisons to control for the possibility of making a Type I Error.

Table 2. Gender difference in measures of mood state variables.

	Sex	Mean	Std. Deviation	t-value
PA pre Time 1	Male	26.18	4.23	-2.15
	Female	28.67	5.45	
PA post Time1	Male	25.59	4.67	-0.96
	Female	27.25	8.50	
NA pre Time 1	Male	14.03	2.00	-1.05
	Female	15.01	4.47	
NA post Time 1	Male	15.22	4.46	-0.43
	Female	15.68	5.04	
PA pre Time 2	Male	23.67	5.19	-1.29
	Female	25.47	6.55	
PA post Time 2	Male	22.04	5.36	-1.69
	Female	24.57	7.03	
NA pre Time 2	Male	14.37	6.49	0.30
	Female	14.03	4.31	
NA post Time 2	Male	14.41	5.40	0.31
	Female	14.07	4.65	
CESD Time 1	Male	13.45	6.34	0.38
	Female	16.70	8.99	
CESD Time2	Male	13.18	5.86	0.53
	Female	14.96	6.95	
Sad (Time 1 pre)	Male	1.11	.32	-2.68
	Female	1.49	.70	
Sad (Time 1 post)	Male	1.96	.77	-0.74
	Female	2.09	.79	
Sad (Time 2 pre)	Male	1.22	.43	-0.95
	Female	1.36	.62	
Sad (Time 2 post)	Male	1.52	.67	0.05
	Female	1.51	.68	

N = 27 for males and 76 for females.

Analyses revealed no statistically significant gender differences on any of the measures of mood state. Thus for subsequent analyses, the sample was collapsed across gender. In addition to assessing for gender differences in mood state, a series of independent-sample t-tests were used to examine possible group

differences for dysphoric and non-dysphoric individuals on each of the measures of memory characteristics. This was an important feature of methodological control to ensure that memory characteristics were similar across forgetting paradigms (see Chapter 2). Using a Bonferroni correction, alpha was set at .02 for 3 comparisons to control for the possibility of making a Type I Error. Results are displayed in Table 3.

Table 3: Group differences on memory characteristics.

Variables	Means (SD) for Non-dysphorics	Means (SDs) for Dysphorics	*t*-test 1-tailed
Age of memories (in years)	4.00 (1.89)	3.53 (1.82)	1.18
Negativity of Memories	3.39 (.44)	3.58 (.45)	-1.91
Clarity of memories	3.63 (.52)	3.66 (.52)	-0.22

Note: N=103; *p< .02* *p<.05.

There were no statistically significant differences in the average age, negative valence, or clarity of memories for the dysphoric group compared to the non-dysphoric group. Since participants were not explicitly told to produce only negative memories, each memory was evaluated in terms of the rating of negativity given by the participant. A review of frequency data showed that all memories were rated as 2 (somewhat negative) or higher on the 5-point scale (1 = not negative at all and 5 = extremely negative). The average valence of the set of 32 memories was assessed to ensure that all participants were in fact, generating negative memories. For the entire sample, the mean valance rating was *M* = 3.47, *SD* = .45, (1 = not negative at all and 5 = extremely negative). Thus, all memories

used were deemed to have met the criterion of being negative in emotional valence.

To determine the extent to which the two mood groups (i.e., dysphoric versus non-dysphoric) may have differed on any of the individual difference factors, a series of independent sample t-tests were conducted using a Bonferroni adjustment of alpha to .007 for the phase 1 variables and .004 for the phase 2 variables. Table 4 represents the means, standard deviations, and t-values by mood group.

Table 4. Group differences in study variables.

	Non-dysphoric		Dysphoric		
	Mean	SD	Mean	SD	t-value
PA pre Time 1	28.32	5.27	27.69	5.37	0.59
PA post Time1	27.65	9.18	25.92	5.94	1.12
NA pre Time 1	13.57	2.48	16.00	5.19	-3.02*
NA post Time 1	15.37	4.49	15.77	5.39	-0.43
Sad (Time 1 pre)	1.17	0.43	1.63	0.76	-3.79**
Sad (Time 1 post)	1.94	0.75	2.18	0.81	-1.56
CESD Time 1	9.54	3.46	22.58	6.91	-12.90**
PA pre Time 2	25.18	6.05	24.68	6.65	0.39
PA post Time 2	24.88	6.59	22.24	6.67	1.95
NA pre Time 2	13.38	4.14	15.40	5.94	-2.02
NA post Time 2	13.06	3.70	16.03	5.92	-3.13*
Sad (Time 2 pre)	1.19	0.44	1.53	0.69	-2.85
Sad (Time 2 post)	1.36	0.62	1.74	0.69	-2.73
CESD Time2	10.49	3.79	21.40	4.66	-12.95**
CUTS	45.33	19.42	63.29	24.12	-4.13**
TCQ-Social	16.71	3.18	17.03	4.67	-0.42
TCQ- Punish	9.10	2.18	9.56	2.69	-0.95
TCQ-Worry	9.96	2.41	11.47	3.19	-2.72
TCQ-Distract	15.71	2.90	14.42	2.30	2.34
TCQ-Appraisal	13.29	2.55	15.11	3.49	-3.02
RSS	30.64	7.67	39.00	8.64	-5.09**

n = 52 for non-dysphoric and 49 for dysphoric. *p < .01; **p<.00

As expected, those in the dysphoric group evidenced a higher degree of sadness at Phase 1 prior to beginning memory generation. This difference disappeared upon completion of the memory generations phase. The two groups were similar in affect (sadness, NA, and PA) through Phase 2 of the study. In addition, the two groups differed on the level of perceived mental control and ruminative coping in response to sadness during the second phase of the study. Thus, participants in the dysphoric group perceived themselves as poor at controlling mental activity and were more likely to ruminate on their sadness, than the non-dysphoric group. Finally, CES-D scores used to categories the two mood groups for both phases of the study statistically differentiated the dysphoric from non-dysphoric groups. Therefore, having evaluated the differences related to gender, memory characteristics, and mood state, the primary analyses is now reported.

3.3 Memory Generation

It was predicted that individuals who were dysphoric would be faster at generating a set of negative autobiographic memories (Hypothesis 1). To test this hypothesis, an independent-sample t-test was used in which mood served as the independent variable with 2 levels (non-dysphoric or those whose CES-D scores were less than 16, and dysphoric or those whose CES-D scores were 16 or greater for Phase 1) and total time to generate 32 autobiographic memories served as the dependent variable. Mean scores on the average time to generate a set of 32 memories between the two groups are reported in Table 5. Although individuals

in the dysphoric group were faster at generating the set of memories, there was no statistically significant support for this proposition, *t (99)* = .989, p = .16 with the chance of detecting differences (power = 1 - β error probability) at .80. Individuals who were dysphoric took a similar amount of time to produce 32 memories as individuals who were non-dysphoric.

Table 5. Means and standard deviations for total time to generate a negative memory set.

Group	Mean (seconds)	Standard Deviation	N
Non-dysphoric	2697.21	441.05	54
Dysphoric	2611.34	430.61	49

3.3.1 The Mood Inducing Effect of the Memory Generation Task

Several researchers have suggested that the act of generating negative thoughts and memories may be in and of itself a mood inducing activity (see Clark, Beck, & Ashford, 1999 for a review). Although not a specific hypothesis of this study, it is possible that the lack of support for the predicted difference in memory generation time may relate to the fact that mood induction took place as a result of the task. Therefore, three post-hoc paired-sample t-tests were conducted using a Bonferroni correction setting alpha at .02, to determine if there were differences on the pre and post measures of mood, including an increase in sadness as indicated by the single-item sadness measure, a decrease in positive affect (PA), and an increase in negative affect (NA), which would then suggest

that negative autobiographic memory generation had the unintentional affect of inducing a negative mood state.

On the single-item measure of sadness, there was a statistically significant difference between self-report ratings of sadness for pre-test (M = 1.39, SD = .65) and post-test, (M = 2.10, SD = .79), $t(102)$ = -7.52, p = .001, suggesting that for all participants, self-report sadness increased after completing the memory generation task. In terms of general negative affect (NA), the difference between the pre-test of the PANAS Negative Affect (NA) subscale (M = 14.76, SD = 4.15) and post-test (M = 15.57, SD = 4.88), $t(102)$ = -1.76, p = .04, power (1 - β) = .99, approached statistical significance suggesting that participants experienced an increase in general negative mood state after completing the memory generation task. Mean scores on the PANAS Positive Affect subscale showed a significant drop from pre-test (M = 28.02, SD = 5.25) to post-test (M = 26. 81, SD = 7.69), and this difference was statistically significant $t(102)$ = 1.81, p = .02, 1 - β = .99. This suggests that all participants experienced a decrease in the degree of positive affect after completing the memory generation task.

3.4 Evaluating the Effect of Mood on Paradigm Efficacy

As stated in the introductory chapter of the present study, there are several differences between DF and RIF in terms of the forgetting components. For example, DF and RIF differ in that DF comprises a to-be-remembered component (RR) and a to-be forgotten component (RF), the difference of which represents the directed-forgetting effect. In contrast, RIF is comprised of three components, Rp+,

Rp-, and NRP in which the difference between Rp- and NRP component scores represents forgetting, and the difference between Rp+ and NRP represent the effect of practice. The primary analysis used to assess forgetting in each paradigm was the R component of DF as synonymous with NRP and the F component of DF as synonymous with Rp-.

To test hypotheses 2 through 8 (see Chapter 1), a 2 (mood) by 3 (paradigm) by 2 (instruction) mixed factorial ANOVAs was used. There was 1 within-subject variable (instruction) in which participants served as their own controls with 2 levels: experimental (E) and baseline (B) condition. The baseline condition was the proportion of words remembered when told to remember (RR) for DF or the unpracticed unrelated list of memories in RIF (denoted as NRP). The experimental condition was the number of words remembered when told to forget (RF) for DF or the related but unpracticed list of memories in RIF (denoted by Rp- for RIF). There were also 2 between-subjects independent variables: mood state with 2 levels: non-dysphoric and dysphoric; and forgetting paradigm with 3 levels: directed forgetting–item (DF-item) method, directed forgetting–list (DF-List) method, and retrieval induced-forgetting (RIF) method. The dependent variable was the number of memories remembered at recall.

Table 6 shows the means and standard deviations for each group. Effect sizes were also reported for these analyses because of the importance to future studies aimed at evaluating the clinical utility of forgetting as an intervention. Previous effect sizes in the literature indicate a moderate effect for forgetting

paradigm efficacy (see Barnier, et al., 2004; Joslyn & Oakes, 2005). All effect sizes are reported using partial eta-squared (η_p^2) because a partial eta is not influenced by the number and significance of other independent variables in the research design (Tabachnick & Fidell, 2007). Finally, of the participants who completed the initial CES-D for the purposes of grouping, the second administration revealed that 17 participants (19 percent) who were dysphoric at phase 1 were non-dysphoric at phase 2 and 7 participants (8 percent) who were non-dysphoric at phase 1 were dysphoric at phase 2. An evaluation of differences in measures of sadness, negative, and positive affect prior to and following the induced-forgetting paradigm procedure were not statistically significant suggesting that induced-forgetting did not alter mood-state.

Table 6. Means and standard deviations for the 2 by 3 by 2 ANOVA.

		Paradigm		
Mood	Instruction	DF-Item	DF-List	RIF
Non Dysphoric	Control Condition	61.01 (15.30) N=21	58.92 (13.13) N=14	59.21 (22.57) N=19
	Exp. Condition	57.14 (16.57)	55. 35 (21.77)	48.03 (24.74)
Dysphoric	Control Condition	57.95 (18.34) N=11	56.25 (22.82) N=13	59.37 (17.46) N=14
	Exp. Condition	60.79 (16.79)	63.46 (17.27)	58.39 (19.25)

SD or standard deviations are in brackets

It was predicted that there would be a significant 3-way interaction among instruction, mood, and paradigm in which RIF would produce the largest forgetting effect even for individuals who are dysphoric (Hypothesis 2). That is, the forgetting effect for each paradigm would depend on whether participants are

dysphoric. The 3-way interaction among paradigm, mood, and condition was not significant, F (2, 86) = .109, p = .897, η_p^2 =.003. The observed power was .07. A sample size of more than 1152 participants would be required to detect the small effect found for this 3-way interaction.

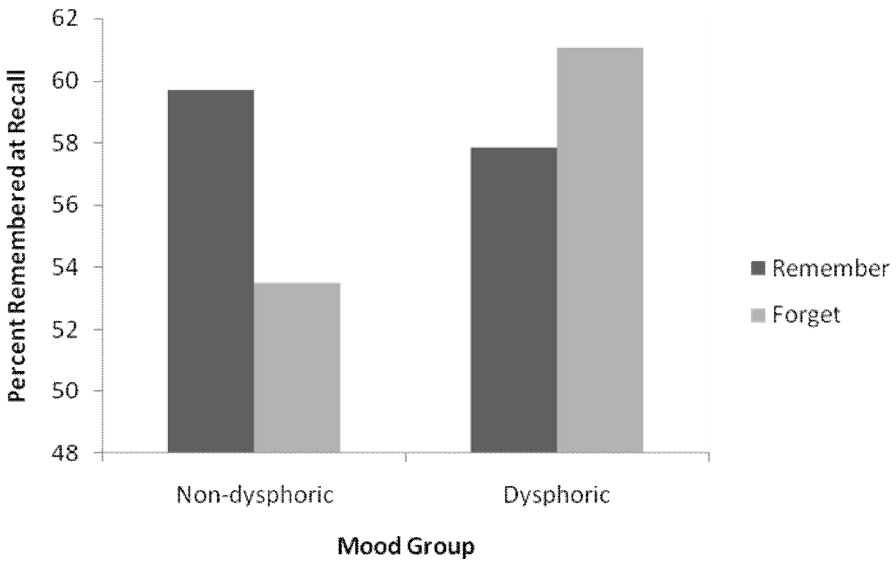
It was predicted that the effect of mood state on the amount of forgetting will depend on the paradigm used (Hypothesis 3). It was expected that the amount of forgetting would be highest for non-dysphoric individuals in the RIF paradigm compared to both non-dysphorics in the DF paradigm and dysphorics in the RIF and DF paradigms. The DF effect would not be demonstrated for the dysphoric group compared to their non-dysphoric counterparts but that RIF would produce a significant forgetting effect for the dysphoric group. The 2-way interaction between mood and paradigm was not statistically significant, F (2, 86) = 1.26, p = .288, η_p^2 =.03. The observed power was .73. That is, the efficacy of the paradigm used did not depend on whether individuals were dysphoric. Forgetting paradigms were no more effective for non-dysphoric individuals than for dysphoric individuals.

It was also predicted that the effect of mood on memory would depend on whether individuals were told to remember (RR and NRP) or forget (RF and Rp-) (Hypothesis 4). The interaction of instruction by mood was significant, F (2, 86) = 5.32, p = .024, η_p^2 =.06, power = .96. The within-subjects scores for amount of forgetting for the non-dysphoric group were higher in the remember condition

(RR and NRP) than in the forget condition (RF and Rp-) compared to the dysphoric group.

To determine which groups accounted for the difference, a post hoc analysis was conducted. To control for a possibly inflated Type I error rate, the alpha levels were set at .01 for 4 comparisons. Using independent sample t-tests, comparisons were made to contrast the two mood groups on how much was remembered in the baseline condition (RR or NRP), M = 59.83, SD = 17.45, for the non-dysphoric group and, M = 57.89, SD = 19.21, for dysphoric group. The groups did not differ significantly, $t(90) = .496$, $p = .307$. Similarly, no statistically significant difference was found between the non-dysphoric group, M = 59.83, SD = 17.45, and the non-dysphoric group, M = 57.89, SD = 19.21, on amount remembered in the experimental condition, $t(90) =-1.87$, $p = .03$. To determine if differences exist between baseline, M = 53.47, SD = 21.08, and experimental conditions, M = 59.84, SD = 17.45, for non-dysphoric group, a paired sample t-test was used. The difference was significant, $t(54) = -2.57$, $p = .007$. In addition, a comparison was made between baseline, M = 61.02, SD = 17.52, and experimental conditions, M = 57.89, SD = 19.20, for the dysphoric mood group. There was no significant difference in scores, $t(38) = .96$, $p = .171$. As Figure 2 represents, individuals who were dysphoric recalled more memories in the experimental condition, M = 59.46, SD = 2.71, than individuals who were not dysphoric, M = 56.61, SD = 2.35. The observed power was .27.

Figure 2. The mood by instruction interaction.



It was also predicted that the effect of paradigm on the amount remembered would depend on the instruction given (Hypothesis 5). Table 7 shows the means and standard deviations for each condition. No statistically significant 2-way interaction was found for instruction by paradigm, F (2, 86) = 1.26, p = .288, effect size, η_p^2 =.183. The observed power was .27.

Table 7. Means and standard deviations for each paradigm by instruction condition.

	Paradigm		
Condition	DF-Item	DF-List	RIF
Baseline Condition	59.96 (16.18)	57.63 (18.12)	59.28 (18.11)
	N=32	N=27	N=33
Exp. Condition	58.38 (16.47)	59. 25 (19.79)	56.58 (19.95)

Standard Deviation in brackets

It was predicted that the amount of memories recalled from the to-be remembered category would be higher than the amount of memories recalled from the to-be-forgotten category (Hypothesis 6). The 2 (mood) by 3 (paradigm) by 2 (instruction) mixed factorial ANOVA yielded no significant main effect for instruction, F (1, 86) = .543, p = .46, effect size, η_p^2 =.06, and the observed power was .11. Thus, participants recalled similar amounts of memories regardless of whether they were to-be-remembered versus to-be-forgotten. The number of participants needed to achieve sufficient power to detect this small effect would be 318.

It was also predicted that the amount of forgetting would be higher for the non-dysphoric group than the dysphoric group (Hypothesis 7) and that the forgetting paradigm used would affect the amount of forgetting that occurs (Hypothesis 8). The RIF paradigm was predicted to produce the greatest amount of forgetting compared to either DF-item or DF-list. Contrary to these predictions, the main effects of mood state and forgetting paradigm were not statistically significant, F (1, 86) = .241, p = .786, and F (1, 86) = .638, p = .427, respectively. That is, the dysphoric and non-dysphoric participants were similar in terms of the amount remembered, and the paradigm they were asked to use did not affect how much was remembered. The observed power was also low (.09 for mood and .12 for paradigm, respectively) suggesting a significantly larger sample (510 participants) would be required in order to increase the chances of detecting these small effects.

3.4.1 Exploratory Analysis of Mood and Individual Paradigms

To determine if the lack of power to detect differences in the previous analyses hinder the ability to demonstrate the robust forgetting effects, Directed Forgetting was analyzed separately from RIF using a 2 (mood) by 2 (instruction) mixed factorial ANOVA. The between-subjects variable, mood state, was defined in the same way as the previous ANOVA, at two levels (dysphoric and non-dysphoric). The within-subjects variable, instruction, also had two levels (R for to-be-remembered memories and F for to-be-forgotten memories). Analysis failed to find a main effect for mood, F (1, 57) =.15, p = .689, effect size, η_p^2 =.01, and observed power = .07. There was no significant main effect for instruction, F (1, 57) =.13, p = .719, effect size, η_p^2 =.01, and observed power =.07. The interaction between mood and instruction approached significance, F (1, 57) = 2.93, p = .09, for a moderate effect size, η_p^2 =.05. The observed power was .93. The amount of forgetting that could be induced using a directed-forgetting paradigm would likely depend on whether individuals were dysphoric or not.

Retrieval-induced Forgetting (RIF) was analyzed using a 2 (mood) by 3 (instruction) mixed factorial ANOVA. The between-subjects variable, mood was defined in the same way as the previous ANOVA at two levels (dysphoric and non-dysphoric). The within-subjects variable instruction had three levels (Rp+, Rp-, and NRP). There was a significant main effect for instruction, F (1, 31) = 10.71, p = .003, effect size, η_p^2 =.26, and observed power = .89. There was no significant effect of mood, F (1, 31) =.58, p = .452, effect size, η_p^2 =.02, and observed power =

.39. There was no significant interaction between mood and instruction, F (1, 31) =.01, p = .933, effect size, η_p^2 =.01, and observed power was .05. Given the moderate effect size reported in previous studies, a sample size of 66 participants would be needed to detect differences.

Since the main effect of instruction was significant, 2 paired-sample one-tailed t-tests (one t-test comparing Rp+ to NRP, the practice effect; and one t-test comparing NRP to Rp-, the forgetting effect) were conducted to determine which pair accounted for the difference. A Bonferroni correction was used to set alpha at .03 for 2 comparisons. The Rp+ / NRP difference was significant, t(32) = 4.66, p = .000. Participants recalled significantly more memories from the retrieval practice list (Rp+; M =72.75, SD = 15.11) than from the unrelated and unpractised (NRP) list of memories (NRP; M = 59.82, SD = 20.52). The NRP / Rp- difference approached significance, t(32) = -1.92, p = .03. Participants recalled more memories from the unrelated and unpractised list of memories (NRP; M = 59.82, SD = 20.52) than from a related but unpractised list of memories (Rp-; M = 52.65, SD = 22.91). Power for these analyses was .87.

3.5 Examining the RIF Practice Effect

As previously stated, there are several differences between DF and RIF in terms of the forgetting components. The third component of RIF is used in comparison with the other two to demonstrate a practice effect. To determine if the same results comparing DF and RIF would be found when the practice effect components (NRP and Rp+) of RIF are used in analyses instead of the forgetting

effect components, a second 2 (mood) by 3 (paradigm) by 2 (instruction) mixed factorial ANOVA in which the practice effect of RIF was examined in comparison to DF-list and DF-item forgetting effects. For this second ANOVA, there were two between-subjects independent variables: mood state with 2 levels: non-dysphoric and dysphoric; and forgetting paradigm with 3 levels: directed forgetting – item method (DF-item), directed forgetting – list method (DF-List), and retrieval induced-forgetting (RIF) method. The dependent variable was the number of memories remembered at recall. For the within-subjects variable (instruction), the baseline condition was the proportion of words remembered when told to remember (RR) for DF or the list of memories designated for retrieval practice in RIF (denoted as Rp+). The experimental condition was the number of words remembered when told to forget (RF) for DF or the related but unpracticed list of memories in RIF (denoted by Rp- for RIF).

A 3-way interaction among paradigm, mood, and condition was not significant. The observed power was .056 and a sample size of more than 1000 participants would be required to provide the power necessary to detect a small effect size (.01). A statistically significant 2-way interaction was found for instruction by paradigm, F (2, 86) = 4.86, p = .01, effect size, η_p^2 =.10. The observed power was .79. Table 8 shows the means and standard deviations for each group.

Table 8. Means and standard deviations for the each paradigm using the practice effect component of RIF.

	Paradigm		
Condition	**DF-Item**	**DF-List**	**RIF**
Baseline Condition	59.57 (16.18)	57.64 (18.13)	72.73 (15.11)
	N=32	N=27	N=33
Exp. Condition	58.38 (16.47)	58. 39 (19.79)	59.28 (20.25)

Standard Deviations in brackets

Post hoc analysis revealed that the difference between the Rp+ and NRP components (the practice effect) in RIF accounted for this significant interaction, $t(32) = 3.35$, $p = .002$. No other predicted 2-way interactions were significant.

A main effect that approached significance was found for the instruction $F(1, 86) = 3.17$, $p = .078$, effect size, $\eta_p^2 = .04$, and the observed power was (.42). That is, more to-be-remembered memories (RR and Rp+) were remembered at recall than to-be-forgotten memories (RF and NRP). The main effect of mood state was not statistically significant, $F(1, 86) = .169$, $p = .682$ with no power (.002) to detect the effect (.002). A sample size of 250 participants would provide the power (.80) needed to demonstrate this small effect. The effect of forgetting paradigm on the amount remembered approached significance, $F(1, 86) = 2.56$, $p = .083$. That is, participants differed on amount remembered at recall as a result of the paradigm they were asked to use. The observed power was moderate (.50) for a small effect size (.06).

3.6 Relations between Mental Control Variables and Forgetting

Tabachnick and Fidell (2007) suggested that regression analysis requires a sample size of N equal to or greater than 50 plus 8 times the number of predictors, in order to test multiple predictions. In addition, testing individual IVs requires an N equal to or greater than 104 plus the number of predictors. The sample size for the current study failed to meet these recommendations. Thus, Pearson correlations were used to evaluate Hypotheses 9 through 17 (see Chapter 1). A summary of descriptive data for the mental control factors, perceived mental control, rumination, and mental control strategy (i.e., distraction, social control, re-appraisal, worry, punishment) are presented in Table 9.

Table 9. Descriptive data for mental control variables.

	DISTRACT	PUNISH	RE-APPRAISE	WORRY	SOCIAL	RSS	CUTS
Mean	15.26	9.31	13.96	10.47	16.80	33.69	51.95
Std. D	2.96	2.56	3.28	3.01	3.97	9.65	24.63
Min	9.00	6.00	6.00	6.00	9.00	15.00	6.00
Max	23.00	19.00	23.00	18.00	27.00	59.00	130.00

N=92

To evaluate the relationship among mental control variables and memory generation time, Pearson correlations were calculated (see Table 10). It was predicted that higher scores indicating poor perceived mental control over cognitions and higher scores on self-report rumination would be associated with faster memory generation time (Hypotheses 9 and 10, respectively). Contrary to these predictions, there was no significant correlation among these mental control

variables and generation time. Similarly, there was no significant relationship between any specific strategy and generation time (Hypothesis 11).

Table 10. Correlations among mental control variables and generation time.

	1	2	3	4	5	6	7	8
1. Generation Time								
2. Dysphoria	-.09							
3. Mental Control	.11	.447**						
4. Distraction	-.02	-.188*	-.062					
5. Punishment	-.01	.051	.473**	.014				
6. Reappraisal	.02	.093	.437**	.036	.261*			
7. Worry	-.13	.323**	.522**	.010	.436**	.221*		
8. Social	.14	.011	.200*	.010	.040	.391**	.024	
9. Rumination	-.06	.320**	.638**	-.133	.294*	.456**	.598**	.086

Note: N= 92; * = p < .05; ** = p < .001

To evaluate the direction and strength of the relationship between the individual mental control variables and degree of forgetting (Hypotheses 12 through 14) Pearson Product Moment correlations were used. The degree of forgetting was analyzed separately for the DF and RIF paradigms to determine if the same mental control variables that were associated with one paradigm would also be associated with the other. Degree of forgetting was operationalised as the R minus F difference for the DF method of induced-forgetting (see Table 11 for correlations).

Table 11. Correlations among mental control variables and degree of forgetting in the DF Paradigm.

	Degree of Forgetting
1. Dysphoria	-.20*
2. Mental Control	-.25**
3. Distraction	.14
4. Punishment	.05
5. Reappraisal	.01
6. Worry	.03
7. Social	-.03
8. Rumination	-.22**

Note: N= 59; * = approaching sig. ** = $p < .05$; *** = $p < .01$.

Level of depressive symptoms (dysphoria) was approaching a significant negative correlation with degree of forgetting. Individuals who were more dysphoric tended to forget less. As predicted, there was a statistically significant negative correlation between perceived mental control and degree of forgetting. Individuals with poor perceived mental control tended to forget less (Hypothesis 12). In addition, rumination was significantly negatively related to the degree of

forgetting (Hypothesis 13). That is, individuals who ruminate tended to also exhibit less forgetting. No significant relationships were found between any of the specific mental control strategies and degree of forgetting (Hypothesis 14).

Table 12 shows the direction and strength of relationships among the mental control variables and degree of forgetting for the RIF method (operationalised as the NRP/Rp- difference) of induced-forgetting.

Table 12. Correlations among mental control variables and degree of forgetting for RIF.

	Degree of Forgetting
1. Dysphoria	-.19
2. Mental Control	-.21
3. Distraction	-.14
4. Punishment	.05
5. Reappraisal	-.14
6. Worry	.07
7. Social	-.13
8. Rumination	-.08

Note: N= 33 * = approaching sig. ** = p < .05; *** = p < .01.

It was also predicted that there would be a significant negative correlation between perceived mental control and degree of forgetting in RIF. Individuals with poor perceived mental control would forget less (Hypothesis 12). In addition, rumination would also be significantly negatively related to the degree of forgetting (Hypothesis 13). That is, individuals who ruminate would also exhibit less forgetting. No significant relationships were found between any of the specific mental control strategies and degree of forgetting (Hypothesis 14). Contrary to the predictions (Hypotheses 12, 13, and 14), there were no significant

relationships among any of the mental control variables and degree of forgetting in the RIF paradigm. This was also true when mental control variables were correlated with the practice effect of RIF (operationalised as the Rp+ / NRP difference) as shown in Table 13 (Hypotheses 15, 16, and 17).

Table 13. Correlations among mental control variables and RIF practice effect.

	Practice Effect
1. Dysphoria	-.05
2. Mental Control	.12
3. Distraction	-.07
4. Punishment	.06
5. Reappraisal	-.18
6. Worry	-.13
7. Social	.14
8. Rumination	-.08

Note: N= 33; * = p < .05; ** = p < .01.

CHAPTER 4: DISCUSSION

The overall goals of the present study were threefold. First, the schema-activation hypothesis (Beck, 1987) was re-evaluated in terms of expected differences in memory accessibility for negative autobiographic events among individuals who were dysphoric versus non-dysphoric. Second, the present study is the first to examine the effect of mood on induced-forgetting using a quasi-experimental design in which 2 different induced-forgetting paradigms were directly compared. Third, this study explored the relationship among individual differences in aspects of mental control in terms of the relationship with memory accessibility and memory impairment. This chapter explicates the findings in terms of the support for specific hypotheses and implications for theory. Limitations are then discussed and evaluated with suggestions for improvements. The implications of the results of the present study are then discussed followed by suggestions for directions for future research in this area.

4.1 Mood and Memory Accessibility

Do individuals who are dysphoric have increased access to negative autobiographic events? Primarily, the results of the present study indicate that dysphoria does not increase accessibility of negative memories. Contrary to the schema-activation hypothesis (Beck, 1967, 1987), which predicts a difference in generation time for depression, individuals who were dysphoric were not faster at generating a set of 32 negative memories compared to a group of non-dysphoric counterparts. What might explain the failure to detect this difference?

With an aim towards improving upon previous methodology, the present study was designed to replicate and extend previous research by methodologically controlling for a number of factors that have been raised as important research paradigm issues (Clark et al., 1999). First, Williams (1997) reported that individuals who are depressed tend to report overly general examples of past experiences. Thus, if specificity is not controlled within the research paradigm, results demonstrating speedier memory retrieval times for a dysphoric group compared to a non-dysphoric group could simply be the result of the specificity versus generality difference.

Two methodological changes were made in the present study to control for the tendency of depressed individuals to be less concrete. First, the instructions used in the present study during the memory generation task were designed to force participants to respond to the memory cue word with a memory for an event in their past from a specific date and time. Second, the experimenter intervened with further prompts to be specific when participants failed to meet this standard. This procedure differs from much of past research in which objective ratings of specificity followed after the completion of the memory generation task. That is, specificity was evaluated by the experimenter in the moment and participants were directed immediately to meet the criteria of providing a memory from a specific time and place in their lives.

Each time a more general event was given, the experimenter prompted the participants to be more specific. In addition, participants in this study rated the

clarity of each specific memory in the memory set and no differences were found for clarity ratings between the two groups (dysphoric versus non-dysphoric). The two groups did not differ on the specificity with which they reported events nor how clear these events were in their own minds. If those who are dysphoric tend to be less concrete in providing clear descriptions of past events (e.g., Kuyken & Brewin, 1995), then undoubtedly when forced to be specific, dysphoric individuals may likely evidence longer generation time.

The control for specificity then, while making methodological sense, may be a likely explanation for the failure in the present study to find differences in memory generation time. However, several studies have suggested that the phenomenon of specificity versus generality is more likely to be evidenced to a greater degree in the retrieval of positive memories than the retrieval of negative memories (e.g., Brittlebank, Scott, Williams, & Ferrier, 1993; Moore, Watts, & Williams, 1988). The present study did not include a category of positive memories and thus, no conclusions can be drawn regarding whether or not controlling for specificity explains the findings in the present study.

An alternative explanation for the lack of findings in support of the schema-activation hypothesis (Beck, 1987) in the present study (i.e., differences in memory generation time due to dysphoria) may be that autobiographic memory generation tasks, like the word-cue method used in the present study, are in and of themselves mood inducing. Indeed, several studies have used autobiographic recollection as a mood induction technique with success (e.g., Abele & Gendolla,

1999; Gendolla & Krusken, 2002). Given the null findings for group differences in memory generation time, the present study undertook to examine this potential explanation in post hoc fashion. Results of the present study support the hypothesis that negative autobiographic memory generation is mood inducing. Participants in the present study evidenced increases in self-report measures of negative affect and sadness, as well as, self-reported decreases in positive affect after memory generation compared to pre-memory generation measures. This finding was true regardless of initial levels of self-reported depressive symptoms. However, one caveat to the preceding discussion warrants mention here. Specifically, the differences across pre and post measures of mood included a single-item, self-report measure of sadness. It is important to note that a single-item scale tends to be a less sensitive and therefore not as reliable a measure. In addition, a single item does not necessarily capture the complexity or multi-dimensionality of the construct of sadness. Further, such scales are open to a number of response biases that cannot be controlled. Thus, increases in sadness that may be evidence of a mood-inducing effect of negative memory generation should be interpreted with caution. Thus, that the present study found an increase in the level of sadness as reported on the single-tem scale used here is not necessarily indicative of an increase in a sad mood state.

The PANAS (Watson & Clark, 1988), however, has a substantial history of reliability and validity (e.g., Crawford; & Henry, 2004; Watson, Clark, & Tellegen, 1988) on which group differences can be based. Since the findings of

the present study suggest an increase in negative affect and a decrease in positive affect after the memory generation task, as measured by the PANAS, it is reasonable that the memory generation task used in the present study did affect mood.

Before reviewing the remaining results of the present study a final point of the mood-inducing effects of negative memory generation is worth noting. In the present study, the focus was on the generation and forgetting of negative autobiographic memories, the first study of its kind. That is, no study to date has combined the elements of negative autobiographic memories, mood state, and memory to assess differences, in support of the Cognitive Theory of Depression. In addition, the present study is the first of its kind to examine these elements in the absence of positive and/or neutral memories. The decision to exclude neutral and positive memories is based on the literature, which suggests that the available cognitive content for individuals who are dysphoric is most likely, negative (e.g., Joorman, Hertel, Brozovich, & Gotlib, 2005; Renaud & McConnell, 2002). In addition, Wessel and Hauer (in press) argue that the resulting comparison of negative to positive memories is not an appropriate baseline. Thus, it is unknown whether the finding that the memory generation task in the present study was mood-inducing could be a direct result of all memories elicited being "negative" in affective tone. Previous research in this area has typically included the generation of positive memories and sometimes, neutral memories (see Wenzel, 2005 for a review). It is possible that an inclusion of

positive memory retrieval category helps to negate any mood-inducing effect that generating negative memories might have. However, this has not been evaluated in previous studies. Thus, any increase in negative mood may have been eliminated or reduced by the production of positive memory generation, which might have countered the mood-inducing effects of the negative memory generation task.

Finally, Dalgleish and Yiend (2006) found that under conditions of suppression effort (how much effort was invested in trying not to think about something), dysphoric individuals do evidence speedier retrieval of negative autobiographic memories compared to non-dysphoric controls. Since the present study did not actively assess for degree of suppression efforts of participants, it is a possible explanation for the lack of statistically significant findings.

Blaney (1986) also theorized that differences in negative autobiographic memories generation may only be evidenced at the more severe end of the dysphoria-depression continuum. Thus, in order to evidence a difference between groups on accessibility of negative memories (as defined by generation time), the comparison group may need to be a sample of individuals diagnosed with clinical depression.

From the results of the present study a number of recommendations can be made with regard to future research. Future investigations into memory generation times should consider the nature of the memory generation task as potentially mood inducing. To this author's knowledge, a sound methodological

approach to overcoming this potential problem does not appear to exist currently. However, researchers need to be aware of and plan to test for the presence of a mood induction when eliciting negative memories accordingly. It would also seem important to assess whether the inclusion of positive and/or neutral memory generation categories will act as a sufficient means to control (or wash out) the mood-inducing effects of generating only negative memories, and if so, researchers are encouraged to use this methodology.

4.1.1 Limitations of the Memory Generation Task

Is the way in which the present study operationalised memory accessibility (i.e., time to generate a set of memories) an adequate proxy for memory accessibility, particularly for individuals who are dysphoric? Past research has measured response latency in a cue-word memory generation task by timing the latency to retrieve the first specific memory generated (e.g., Kuyken & Brewin, 1995). Along similar lines, the average latency to retrieve specific memories has been calculated across multiple trials (e.g., Wenzel, Jackson, Brendle, & Pinna, 2003) to obtain an average time to generate a specific memory. However, while these studies maintained a high degree of internal validity, they can be criticized for failure to reflect the continuous uninterrupted flow of conscious thought processes that typify our cognitive reality (James, 1950). That is, we do not think in word lists, nor do we have a single thought that just stops or is not connected to or evocative of other thoughts. Therefore, the present study argues that an average generation time of multiple trials or single

memory generation time does not reflect how cognitive processes and content of the mind actually work.

In addition, many studies on response latency for autobiographic memory generation deal differently with omissions. Omissions are instances in memory retrieval tasks in which participants fail to generate a memory in a specific time period. Thus, in some cases, this time is included in the calculation of averages (Goddard, Dritschel, & Burton, 1997), whereas in other studies, omissions are excluded from analysis (Leung & Bryant, 2000). The inclusion of omissions in generation time calculated in the present study are reflected in the fact that if participants were unable to generate a specific memory to a given cue word, the experimenter simply went to a different word. The relevance of cue-word meaning may be an important factor for participants (i.e., that the cue-word "guilt" may be of relatively less importance to a participant and thus would not trigger memories). Indeed, Rubin and Schulkind (1997) demonstrated that cue-words that were rated as more meaningful produced faster generation times. While it seems that the lack of findings in support of a generation time difference between dysphoric and non-dyphoric groups is inconsistent with previous studies finding this difference (Clark & Teasdale, 1985; Teasdale & Russell, 1983; Teasdale, Taylor, & Fogerty, 1980; Teasdale & Taylor, 1981), it is important to note that these studies did not explicitly report on how they defined and handled omissions in data analysis. However, for studies that did report how omissions were handled, the results depended on whether omissions were included or not.

Burke and Matthews (1992) did not find a difference in response latency for anxious versus non-anxious individuals. However, when they controlled for omissions, the difference emerged. It is argued here that the exclusion of omissions, however they are defined, comes at a cost to external validity.

Previous research has not always reported the degree to which they controlled for the affective tone and age of the memories being generated. In the present study, non-dysphoric individuals were similar to those in the dysphoric group on their ratings of the degree of negativity, clarity, and average age of the memories they generated. Differences in affective tone (i.e., positive versus negative memories) have been found to differentiate individuals with pathology from those without pathology (e.g., Croll & Bryant, 2002; Wenzel, 2000). Thus, the finding of no difference in ratings of negativity eliminates the likelihood that failure to find this difference in generation time may be due to disparity of ratings of affective tone between the dysphoric and non-dysphoric groups. These findings also reflect results from past research indicating that ratings of pleasantness and the age of memory tend not to affect retrieval time (see Rubin, 2005), which are contrary to studies suggesting that rating the affective tone of memories could potentially confound results (see Williams, Watts, MacLeod, & Matthews, 1988 for a discussion of this issue).

With the preceding discussion in mind then, it is possible that the definition used in the present study of memory accessibility can be criticized for failure to exert more stringent control over issues such as specificity versus

generalisability. Perhaps it is towards a balanced methodological approach, which considers equally internal control and real world context that future research should strive.

4.1.2 General Limitations of Phase 1

Additional limitations specific to the methodology used in phase 1 of the present study warrant discussion. First, the 3 to 7 day time delay between phase 1 and phase 2 may confound the results on the study. Although this delay was driven by the need for paradigm preparation time and participant availability, there may have been an inadvertent affect on mood group and paradigm. Since this time delay was not recorded for each participant, there is no way to know whether individuals in the dysphoric group were more or less likely to return for phase 2 after a longer delay than their non-dysphoric counterparts, or whether longer delay was more common for those who engaged in RIF versus DF. The issue of time delay needs to be addressed in future studies to ensure that differences in remembering and forgetting are not associated with time delay differences.

Second, the correlational nature of phase 1 of this study and lack of non-random assignment to groups prohibits the interpretation of results as causal. As is the case with correlational research, results can be accounted for by a third variable. For example, the lack of difference in memory generation time could be the result of participants in the dysphoric group being hindered by psycho-motor retardation (a symptom of the depressed mood state). Memories may have

indeed been more accessible but participant response may have been slower due to somatic symptoms or low motivation, which tends to typify dysphoria. It is impossible to control for every possible alternative explanation unless a true experiment can be conducted. One way to examine this possibility would be to use a mood induction of non-dyphoric individuals. Such a design alternative, while preserving internal validity will come at the expense of external validity and generalisability.

An additional limitation to the present study is the degree of difference among the two mood groups. That is, there is a possibility of restricted range when using a continuous measure to then categorize individuals into groups. It is not uncommon within the literature to dichotomize a continuous variable for the purpose of evaluating group differences. However this strategy is not without costs (e.g., loss of power, less variability between groups). One way to overcome this potential limitation is to take the top (high scores) and bottom (low scores) as the primary sample. However, the small sample size in the present study prohibited using such a technique to ensure groups would differ enough to evidence the expected results. Future research should consider this issue and plan accordingly using extreme scores or by using a mood induction procedure.

In the present study the categorization of participants as either dysphoric or non-dysphoric was based on whether their CES-D scores fell above or below a cut-off of 16. The decision to use the CES-D over alternative and more sensitive

measures (e.g., BDI-II) was based in part on the advantage of cost (e.g., the CES-D is in the public domain and the BDI-II is a protected test) as well as its ability to discriminate the severity of symptoms. However, not all items on the CES-D tap the specific symptoms of depression identified in the DSM-IV TR. It is possible that the CES-D items assess the broader construct of dysphoria (including anxiety) rather than the more specific depressive symptoms associated with MDD. Santor, Zuroff, Ramsey, Cervantes, and Palacios (1995) evaluated the ability of the CES-D to discriminate symptom severity. They concluded that while the CES-D discriminates symptom severity better than the BDI, it is likely to overestimate the prevalence of depressive symptoms in a university sample. The BDI appears to be a more sensitive measure for identifying clinical depression (Santor et al., 1993). The implication for the present study then is that the severity of dysphoria may be over represented and a higher cut-off score should be a consideration for future research. In addition, there can be no direct generalization of findings to a clinical population.

Finally, it is important to acknowledge the use of a university student sample as a limitation. University is a time of changes and challenges. Students face the challenge of adjusting to new classes, professors, drastically different academic responsibilities compared to high-school, extra-curricular activities, studying, and relationships (Clark, 2005). Many students experience significant amounts of stress including dysphoria (Dyson & Renk, 2006) as they learn to adjust to these stressors. Thus, the university population is a milieu rich with

psychological distress of which dysphoria may be disproportionately over represented compared to community samples. It can also be argued that university is also a unique experience and studies that adopt the use of this population are limited in terms of the ability to generalize findings. Because many studies on memory utilize a college population, and mood affects aspects of memory, researchers must consider the impact of this unique sample on study results. Therefore, it is particularly important that researchers examine generation time differences across a wide range of sample demographics, including young versus old; dysphoric versus clinically depressed; and university and non-university matched-aged groups. This is the only way to ensure generalisability of results.

4.1.3 Summary of Findings for Phase 1: Memory Generation

The present study is the first to evaluate generation time within the cue-word method of memory generation using the total time to generate 32 memories. This procedure was intended to allow for a more continuous flow of thought (i.e., that participants would be generating multiple memories to the same cue word) that reflects the network analogy of cognitive activation (Anderson & Bower, 1973). Despite the efforts to improve methodology, the present study failed to support findings from previous studies, which have evidenced shorter response latencies for dysphoric participants compared to non-dysphoric controls (e.g., Fitzgerald, Slade, & Lawrence, 1988; Parrott, 1991; Teasdale & Taylor, 1982; Strauman, 1992). However, the results are consistent

with a more recent study that also failed to find this time difference when dysphoric individuals were encouraged to actively suppress (not think about) a target negative memory (e.g., Dalgleish & Yiend, 2006). It may be that Dalgleish and Yiend's use of a "stream of consciousness" task in which participants wrote down their thoughts while monitoring for the presence of target negative memories contributed to this finding. This stream of consciousness technique used by Dalgliesh and Yiend may be a viable methodology to adapt as a technique for autobiographic memory generation if researchers can control for the specificity issues discussed above.

Did the present study fail to support the schema-activation hypothesis (Beck, 1987)? Clark et al. (1999) argued that autobiographic memory studies provide the best evaluation of schema activation but based on current knowledge, methodological constraints continue to pose a challenge. Indeed, Clark et al. (1999) stated, "autobiographic memory recall provides a more direct assessment of enduring negative self-schema…and it assesses more general, personal memories and experiences that are likely to have greater ecological validity" (p. 226). They encourage researchers to continue to develop methodologies with greater ecological validity. Thus, the current findings do not necessarily contradict schema activation but rather highlight the need for the search for a more novel approach and perhaps a balancing act between internal and external validity.

Research suggests that autobiographic memory tasks are among the most important in terms of the contributions to be made to theory (see Clark, Beck, & Alford, 1999 for a review) and applied clinical psychology (e.g., Wenzel, 2005; Williams, 1996). However, the rich source of knowledge about cognitive processes provided by autobiographic memory tasks is sometimes at the expense of experimental control. In the present study, attempts were made to adhere more closely to real-world experiences of cognition at the expense of rigorous experimental control. Thus, finding that there was no difference in memory generation time, may reflect the more loosely defined and less tightly controlled definition of memory accessibility used in Phase 1 of the present study than the more experimentally controlled studies conducted in the past. Clearly a methodological approach that can better balance internal control and external validity needs to be created (Clark, et al., 1999). Individual difference factors that constitute the third variable explanation (i.e., that dysphoric individuals may be generally slower in cognitive processing and response latency as a result of the nature of somatic symptoms) must be controlled. Previous research has also suggested alternatives to measuring speed of recall, by demonstrating differences between dysphoric and non-dyphoric groups using probability of recall (e.g., Clark & Teasdale, 1982; Fogarty & Hemsley, 1983). Whether this operationalisation would lead to group differences in the context of the methodology used in this study is a subject for future investigation.

4.2 Induced-forgetting and Mood

As Chapter 1 outlined, the Cognitive Theory of Depression (Beck, 1967) suggests that the dysphoric individual is predisposed to the access of negative schemas that distort information-processing. Depressed mood is maintained or even exacerbated as the cycle of negative thinking about the self continues. As a result, negative memories are more accessible and may lead to the mood-congruent memory bias (MCMB). Indeed, Tafarodi, Marshall, and Milne (2003) compared several theoretical explanations for the MCMB and demonstrated support for Beck's Cognitive Theory of Depression over others (e.g., associated network theory, Bowers, 1981). This highlights the importance of self-relevance in producing the MCMB. Although the present study failed to find differences in memory generation time, the schema-activation hypothesis implies that individuals who are dysphoric should evidence deficits in forgetting.

4.2.1 Dysphoria and Induced-forgetting Effects

The ability to forget emotionally valenced memories has only recently been the subject of investigation using both DF and RIF paradigms (see Chapter 1). As suggested by studies examining suppression efforts during dysphoria, negative cognitive content is difficult to suppress without the cost of rebound effects. However, these two lines of research have evolved quite separately from one another and no study to date has undertaken to examine the forgetting of negative memories in the context of dysphoria. Further, the present study is the first to experimentally compare the efficacy of different induced-forgetting

paradigms using a quasi-experimental design in which a direct comparison of paradigmatic efficacy could be made. Several significant findings were found and are now discussed.

In the evaluation of forgetting effects, the effect of mood state on the total amount of memories recalled depended on whether participants received instructions to remember (or practiced retrieving a subset of memories) or to forget (or did not practice an unrelated subset of memories). Individuals who were not dysphoric remembered more of the to-be-remembered memories than the to-be-forgotten memories. The experience of dysphoria negated any difference due to instruction. This demonstrates that induced-forgetting of self-relevant material, specifically autobiographic memories, is possible (e.g., Barnier et al., 2004; Dalgleish & Yiend, 2006; Joorman et al., 2005). However, evoking a highly emotional response in participants does not always lead to successful forgetting (Payne & Corrigan, 2006; Wong & Moulds, 2008).

That dysphoric participants remembered similar amounts of memories when instructed to do so (or when they engaged in retrieval-practice) as they did when instructed to forget is consistent with past research (Bulevich, Roediger III, & Balota, 2003; Conway & Barnier, 2003; Hertel & Gerstle, 2003). Much of the difference between these studies that may account for findings lies in stimuli differences (i.e., autobiographic memories versus self-relevant words), and instructions (i.e., to forget versus to not think about). From these contradictory results, the best conclusion may be that perhaps induced-forgetting of self-

relevant material is a fragile phenomenon where mood state is concerned and may greatly depend on the stimuli used in the respective forgetting paradigms as well as the type of explicit instructions used in a given methodology. One advantage to the present study is that induced-forgetting paradigm comparisons were made using the same stimuli and thus make it considerably less difficult to interpret findings.

McNally (2005) suggested that in order to understand forgetting in a clinical context, the kind of stimuli necessary to understand the cognitive functions of forgetting is in part, inter-dependent on the clinical phenomenon of interest. That is, the stimuli must match the disorder. Further, McNally suggested that in order to ascertain effects due to negativity, and thus ensure the results are not due to emotionality, categories containing positive emotional material should be used. Similarly, Badsen and Badsen (1996) concluded that the efficacy of induced-forgetting may largely depend on the material subjected to induced-forget after finding no DF effect for judgments based on assured knowledge. It is possible that the "knowing" that comes as a result of the self-relevance of autobiographic memories, leads to a reduction in DF efficacy (Gardiner, Gawlik, & Richardson-Klavhen, 1994). In addition, DF effects tend to be weakest for sentences and personally meaningful material (Golding & Keenan, 1985). That is, perhaps the forgetting effect is weak because only negative stimuli were used and findings indicate that depressed people have a

heightened sensitivity to negative stimuli, thus negative material would be harder to forget.

In addition, DF data represents memory recall in response to a forget cue. As discussed in Chapter 1, instruction to forget, trigger the suppression effort process. Individuals who are depressed are more likely to engage in chronic thought suppression efforts (Wenzlaff, 2005), the result of which is the rebound effect. The rebound effect could be influencing DF, thus weakening the overall forgetting effect.

4.2.2 Limitations

As discussed in a previous section the use of the university sample and the use of a dimensional scale to generate two groups for comparison limit both the extent to which results can be generalized and the variability among participants that may have been needed to demonstrate group differences. An additional limitation in the present study was the limited power to detect many of the hypothesized differences and the small effects. This limitation is important in terms of the contributions of this study to theory and practice and is therefore, discussed in more detail.

In terms of the examination of paradigmatic differences in induced-forgetting, the prediction of main effects and several interactions were not statistically significant, with one exception. The predicted 2-way interaction of mood and instruction was significant, and the effect size moderate. Specifically, the effect of mood on amount recalled depended on the instruction given. Post

hoc analysis revealed that for the non-dysphoric group more was remembered in the to-be-remembered category than the to-be-forgotten category and it was this comparison that accounted for the significant interaction. For the most part the results of this study yielded small effect sizes. As a result, the size of the sample in the present study was not sufficient to provide the power to detect many of the predicted differences.

Prior to beginning the present study, the literature was surveyed to determine by rule of thumb, an estimate of the number of participants needed. The initial consideration of power was based on previous literature in which results yielded moderate to large effects based on sample sizes of between 15 and 20 in a given cell within the statistical design. Therefore, 20 participants per cell should have been adequate to detect differences if they were there. However, such small effects for many of the hypothesized differences were unexpected. The sample size estimate was hampered by the absence of any study as complex as the analytic strategy used in the present study. Based on the limited previous research available, it was estimated that 20 participants per cell would be adequate to detect the moderate to large effects found in previous studies, particularly given the choice to use a within-subjects variable to compare to-be-remembered and to-be-forgotten material. However, it appears that the complexity of the study required a significantly larger sample size to demonstrate small effects. Based on the mathematical computation of the components of power analyses (alpha level, effect size, and power at .80), an

estimated 1152 participants to demonstrate group differences in the 3-way interaction between mood, paradigm, and instruction would be needed.

The practical (e.g., time and money) implications associated with a decision to proceed with further data collection warrant some consideration, as does the ethical implications to participants in proceeding to subject individuals to the memory generation process. Specifically, it is important to question the practical costs of continuing to collect data when the small effect sizes found raise the question of theoretical and practical importance of induced-forgetting during dysphoria. Coupled with the risk of psychological harm (as evidenced by 3 participants in the present study who needed immediate mental health intervention after engaging in the memory generation task) it was determined that to proceed with further data collection as the present study stands was both impractical and potentially unethical given the small effects.

While previous studies report a moderate to large forgetting effect size in RIF (e.g., Barnier et al., 2004), the use of meaningful material in DF has yielded smaller effect sizes (Geiselman, 1974; Golding & Keenan, 1985) because they are much more difficult to forget (Golding, Long, & MacLeod, 1994). Thus, exploring forgetting effects through the separate analysis of individual paradigms was important. These analyses showed that the forgetting effect demonstrated by the DF paradigm was more likely to depend on whether individuals were dysphoric or not. Subsequently, the presence of dysphoria may have negated the DF effect. In the analysis of RIF, both forgetting and a practice effect occurred and it made

no difference what mood participants were in. These results strongly suggest that RIF is likely a better paradigm to use to induce forgetting when individuals are dysphoric. Thus, as the separate evaluation of RIF and DF suggest, power issues were substantially reduced but unfortunately, not eliminated. However, it begs the question of why DF did not work for dysphoric individuals?

Some research suggests that the clinical phenomenon of interest itself may influence results and will dictate methodological considerations. For example, if the clinical phenomenon of interest is PTSD then stimuli must contain both positive and negative emotional valence in order to examine specificity. Perhaps the same is true for dysphoria (depression).

Finally, several studies suggest that to-be-forgotten information is not necessarily treated that way by participants when instructed to forget (e.g., Fleming, Wegner, & Petty, 1999; Kassin & Sommers, 1997). This is particularly true when information targeted as to-be-forgotten is relevant to the individual (Golding, 2005). When participants are told in the experimental paradigm to "forget it, it was the wrong list" perhaps they do not necessarily buy the instructions in anticipation that the to-be-forgotten list will be requested at recall. Participants then must be made to believe that information to be forgotten is of no importance to them in the situation. It is possible that in the present study, participants were less convinced of the forget instruction than expected. These plausible explanations for the lack of a forgetting effect, as well as those

explanations mentioned above, offer important avenues to advance future research in this area.

4.2 3 Summary of Induced-forgetting Findings

Past research has suggested that suppression efforts (e.g., instructions to "not think about" or "forget") often lead to failure (rebound effects), particularly for individuals who are depressed (e.g., Roemer & Borkovec, 1994; Wegner & Gold, 1995; Wenzlaff, Wegner, & Roper, 1988; Wegner & Smart, 1997; Wenzlaff & Wegner, 2000). So it would seem then that when it comes to negative cognitive content, efforts to gain mental control using suppression will become increasingly more difficult as the degree of depressed mood increases (Wenzlaff & Wegner, 2000). If instruction to not think about something can ironically make those thoughts more accessible and intrusive, then it seems reasonable to expect DF effects to be less evident. Subsequently, a RIF paradigm may be potentially therapeutic in reducing depressed mood and actively countering the tendency to engage in thought suppression.

Nevertheless, subsequent studies have failed to replicate the rebound effect (for a review see Abramowitz, Tolin, & Street, 2001; Wenzlaff & Wegner, 2000). The results of Abramowitz et al.'s (2001) meta-analysis of 28 controlled studies on rebound effect yielded only a small to moderate rebound effect size. Despite studies that have found the rebound effect (e.g., Davies & Clark, 1998; Harvey & Bryant, 1998; McNally & Ricciardi, 1996), others have demonstrated a short–term effect (e.g. Markowitz, & Borton, 2002; Salkovskis & Campbell, 1994;

Trinder & Salkovskis, 1994), and still others have found no rebound effect at all (e.g. Borton, 2002; Kelly & Kahn, 1994; Roemer & Borkovec, 1994). If power had not been a substantial limitation, the small effects found for many of the hypothesized difference calls into question the clinical utility of induced-forgetting for psychological problems. With such small effects, it is likely that induced-forgetting would be of minimal therapeutic value in producing positive change. However, the finding that RIF (a strategy that does not require instruction to remember or forget in any form) was not affected by mood state offers a degree of hope that through retrieval practice methods (versus instruction to forget) depressed individuals may have a viable means by which they can inhibit negative mental content and thus reduce or eliminate the effects of negative cognitions on mood.

Finally, Macrae and Roseveare (2002) demonstrated that when material is highly self-relevant, it may be more resistant to forgetting. The results of the present study support this notion when mood is considered, specifically for the DF paradigm. Although, Macrae and Roseveare concluded that self-relevance then, may hinder forgetting, the results of the present study suggest that it may be paradigm specific. That is, RIF appears to be unaffected by the highly self-relevant nature of autobiographic memories (e.g., Barnier, et al., 2004).

Another limitation to the present study warrants discussion. First, amount remembered after instruction to remember was used as a within-subjects control condition to compare with the amount remembered when instructed to forget.

While within-subject comparisons afford greater chance of detecting differences, and have become the preferred method for DF, Anderson (2005) suggested that the elimination of a between-subjects control condition for DF-list procedures potentially confounds results. For example, by comparing List 1 to List 2, as was done with DF-list in the present study, results are potentially confounded with things such as learning to learn (Postman, 1971), retroactive interference, or the development of better strategies to aid in encoding simply as a result of the passage of time (Anderson, 2005). Other than the fact that within-subjects comparison are now a standard practice in DF deigns (MacLeod, 1998), it also enabled us to reduce the statistical complexity and need for a much larger sample size when a separate control group is needed.

4.3 Mental Control Factors as a Source of Individual Differences in Remembering and Forgetting

To this author's knowledge no studies currently exist that have examined whether the individual cognitive risk or vulnerability factors associated with depression impede one's susceptibility to forgetting paradigm effects. Thus, the present examination of mental control factors as predictors of successful memory generation and forgetting was novel.

In the present study several cognitive factors were evaluated in terms of the relationship they would share to memory impairment (i.e., generation time and induced-forgetting). Contrary to predictions there was no relationship of any of the mental control variables and memory generation. As predicted, however,

poor perceived mental control and higher levels of rumination were related to lower levels of forgetting as evidenced in a DF task. These two findings are consistent with the literature (see Chapter 1). Given the positive correlation of perceived mental control and suppression (Rhyno et al., 2003), it makes sense that the amount forgotten in a paradigm such as DF that relies on the explicit instruction to forget would produce a significant relationship. Similarly, the tendency to ruminate, a correlate of adverse emotional states, should evidence a strong link to memory impairment as defined by the "remember-forget" difference. This should be especially true when thoughts, images, and memories are triggered and focused on.

Also contrary to predictions, neither perceived mental control nor rumination was associated with induced-forgetting or the practice effect in the RIF paradigm. This may be good news given that mental control factors predict depression (see Clark, 2005 for discussion). Surprisingly, no significant relationships between individual mental control strategies and induced-forgetting for either DF or RIF were found.

Although there was no existing literature on which to base specific hypotheses about what could be expected, several studies suggested that these mental control strategies should share a relationship with aspects of memory. For example, Luciano and Gonzalez (2007) reported the results of three recent studies examining the short and long-term effects of using focused distraction (e.g., intentional mental concentration on a target thought, image, or memory) in

reducing the resurgence of unwanted thoughts. Their results highlight the benefits of distraction as a mental control strategy. Thus, since there was sufficient power to detect this relationship, it is surprising that it was unsupported.

Additional research also provided evidence for the effectiveness of distraction for individuals with sleep problems (Harvey & Payne, 2002), treating obsessions and compulsions (Abramowitz, Whiteside, Kalsy, & Tolin, 2003; Amir, Cashman, & Foa, 1997), and reducing anxiety (Coles & Heimberg, 2005). Therefore, distraction as a highly constructive mental control strategy for managing unpleasant thoughts and memories seemed a plausible individual difference factor to consider. That it was not correlated with forgetting may be the result of measurement.

4.3.1 Limitations and Implications

Several possible limitations regarding the aspect of mental control are worth noting. First, it is important to acknowledge the substantial overlap among measures used in this study to examine aspects of mental control. As noted in the results section, the CES-D shares a substantial portion of variance with the measures of mental control and rumination. It is possible then that these measures are not orthogonal and may be measuring the same thing. If this is indeed the case, then the lack of significant findings could be the result of this overlap. However, on examination of correlations, the moderate level of association would imply that while constructs overlap moderately, there is

distinctiveness among constructs. Low correlational values would indicate that constructs are unrelated. Moderate correlations suggest some overlap in construct definition (as is the case in the present study). High correlations that approach the maximum range of plus or minus one, would suggest that the same construct is being measured. For example, rumination has been conceptualized as a response style (see Nolen-Hoeksema, 1987 for a review). However, some researchers argue that it is a symptom of depressed mood (see Luminet, 2004 for review of rumination as a response style). Therefore, we could expect a moderate association between mood and rumination. Unfortunately research is hampered by the lack of self-report instruments to assess mental control constructs like coping response that are not highly correlated with depression measures. The implications of the moderate associations among mood and mental control variables in the present study are that these constructs are distinct enough to serve as possible individual difference factors in induced-forgetting and should be given consideration by those who do research in this area.

As with all self-report measures, there is the assumption that individuals have a direct access to their own internal responses, and that they are willing to give an accurate report of them. However, several studies suggest that these assumptions are often violated (e.g., Brewer, 1986; Conway et al., 2000). Future research can attempt to overcome these potential limitations by using performance-based measures of psycho-physiological or neuro-anatomical correlates of rumination (see Luminet, 2004 for a review of these procedures).

Alternatively, researchers can opt for a rumination manipulation as part of the research design. However, adding such a manipulation may only serve to complicate methodology.

It is also important to point out that the development of the measures of perceived mental control and mental control strategies used in the present study was done in the context of unwanted intrusive thoughts (e.g., Rhyno, Clark, & Purdon, 2003; Wells & Davies, 1994). The present study did not address the issue of whether the negative memories being generated were indeed, unwanted. Rhyno and Clark (2005) delineated some of the important properties that define unwanted thoughts. When thoughts unintentionally enter our flow of mental activity, grabbing attentional resource, are a source of discomfort, become chronic, and are so difficult to control that they interfere with life, we have experienced a cognitive intrusion. Whether or not the negative memories generated in this study meet the criteria for this type of cognitive intrusion was not assessed. Thus, measures such as the CUTS (originally developed to assess unwanted cognitive thoughts) may have been inadequate or less valid measures for evaluating the relationship between mental control factors and the induced-forgetting of negative memories.

Future research may need to focus on intrusive thoughts as the stimuli of interest for depression. Clark and Rhyno (2005) suggested that in the general population, 80 to 90 percent of nonclinical samples report this phenomenon (and 18 percent of cognitive intrusions are experienced as unacceptable). The most

frequently cited intrusive thoughts are related to sadness, worry, and anger (Clark & Rhyno, 2005), and 96 percent of these intrusive thoughts relate to current daily experiences (not past experiences as would be the case with memories). Thus, intrusive thoughts appear to be stimuli of interest for future research on forgetting.

Rumination has been shown to impact memory in that instruction to ruminate tends to contribute to an increase in a MCMB (Lyubormirsky et al. 1998). Rumination and depression are positively correlated and since dysphoria was unrelated to and did not evidence differences among groups on aspects of memory for RIF, then it seems reasonable to conclude that rumination would evidence similar findings. In the only known study of depressive rumination and directed forgetting, highly dysphoric individuals who ruminated intentionally demonstrated the standard directed-forgetting effect for emotionally valenced words (Wong & Moulds, 2008). This recent finding contradicts the idea that those who ruminate in response to a depressed mood would be more likely to have difficulty forgetting when instructed to do so (Payne & Corrigan, 2006) – at least for emotional words. It may be important then to analyze the induced-forgetting effects for the cue words used in this study in the same way that the negative memories were analyzed to evaluate if differences exist among forgetting effects for words versus memories. This is a possible next step for the present study.

In conclusion, the present study found that perceived mental control and rumination share a significant relationship with the degree of forgetting for DF

but not RIF. The implication of this finding is that it supports the robust findings from the suppression literature that explicit instructions to forget may be more challenging to individuals who ruminate in response to sadness as well as for those whose perceptions about their ability to control mental content is poor. The ironic processes believed to plague depressed individuals may be due to these individual differences in mental control, which may moderate the relationship between depressed mood and chronic thought suppression efforts. The associations among mental control and Degree of forgetting in DF may unduly affect the results of experimental research, as well as, indicate to practitioners, that efforts to suppress may be hampered by such individual differences, which may need to be evaluated in order to determine whether intervention length and effectiveness of therapy is appropriate. Finally, researchers investigating forgetting may want to consider the use of paradigms such as RIF, which appear to be uninfluenced by mental control differences.

4.4 Gender Differences in Dysphoria

One interesting finding was the results of preliminary analysis in which there was no gender difference in among men and women in the level depressive symptoms. A specific hypothesis about gender differences in dysphoria was not specified. Considering the robustness of the gender difference in depressive symptoms that is also typically evidenced in college samples in which 25 to 30 percent of individuals will show moderate to severe depressive symptoms (e.g., Rhyno, Clark, and Purdon, 2003, 2004, 2005; Wang, Clark, & Purdon, 2003), it is

possible that the current sample may not reflect the gender difference that is typically found in the general population. Other studies using a college sample also failed to find this difference (e.g., Wong & Whitaker, 1993). Thus, the present study may be limited in its ability to generalise results to the general population.

4.5 Implications and Future Directions

There are several key points that can be highlighted in light of the present study results. First, generating negative autobiographic memories is likely to lead to an increased negative mood state. Researchers who use this technique, particularly where mood is of quintessential importance, are advised to evaluate the degree to which methodology introduces this potential confound. Second, the type of instruction given during experimental evaluation of induced-forgetting appears to matter when individuals are dysphoric. This will become problematic for studies that select from a university population in which dysphoria is particularly common unless the dysphoric mood is of interest in the study. Third, individual differences in perceived mental control and ruminative coping may impact results of studies designed to examine the forgetting aspects of memory particularly where instructions to forget are used and therefore, these factors should be taken into consideration in future studies.

That mood state, as defined in the present study, did not substantially affect induced-forgetting efficacy, at least for RIF, may actually be viewed in a positive light. A paradigm that does not depend on mood state may prove to be a valuable strategy to combat negative mood states from spiraling into more

severe and prolonged depressed mood. In addition, that mental control factors were not associated with degree of forgetting in RIF is also promising given that mental control factors are highly predictive of depression. Conversely, that DF may only be effective for non-dysphoric individuals is consistent with the suppression literature indicating that explicit instructions to forget hinders forgetting (see Chapter 1 for review). Future research should continue in this area with an aim towards increasing the sample size and ascertaining the effect size when power is not a limitation. The implication for small effects in determining behaviour is an interesting theoretical issue. Finding small effect sizes that do not distinguish one theory from another are likely of little theoretical importance. The same may be true of a large effect that would have been predicted from any given theory. However, a small effect size that does differentiate one theoretical perspective from another by design is important to theory.

In the present study, the majority of effects were small. However, insufficient power prohibits any meaningful interpretation as to the implications of these small effects for Beck's (1987) Cognitive Theory of Depression, the Ironic Process Theory (Wegner, 1994), and the theoretical mechanisms believed to underlie different induced-forgetting paradigms (e.g., inhibition versus practice effects; see chapter 1 for definitions). This is an avenue for further exploration in terms of whether small effects further elucidate any distinction among forgetting paradigms. Small effects for induced-forgetting also raise the issue of whether

practically and therefore, clinically, induced-forgetting is worth exploring as a potential intervention. However, there is much to be explored before the clinical utility of forgetting paradigms can be evaluated.

From a theoretical perspective, inducing the forgetting of unwanted, distressing, and negative cognitive content appears to make sense. If the ironic effect of mental control failure over negative mental content is the exacerbation of a negative psychological state, then surely efforts to reduce the content will serve to repair negative psychological impact to the self. What does a forgetting paradigm actually do? Are memories really forgotten and should this be the goal of clinical intervention?

The prevailing thought in the current literature on induced-forgetting is that forgetting occurs as a result of inhibition (see Neath & Surprenant, 2003 for a review of several theoretical perspectives). It may be concluded then that despite the terminology used in naming these paradigms as "forgetting" that negative autobiographic memories are not really forgotten but rather are inhibited from coming to mind (at least during the paradigm protocol). For how long this lasts is not known. If it is that memoires are not truly forgotten but simply inhibited for a period of time, it begs the question as to whether or not this is an appropriate strategy of clinical value. Cognitive interventions grounded in Beck's (1987) Cognitive Theory of Depression are designed to encourage the reappraisal of distorted thinking and the attributions and judgments that result from faulty cognitive processes (Clark et al., 1999). This idea is consistent with other

therapeutic models based on exposure to or acceptance of distressing memories, thoughts, or images. So how exactly could induced-forgetting be construed as an effective coping strategy? Briere (1996) offered an illustrative example with his concept of the therapeutic window during exposure therapy.

Exposure therapy (Foa, Rothbaum, & Steketee, 1993) is predicated on the idea that helping a client to habituate to disturbing memories, via a process of re-experiencing while learning to deal with the unpleasant emotions attached to the experience, reduces the distress caused by the memory. While exposure therapy has been deemed an evidenced-based intervention for many mental health issues (e.g., anxiety, PTSD, and phobias), Briere (2002) suggested that to be most effective exposure therapy should take place within a therapeutic window. The window refers to "the psychological location between overwhelming exposure and excessive avoidance wherein therapy is most effective" (p.10).

Briere (2002) suggested that autobiographic memories become a source of distress because they activate associated implicit cognitive content (e.g., feelings, schema, and sensory impressions). He further advocated for clinicians to attend to aspects of therapy that include pace, intensity, and correct focus on content during exposure therapy. At any one point in a session then, an individual's ability to exert some control over the level of activation of negative memories becomes important for treatment efficacy. Induced-forgetting may be a viable strategy in which a therapist can engage clients to manage memory activation simply by the elaborate rehearsal (e.g., mentally or verbally) of associated

memories that are of less intensity (and thus inhibiting the more intense memories) long enough to ensure that the therapeutic window is neither under nor over shot. This conceptualization of the possible clinical application of induced-forgetting (e.g., RIF) to a clinical setting notwithstanding, we are a long way from the present study results and a therapeutically useful tool. The example used here was specific to interventions for trauma. Arguably, autobiographic content is more representative of the schema deemed to hallmark depression and dysphoria more so than word lists or sentence stems. However, there is little evidence to suggest that negative memories are themselves a key cognitive disturbance in depression or dysphoria. This is exactly the opposite for PTSD in which negative memories are of central importance. This exemplifies the importance of matching the cognitive phenomenon with the psychological disorder of interest (i.e., the negative memories central to PTSD versus the unwanted negative thoughts central to depression, anxiety, or OCD).

The results of the present study do generate a platform to first address limitations and then perhaps extend the study of induced-forgetting of autobiographic content to other populations (e.g., memories associated with PTSD). Further, individual difference factors such as age, personality trait factors (e.g., neuroticism), and state factors (e.g., anxiety) remain largely unexplored. In addition, younger and older populations for whom inhibitory processes may be underdeveloped (as in children) or in decline (as with some geriatric groups)

may also be of interest in future research given the assumptions of inhibition in forgetting and suppression.

While an extension of induced-forgetting to other populations such as children has not been the subject of substantial investigation, initial application of RIF to children suggests that RIF works despite the fact that children are still developing inhibitory abilities. Although the majority of studies investigating aspects of forgetting have used adult populations, Ford, Keating, and Patel (2004) were the first to generalise RIF to children. The practical application of RIF for childhood disorders in which forgetting certain aspects of experience may be beneficial (i.e., children's memory for painful medical procedures) may also prove therapeutic.

The idea that children can forget through retrieval induction is an intriguing one, given that children's ability to inhibit information is linked to frontal lobe development (Dempster, 1993). Children then are generally considered to be less successful at inhibition tasks because frontal lobe development is believed to be incomplete until early adulthood (Bjorklund & Harnishfeger, 1995). Thus, future studies might expect differences in forgetting abilities between different age groups.

Further, the examination of disorders such as PTSD, and anxiety disorders, in which negative cognitive content is a clear symptom and its reduction is critical to ameliorating the disorder, are also avenues worth exploring in terms of the effect of induced-forgetting of negative thoughts and

memories on alleviating symptoms. With the emergence of new therapeutic interventions such as mindfulness therapy and acceptance and commitment therapies, comes a refocus on changing the goal from suppression of unpleasant thoughts and emotional memories to fully experiencing them (e.g., Hayes, Strosahl, & Wilson, 1999). In a recent study, Marcks and Woods (2005) experimentally demonstrated that an acceptance-based approach is more recommended over thought suppression to deal with intrusive thoughts. Acceptance showed a strong negative relationship with intrusive thought frequency, discomfort, depressive symptoms, obsessive-compulsive complaints and trait anxiety (Marcks & Woods, 2005).

Finding support for the some of the specific hypotheses in this study has implications for research in both cognitive psychology and applied clinical psychology. For researchers in the field of cognitive psychology where forgetting is of particular interest, this study elucidated a number of individual differences factors that need to be taken into account when using induced-forgetting paradigms. Specifically, the typical use of university students for basic research purposes poses a number of considerations given the high rate of depressive symptoms reported in college samples. In addition, ruminative coping, and poor perceived mental control may affect the results of memory tasks in general, and induced-forgetting specifically. Further, this study elucidates the importance of considering which forgetting paradigm may be most effective depending on the goals of the study. That is, findings may be hindered or facilitated by individual

characteristics such as mood, perceived mental control abilities, and coping strategies such as rumination. In addition, extension of findings to the general population in younger and older adults may also require consideration of mood state and other cognitive variables that account for differences in one's ability to forget using experimental paradigms, particularly DF. Finally, results support the extension of forgetting paradigms to more complex material such as that represented by self-relevant negative memories and provide preliminary support to the schema-activation hypothesis and subsequently, Beck's (1987) Cognitive Theory of Depression.

For clinical researchers, enhancing an understanding of the effects of mood on forgetting has provided an avenue of substantial investigation into alternative cognitive-based treatment and preventative strategies for depressed individuals. Although the results of the present study are far from representing a test of induced-forgetting paradigms as possible treatments, preliminary results from this study may facilitate the development of forgetting strategies as part of the existing cognitive treatment models for mood disturbance. Assume that under normal conditions (e.g., no psychological distress), most individuals can be induced to forget. This is similar to an assumption that in normal populations, individuals engage in self-cognitive therapy to alleviate a depressed mood when need be. For others, where the assistance of a therapist in initiating the process of cognitive therapy (e.g., challenging assumptions, or reconstructing irrational thoughts and beliefs) is required, the same may be true of induced forgetting

methodology. That is, perhaps for most of us, it is something that is self-initiated but for others, it may be a viable therapeutic intervention requiring the assistance of a trained intervener. Whether this line of inquiry develops in future research remains to be seen.

While this study promised to advance our understanding of paradigmatic and individual difference in forgetting of self-relevant negative memories, several limitations were noted. First, the size of the expected effects was limited by sample size. In their recent study, Wessel and Hauer (in press) have suggested that the application of forgetting paradigms to autobiographical memories in which the goal is to construct a more externally valid representation of real world cognitions, at the cost of rigorous experimental control, will likely yield much smaller effects. In addition, the sample was limited to a non-clinical population so it will be impossible to state, with any degree of certainty, the generalisability of findings to clinically depressed individuals. Despite this limitation though, the dimensional conceptualisation of depression allows speculation as to the generalisability to samples of clinically depressed persons because the depressed mood state is more intense.

Finally, dysphoria as defined in this study does not necessarily prohibit the generalisability of findings to other forms of mood disorders and other mood states (e.g., Bipolar Depression and anxiety), particularly if they are conceptualized as more severe disturbances of mood along the dysphoria-depression continuum. In addition, psychological disorders in which negative

emotional memories are particularly problematic (e.g., PTSD) should be investigated. Where the cognition of interest is intrusive thoughts, (i.e., the cognitions associated with Anxiety Disorders and Schizophrenia), distinctions should be made between intrusive thoughts and memories. Thus, the choice of stimuli should reflect the corresponding psychological dysfunction. Further study in which these constructs are measured would help elucidate other plausible individual difference factors worthy of consideration for both clinicians and researchers.

This study has laid the foundation for future research to focus on the potential therapeutic value of induced-forgetting, particularly using the RIF paradigm. As research in this area continues to evolve, attention needs to be paid to the extent to which RIF might ameliorate symptoms, how long RIF effects last, and to what extent such a procedure has on improving mood. These areas constitute a substantial line of inquiry on which to continue to build our knowledge and understanding of forgetting. As this research moves forward perhaps new preventative strategies or even treatments for depression or other psychological issues will surface. This study sheds light on a number of future directions in which researchers can proceed in order to tease apart the statistical and applied significance for the practical application of forgetting paradigms to psychological problems.

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APPENDIX A

Consent to Participate in Research (Participant Pool)

You are invited to participate in a study entitled **The Effects of Mood on Remembering Negative Memories (E1)**. Please read this form carefully, and feel free to ask any questions you may have.

Researcher:
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E-mail: tmarche@stmcollege.ca

Purpose and Procedure: The main purpose of the current study is to find out whether an individual's mood state influences the ability to accurately remember information. It will also examine whether other factors linked to one's cognition style of remembering events (such as how you control unwanted thoughts and how you respond to a sad mood) may also influence memory accuracy. Finally, it will investigate whether there are certain types of memory strategies that are better than others, depending on their mood state and other individual differences (such as age and gender). This study was reviewed and approved on ethical grounds by the University of Saskatchewan Advisory Committee on Ethics in Behavioural Science Research on May 23, 2006. Before you agree to participate, it is important to understand the following:

In this study (which contains 2 phases and will take approximately 2 hours of your time to complete both phases over a 1-week period) you will first be given some words and asked to recall specific memories from your past experiences that might relate to these words. This first phase will take 45 minutes to 1 hour of your time. You will receive 2 participation credits to use towards your introductory psychology course. In the second phase of the study you will be asked to complete a number of questionnaires asking you about aspects of your memory and mood (e.g., how you control unwanted thoughts, respond to sad mood, and how you are feeling lately). You will also be shown some words and asked to remember specific aspects of your memories. This second phase will take approximately 45 minutes to an hour of your time and you will receive an additional 2 participation credits for a total of 4 credits for completing both phases of the study.

Potential Risks: There are no known risks associated with participation in this study. However, you will be asked to answer questions about your mood and experiences that may possibility make you more aware of particular difficulties you could be experiencing. Specifically, you will be asked recall memories about negative events from your life that you may not have thought about recently, which may also make you more aware of particular difficulties of which you were not fully aware. Finally, you will be asked to rate your current mood and this may also make you more aware of how you are

feeling. Such questions and activities may prove to be an addition source of distress once you become more aware. If this is the case, it is important to know that counselling services are available (free of charge) for university students at the Student Counselling Centre. The Student Counselling Centre is located on campus, next door to the main entrance of Upper Place Riel.

Potential Benefits: Potential benefits of participation in this study are that you will learn more about individual differences in mood and experiences that may influence how accurately a person remembers information. In addition, your participation may help to enhance your current understanding of the research process from a participant perspective.

Confidentiality: Although the results of this study may be presented in a conference setting and may become part of published research, it will be reported in aggregate form so that it will not be possible to identify individuals. Furthermore, the consent form that you have signed will be stored separately from all other materials used to ensure that your personal information cannot be linked to your actual performance. Please do not put your name on any other the materials used other than this consent form. A personal identification code may be requested to ensure that information gathered in each phase of this study can be linked together for accuracy, but this will *not* include your name.

Storage of Data: All data and results will be stored safely and securely by the research supervisor in a locked filing cabinet located in the supervisor's laboratory at the University of Saskatchewan for a minimum of five years following the completion of the study.

Right to Withdraw: Your participation in this study is completely voluntary. You may withdraw from the study for any reason, at any time, without penalty of any sort and without loss of research credit for this session. If you withdraw from the study, any information collection will immediately stop and any information that you have contributed will be destroyed.

Questions: If you have any questions concerning the study, please feel free to ask at any point; you are also free to contact the researchers at the numbers provided above if you have questions at a later time. This study has been approved on ethical grounds by the University of Saskatchewan Behavioural Sciences Research Ethics Board on **May 23, 2006.** Any questions regarding your rights as a participant may be addressed to that committee through the Office of Research Services (966-2084). Out of town participants may call collect. Should you wish to receive a paper copy of the final results, please feel free to contact either of the researchers named above.

Consent to Participate: I have read and understand the description provided above; I have been provided with an opportunity to ask questions and my questions have been answered satisfactorily. I consent to participate in the study described above understanding that I may withdraw this consent at any time. A copy of this consent form has been given to me for my records.

_____ _____

(Signature of Participant) (Date)

_____

(Signature of Researcher)

APPENDIX B

Demographic Information Questionnaire

Please answer the questions below.

How old are you? _____

What is your gender? Male / Female

What is your ethnicity? _____

Is English your first language? Yes / No

If no, how many years have you spoken English? _____

Name the title of a movie or TV show you have watched recently that has made you feel happy or laugh? _____

Would you watch this movie or TV show again? Yes No

Briefly describe what about it made you feel happy?

Have you ever been treated for a mental health problem? Yes/No

Are you currently seeking counselling or psychological services? Yes/No

Have you ever participated in a related-word list study before? Yes / No

If yes, what did you have to do?

Please record the *first three letters* of your *mother's first name* and your month and day of *your* birth in the space below?

_e.g., JAN1206 _____

Participant Code:

APPENDIX C

Control of Unwanted Thoughts Scale (CUTS-40)

Instructions:

Please recall some recent experiences you have had with unwanted thoughts. 'Unwanted thoughts' can include worries:

- Worries or unpleasant thoughts that occur against your will
- Thoughts that, in and of themselves, might not be unpleasant but are ones you don't want to have at a particular time or in a particular place.

Listed below are a series of statements that refer to the general experience of unwanted thoughts and one's attempt to gain control over them. Please indicate how much you agree with each statement by circling the number that best reflects your experience with unwanted thoughts and your control of them.

Statements	Disagree/Not Applicable	Slightly Agree	Agree	Agree Moderately	Strongly Agree
1. My unwanted thoughts tend to be persistent. (UTS)	0	1	2	3	4
2. Persistent negative unwanted thoughts usually indicate that something bad is about to happen to me. (UTS)	0	1	2	3	4
3. My unwanted thoughts can interfere with what I am doing. (UTS)	0	1	2	3	4
4. The more often I have a particular unwanted thought, the greater the chances it will come true. (UTS)	0	1	2	3	4
5. I use repetitive phrases or rituals to cancel out the negative effects of unwanted thoughts. (MCS)	0	1	2	3	4
6. I have unwanted thoughts much of the time. (UTS)	0	1	2	3	4
7. I find it difficult to tell when I've achieved good control over an unwanted thought. (MCS)	0	1	2	3	4
8. My mind tends to race with unwanted thoughts. (UTS)	0	1	2	3	4
9. I am on the look-out for unwanted thoughts that might enter my mind. (UTS)	0	1	2	3	4

Statements	Disagree/Not Applicable	Slightly Agree	Agree	Agree Moderately	Strongly Agree
10. My unwanted thoughts tend to involve situation(s) or problem(s) that require my attention. (UTS)	0	1	2	3	4
11. I often try to remove or suppress unwanted thoughts that have entered my mind. (MCS)	0	1	2	3	4
12. I have difficulty exerting enough control over my unwanted thoughts so that they no longer bother me. (MCS)	0	1	2	3	4
13. Many of my unwanted thoughts are distressing to me. (UTS)	0	1	2	3	4
14. When I have “nasty” unwanted thoughts, I think I must be a terrible person. (UTS)	0	1	2	3	4
15. It is easy to lose my desired level of control over unwanted thoughts. (MCS)	0	1	2	3	4
16. I tend to have the same unwanted thought over and over. (UTS)	0	1	2	3	4
17. I will look for evidence that an unwanted thought is not important in order to stop myself from thinking about it. (MCS)	0	1	2	3	4
18. I am concerned that failure to control certain unwanted thoughts could lead to dire consequences for others or myself. (MCS)	0	1	2	3	4
19. It doesn’t take much to trigger my unwanted thoughts. (UTS)	0	1	2	3	4
20. If left unattended, some of my unwanted thoughts could lead to serious consequences. (UTS)	0	1	2	3	4
21. I try to rationalize or think through an unwanted thought until it no longer bothers me. (MCS)	0	1	2	3	4
22. I tend to have unwanted thoughts. (UTS)	0	1	2	3	4
23. Once an unwanted thought enters my mind, it usually interferes with my concentration despite my best efforts. (MCS)	0	1	2	3	4

Statements	Disagree/Not Applicable	Slightly Agree	Agree	Agree Moderately	Strongly Agree
24. It is important that I maintain control over my thoughts. (MCS)	0	1	2	3	4
25. I tend to spend a lot of time searching my mind for unwanted thoughts. (UTS)	0	1	2	3	4
26. I should try harder to prevent or remove unwanted thoughts from my mind. (MCS)	0	1	2	3	4
27. It is important for me to maintain strict control over unwanted thinking. (MCS)	0	1	2	3	4
28. I look to close friends or family to help me deal with unwanted thoughts. (MCS)	0	1	2	3	4
29. Having frequent unwanted thoughts about something bad happening increases the risk that it will actually happen. (UTS)	0	1	2	3	4
30. When my unwanted thoughts occur, they really stand out in my mind (UTS).	0	1	2	3	4
31. It's important for me to 'think through' my unwanted thoughts. (UTS).	0	1	2	3	4
32. Sometimes I think there must be something wrong with me because I have so many unwanted thoughts. (UTS).	0	1	2	3	4
33. If I just ignore an unwanted thought, I feel even more responsible for any negative consequences that might happen. (UTS)	0	1	2	3	4
34. I wonder if some of my unwanted intrusive thoughts are due to unresolved issues. (UTS)	0	1	2	3	4
35. If I don't control my thoughts, I could end up doing something embarrassing or hurtful toward others. (MCS)	0	1	2	3	4
36. If I have a thought that something bad could happen, then I have a responsibility to make sure it doesn't happen. (UTS)	0	1	2	3	4

Statements	Disagree/Not Applicable	Slightly Agree	Agree	Agree Moderately	Strongly Agree
37. I am quite successful at controlling my unwanted thoughts. (MCS)	0	1	2	3	4
38. I think I have a problem with unwanted thoughts. (UTS).	0	1	2	3	4
39. I haven't really found any strategies that work well at getting ride of my unwanted thoughts. (MCS)	0	1	2	3	4
40. My unwanted thoughts must have importance, or they wouldn't keep coming back. (UTS).	0	1	2	3	4

Participant Code:

APPENDIX D

Thought Control Questionnaire (TCQ)

Most people experience unpleasant and/or unwanted thoughts (in verbal and/or picture form), which can be difficult to control. We are interested in the techniques that you *generally*
use to control such thoughts.
Below are a number of things that people do to control these thoughts. Please read each statement carefully, and indicate how often you use each technique by *circling* the appropriate number. There are no right or wrong answers. Do not spend too much time thinking about each one.

When I experience an unpleasant / unwanted thought:

	Never	Sometimes	Often	Almost always
1 I call to mind positive images instead	1	2	3	4
2 I tell myself not to be so stupid	1	2	3	4
3 I focus on the thought	1	2	3	4
4 I replace the thought with a more trivial bad thought	1	2	3	4
5 I don't talk about the thought to anyone	1	2	3	4
6 I punish myself for thinking the thought	1	2	3	4
7 I dwell on other worries	1	2	3	4
8 I keep the thought to myself	1	2	3	4
9 I occupy myself with work instead	1	2	3	4
10 I challenge the thought's validity	1	2	3	4
11 I get angry at myself for having the thought	1	2	3	4
12 I avoid discussing the thought	1	2	3	4
13 I shout at myself for having the thought	1	2	3	4
14 I analyse the thought rationally	1	2	3	4
15 I slap or pinch myself to stop the thought	1	2	3	4
16 I think pleasant thoughts instead	1	2	3	4
17 I find out how my friends deal with these thoughts	1	2	3	4
18 I worry about more minor things instead	1	2	3	4
19 I do something that I enjoy	1	2	3	4
20 I try to reinterpret the thought	1	2	3	4
21 I think about something else	1	2	3	4
22 I think more about the more minor problems I have	1	2	3	4
23 I try a different way of thinking about it	1	2	3	4
24 I think about past worries instead	1	2	3	4
25 I ask my friends if they have similar thoughts	1	2	3	4
26 I focus on different negative thoughts	1	2	3	4

27 I question the reasons for having the thought	1	2	3	4
28 I tell myself that something bad will happen if I think the thought	1	2	3	4
29 I talk to a friend about the thought	1	2	3	4
30 I keep myself busy	1	2	3	4

Participant Code:

APPENDIX E

Rumination on Sadness Scale (RSS)

The statements below describe some thoughts that people may have when they are feeling sad or down. Please read each statement and decide how much you do what the statement describes when you are feeling sad. Indicate the degree to which you do what is described by circling the appropriate number on the scale.

WHEN I AM SAD, DOWN OR FEEL BLUE . . . . . .

A. I have difficulty getting myself to stop thinking about how sad I am.

1	2	3	4	5
NOT AT ALL	RARELY	SOMETIMES	QUITE A BIT	VERY MUCH

B. I repeatedly analyze and keep thinking about the reasons for my sadness.

1	2	3	4	5
NOT AT ALL	RARELY	SOMETIMES	QUITE A BIT	VERY MUCH

C. I search my mind many times to try and figure out if there is anything about my personality that may have led me to feel this way.

1	2	3	4	5
NOT AT ALL	RARELY	SOMETIMES	QUITE A BIT	VERY MUCH

D. I get absorbed in thinking about why I am sad and find it difficult to think about other things.

1	2	3	4	5
NOT AT ALL	RARELY	SOMETIMES	QUITE A BIT	VERY MUCH

E. I search my mind repeatedly for events or experiences in my childhood that may help me understand my sad feelings.

1	2	3	4	5
NOT AT ALL	RARELY	SOMETIMES	QUITE A BIT	VERY MUCH

F. I keep wondering about how I was able to be happy at other points in my life.

1	2	3	4	5
NOT AT ALL	RARELY	SOMETIMES	QUITE A BIT	VERY MUCH

WHEN I AM SAD, DOWN OR FEEL BLUE . . . . . .

G. I lie in bed and keep thinking about my lack of motivation and wonder about whether it will ever return.

1	2	3	4	5
NOT AT ALL	RARELY	SOMETIMES	QUITE A BIT	VERY MUCH

H. If people try to talk to me or ask me questions it feels as though they are interrupting an ongoing silent conversation I am having with myself about my sadness.

1	2	3	4	5
NOT AT ALL	RARELY	SOMETIMES	QUITE A BIT	VERY MUCH

I. I question and keep wondering about the meaning of life to find clues that may help me understand my sadness.

1	2	3	4	5
NOT AT ALL	RARELY	SOMETIMES	QUITE A BIT	VERY MUCH

J. I repeatedly think about what sadness really is by concentrating on my feelings and trying to understand them.

1	2	3	4	5
NOT AT ALL	RARELY	SOMETIMES	QUITE A BIT	VERY MUCH

K. I get the feeling that if I think long enough about my sadness I will find that it has some deeper meaning and that I will be able to understand myself better because of it.

1	2	3	4	5
NOT AT ALL	RARELY	SOMETIMES	QUITE A BIT	VERY MUCH

L. I keep thinking about my problems to try and examine where things went wrong.

1	2	3	4	5
NOT AT ALL	RARELY	SOMETIMES	QUITE A BIT	VERY MUCH

M. I exhaust myself by thinking so much about myself and the reasons for my sadness.

1	2	3	4	5
NOT AT ALL	RARELY	SOMETIMES	QUITE A BIT	VERY MUCH

Participant Code:

APPENDIX F

Single Item Self-Report Mood - Sadness

On the five-point scale below, please indicate how sad you feel right now?

|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |
| Not Sad At All | Somewhat Sad | Moderately Sad | Very Sad | Extremely Sad |

Participant Code:

APPENDIX G

Positive and Negative Affect Scales (PANAS)

This scale consists of a number of words that describe different feelings and emotions. Read each item and then mark the appropriate answer in the space next to that word. Indicate to what extent [INSERT APPROPRIATE TIME INSTRUCTIONS HERE]. Use the following scale to record your answers.

1	2	3	4	5
very slightly	a little	moderately	quite a bit	extremely or not at all

___ interested	___ distressed	___ excited	___ upset
___ strong	___ guilty	___ scared	___ hostile
___ enthusiastic	___ proud	___ irritable	___ alert
___ ashamed	___ inspired	___ nervous	___ determined
___ attentive	___ jittery	___ active	___ afraid

We have used PANAS with the following time instructions:
(you feel this way right now, that is, at the present moment)
(you have felt this way today)
(you have felt this way during the past few days)
(you have felt this way during the past week)
(you have felt this way during the past few weeks)
(you have felt this way during the past year)
(you generally feel this way, that is, how you feel on the average)

APPENDIX H

Negative Cue-Word List

Empty	Accident	Ordeal
Fear	Rejection	Impossible
Ugly	Stupid	Sad
Weak	Blaming	Shame
Hopeless	Horrified	Guilt
Loser	Doubt	Punishment
Failure	Tragedy	Pain
Temper	Loss	Harmful
Death	Suspicious	Angry
Sickness	Defeat	Mournful

Cue words to elicit negative memories:

Participant Code:

APPENDIX I

Memory Record Form

Elicitation word: _____

Memory 1 (M1).

_____

Exemplar: _____

[Now turn to the memory rating sheet and ask the participant to verbally rate the clarity, valance, and age of memory]

Memory Negativity _____

Memory Clarity _____

Memory Age _____

Memory 2 (M2).

_____

Exemplar: _____

[Now turn to the memory rating sheet and ask the participant to rate the clarity, valance, and age of memory]

Memory Negativity _____

Memory Clarity _____

Memory Age _____

Memory 3 (M3).

_____

Exemplar: _____

[Now turn to the memory rating sheet and ask the participant to rate the clarity, valance, and age of memory]

Memory Negativity _____

Memory Clarity _____

Memory Age _____

Memory 4 (M4).

_____

Exemplar: _____

[Now turn to the memory rating sheet and ask the participant to rate the clarity, valance, and age of memory]

Memory Negativity _____

Memory Clarity _____

Memory Age _____

Participant Code:

APPENDIX J

Subjective Ratings of Valance, Clarity and Age of Memory

Subjective Rating Scale for Memory Negativity

On the five-point scale below, please indicate how negative this memory is:

|----------|----------|----------|----------|

1	2	3	4	5
Not Negative At All	Somewhat Negative	Moderately Negative	Very Negative	Extremely Negative

Subjective Rating Scale for Memory Clarity

On the five-point scale below, please indicate how clear in your mind this memory is:

|----------|----------|----------|----------|

1	2	3	4	5
Not Clear At All Clear	Somewhat Clear	Moderately Clear	Very Clear	Extremely Clear

Participant's Age When Memory Occurred

How old were you when this memory/event took place? _____

APPENDIX K

Cue Word Rating

Subjective Rating Scale for Negative Valence of Cue-words

On the five-point scale below, please indicate how negative the word _____ is:

|----------|----------|----------|----------|

1	2	3	4	5
Not Negative At All	Somewhat Negative	Moderately Negative	Very Negative	Extremely Negative

Subjective Rating Scale for Negative Valence of Cue-words

On the five-point scale below, please indicate how negative the word _____ is:

|----------|----------|----------|----------|

1	2	3	4	5
Not Negative At All	Somewhat Negative	Moderately Negative	Very Negative	Extremely Negative

Subjective Rating Scale for Negative Valence of Cue-words

On the five-point scale below, please indicate how negative the word _____ is:

|----------|----------|----------|----------|

1	2	3	4	5
Not Negative At All	Somewhat Negative	Moderately Negative	Very Negative	Extremely Negative

Subjective Rating Scale for Negative Valence of Cue-words

On the five-point scale below, please indicate how negative the word _____ is:

|----------|----------|----------|----------|

1	2	3	4	5
Not Negative At All	Somewhat Negative	Moderately Negative	Very Negative	Extremely Negative

Subjective Rating Scale for Negative Valence of Cue-words

On the five-point scale below, please indicate how negative the word _____ is:

|----------|----------|----------|----------|

1	2	3	4	5
Not Negative At All	Somewhat Negative	Moderately Negative	Very Negative	Extremely Negative

A *Subjective Rating Scale for Negative Valence of Cue-words*

On the five-point scale below, please indicate how negative the word _____ is:

|----------|----------|----------|----------|

1	2	3	4	5
Not Negative At All	Somewhat Negative	Moderately Negative	Very Negative	Extremely Negative

A *Subjective Rating Scale for Negative Valence of Cue-words*

On the five-point scale below, please indicate how negative the word _____ is:

|----------|----------|----------|----------|

1	2	3	4	5
Not Negative At All	Somewhat Negative	Moderately Negative	Very Negative	Extremely Negative

A *Subjective Rating Scale for Negative Valence of Cue-words*

On the five-point scale below, please indicate how negative the word _____ is:

|----------|----------|----------|----------|

1	2	3	4	5
Not Negative At All	Somewhat Negative	Moderately Negative	Very Negative	Extremely Negative

APPENDIX L

Visual Search Task

Please go through each line below slowly and strike out each *vowel* you see.

LDXQBGSPCEYSGUMMJKKFDTPHSCLNLIXFTVRKIISCELULQCSSDJBZYJ

VSQNMZELZRQRAFSRMVYJKOSEMQLFSMQOZRABPSTXSCOXPOUOCZT

CLDQUNHLYKNQEVHOFQGXUYHYGTKJBUYBTLBRLNNPXSFIKOLFYGF

MGKDFQUHOJFXLNFUUIVXNCUMBOABWECKNUCUAEJGVRYQSTRBQT

AGOVMYFCRQTFRTCJRFUJKDZKJVHKDMSSRZGGNNIRWHJOHRMFPDT

KSLVTOUEMUETYYXMBYLGKWUTTOOXDGRSBYZMGMWGGDUYYUER

VBIZWVSZAMTIYJKMPRZTHOXJGBQYLUSGKLQJYJZRRTKLFKFYHDEA

DRJHCYBJVDNNOFCJKHMFGGZXBTZZULPDATAAYUGJFUTQBSSEDEDT

JSRDULYDEBVRUNSMSHBQHAIVUDXCDUYUHGRYUZXTNPJCQPFGFGPY

CSZDVWHKQSWMGCVJUJBSHLZXXEOYZXUQFXJWJZXLBLJSRRKVELK

HZTCCVHYFREMKUTTWJDIPXRWTYSQSECJCVYRJGPLZZZVXWMLMBH

ZYAHRFKNTZHXQRJACNUZSKUPRWYJDXOIBGBIIWBPGLOXAGIJJRPM

XVNRLKVZIYYITNZLSTCEXFOKOXYOPDHIFHJEGHYGSVETKCZBCDRSQ

JJIAVEVVEONFQCFKTQBAQNGJXRLXAUTBCEIIBSJZIGYWQRHDYFBYK

YHREPHZRTVRSOTWZOHYOQSOWSPJLORPHDMNHYSMBDIPEASNJKIY

XKWNYZKQJUYJUKJWHCWIITLRAGHLLCCDCUVYKFEUDBHZOAVKGE

WELICGKDGDYJUAWJIESMDOJJNWPWQAZTPNAGVAKSKZOVAIQYBXP

YAMVTEICOQBQLICTRLZJFBLDIWQTZPPMDVSWMPBPSLOVWPPAGNO

NZFGGIUQYXKKKAYXCCTOQZOASJXRVRPVANEJFFTQSKAQGWPOAFC

PRLAHQOXEPBDGZXIJCVYRJGPLZZZVXWMLMSEDEDTJSRDULYDEBJF

APPENDIX M

Debriefing Form

The Effects of Mood on Remembering Negative Memories

Researcher:
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Research Supervisor:
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Thank you for participating in this study, I hope you found it interesting and perhaps gained some insight from your experience as well.

The purpose of this study was to investigate whether certain methods of forgetting are better at helping individuals forget negative memories than others or if this depends on how sad a person is at the time. For individuals who experience a depressed mood, a major aspect of their experience during is the constant recurrence or intrusion of negative memories/experiences that are difficult to forget. This may make your mood worse or prolong the effects of feeling badly. By applying specific methods of forgetting in applied clinical settings, some useful treatment methods may be developed in the future. For example, retrieval of partial information from a set of memories acts to inhibit related information. In other words, aspects from an event that one retrieves from memory (perhaps repeatedly) acts to inhibit the recollection of the non-retrieved information in the same memory set. If this paradigm can be applied to negative memories, individuals who suffer from recurrent intrusions of such memories may be able to *inhibit* them through recall of related, but more neutral or positive, information and perhaps stop the onset of more serious mood problems.

If you are interested in receiving a paper copy of the final results or have any further questions, please feel free to contact me or my research supervisor. Thank you again for your participation!