The Effects of Induced Depressed Mood State On Explicit (Conscious) and Implicit (Unconscious) Memory Processes

by

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Abstract

The relationship between induced depressed mood and retrieval of encoded information from explicit and implicit memory was investigated in a 2 X 2 factorial design. The study attempted to replicate the findings of Bazin, Perruchet, De Bonis, and Féline (1994) who reported a clear distinction between explicit and implicit memory in clinically depressed in-patients: Recall was impaired using a direct test of memory (cued-recall), whereas participants' performance on the indirect memory test (word-stem completion) was unaffected. Sixty participants (16 males and 44 females) were randomly assigned to one of four groups. Participants were induced into a depressed or neutral mood state by reading Velten's (1967) Mood Statements and subsequently instructed to perform either the cued-recall or the word-stem completion task. The dependent variable was the percent priming score which was obtained by subtracting the proportion of correct unstudied words recalled from the proportion of correct studied words recalled on the memory test. Results show that the depressed group, relative to the neutral group, were not significantly impaired on either the cued-recall or the word-stem completion task. The implications of the lack of depressive deficits from both explicit and implicit memory processing are discussed.

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Introduction

Past clinical studies have demonstrated the significant detrimental effects of depression on cognitive functioning, including memory loss and impaired concentration. However, the majority of studies have documented these cognitive and memory deficits with primarily direct memory tasks, which measure explicit (conscious) memory processing. The purpose of the present study was to investigate whether the same degree of depressive deficits occurred with another form of memory processing known as implicit (unconscious) memory. This speculation builds upon previous cognitive and neuropsychological research studies that have shown a dissociation or distinction between explicit memory and implicit memory performances within depressed individuals. For example, a study by Bazin, Perruchet, De Monis, and Féline (1994) reported that their clinically depressed patients were significantly impaired on the direct test of explicit memory, whereas their performance on the indirect test of implicit memory was unaffected. Therefore, explicit and implicit memory systems may present as separate entities and function differently from one another. The present study investigated this hypothesis in a 2 X 2 between-subjects experiment, which examined the relationship between induced mood states and the retrieval of information from these two underlying memory processes: explicit and implicit.

Memory

Terminology. Before highlighting the relevant research studies in the memory literature, it is necessary to clarify some of the terminology used in this field. A number of researchers (e.g., Johnson & Hasher, 1987; Reingold & Merikle, 1990; Richardson-Klavehn & Bjork, 1988) have observed the frequent misuse of terms such as "explicit" and "implicit" in the majority of studies on human memory. They argued that the explicit and implicit

labels were confusing to the reader because these terms have been used interchangeably to refer to either the underlying hypothetical memory (unconscious or conscious) processes or the specific memory tasks used to measure these memory processes. The researchers stated that it would be less ambiguous if different terms were used to differentiate between the various definitions. They recommended the terms "explicit" and "implicit" to refer strictly to the underlying conscious and unconscious memory processes, respectively. On the other hand, the terms "direct" and "indirect" were suggested to be used when referring to the type of tasks that measure explicit and implicit memory, respectively. The investigator in the present study adhered to the recommended terminology.

Explicit memory. An increasingly studied topic within the theoretical and empirical literature on human memory is the two different ways in which memory for past experiences are cued, most often referred to as explicit and implicit memory (Graf & Schacter, 1985; Schacter, 1987). In recent decades, research has focussed primarily on *explicit memory,* and until recently, the majority of memory studies had followed this procedural design, examining only direct measures of memory. Explicit memory requires making direct reference to, and intentional recollection of, earlier presented information. This form of memory can be measured with a number of *direct* memory tests such as free-recall, cued-recall, and recognition whereby the respondent will consciously attempt to remember the wanted information (Schacter, 1987). For example, in a typical direct memory test, participants are initially shown a series of words, pictures, or some set of to-be-remembered information during a study or learning episode. Later, they are given a recall (free or cued) or a yes/no recognition test in which they must think back to this previous study period in order to produce or select a correct response. Because these task instructions make explicit

reference to *a prior* experience, such tasks have been referred to as *direct* (Johnson & Hasher, 1987), *explicit* (Graf & Schacter, 1985; Schacter, 1987), *autobiographical* (Jacoby & Dallas, 1981), *episodic* (Tulving, 1972, 1983), or *intentional* (Jacoby, 1984) memory tests.

Implicit memory. In the recent past, the empirical research on human memory has undergone a major change, characterized by Richardson-Klavehn & Bjork (1988) as a "revolution in the way that we measure and interpret the influence of past events on current experience and behavior..." (p. 475-76). In the last 10 years, there has been an increasing number of empirical studies shifting their attention away from the traditional explicit memory research and instead, focussing on measuring an indirect form of memory called *implicit memory* (Graf & Schacter, 1985; Jacoby & Dallas, 1981; Roediger, Weldon, & Challis, 1989). Rather than being asked consciously to retrieve specific information from explicit memory, participants are asked to perform various *indirect* memory tasks which tap into an automatic form of processing whereby information is retrieved unintentionally or unconsciously from a prior learning experience (Roediger & McDermott, 1992). Unlike explicit memory, implicit memory is assessed by measuring whether a person's memory recall has been influenced or facilitated by mere exposure to that past learning experience, without that person's necessarily being *aware* that memory was being assessed (Schacter, 1987). Because these memory tasks instruct participants to solve a problem for which a particular past experience could be relevant, but the task does not direct one to consider that past experience, such tasks have been referred to as *indirect* (Johnson & Hasher, 1987), *implicit* (Graf & Schacter, 1985; Schacter, 1987), *incidental* (Jacoby, 1984), or *semantic* (Tulving, 1972, 1983) tests of memory. Thus, in these indirect memory tasks, the participant is first innocuously exposed or *primed* to a word (e.g., *elephant*) during the study episode.

The respondent is later challenged with the presentation of a test cue in a perceptually degraded or fragmented form and then instructed to solve this partial cue with *the first word that comes to mind.* Various types of indirect memory tests have been used in research including word-stem completions (e.g., ele-----), word-fragment completions (e.g., e_e_h__t), anagram solving (e.g., lepanthe), and homophone spelling (e.g., fair or fare; primed with word *taxi*; more likely to write less common spelling, *fare*, during memory test). The word-stem and word-fragment completion tasks are among the most popular of the indirect tests of memory (e.g., Graf & Mandler, 1984; Tulving, Schacter, & Stark, 1982; Warrington & Weiskrantz, 1974).

Word-stem completion task. Of relevance to the present study, the word-stem completion task involves presenting the participants with a list of words during the study or learning period. Later on, an incidental memory test is given and the participants are given only the first three letters (i.e., *word-stems*) of each of the words presented during the study episode. For example, the respondent may have been previously exposed to the word *drama* and then was presented with the word-stem *dra--* during the memory test with the instructions to complete this particular word-stem with the first word that comes to mind. According to the *repetition priming effect* (Cofer, 1967, as cited by Schacter, 1987), previously primed with the word *drama* would make the participant much more likely to complete the word-stem *dra--* with the word *drama*, than with other possible responses such as *drain, drawn, or drape*. Thus, within indirect memory tests, there is a strong tendency for individuals *unconsciously* to complete word-stems with previously *studied* (primed) words, rather than *unstudied* (unprimed) words.

Dissociation Between Explicit and Implicit Memory

The present study investigated whether an induced depressed mood state produced a *dissociation* or a *differential effect* between explicit and implicit memory processes. Examining this dissociation mechanism provides an interesting opportunity to understand and investigate further the retrieval processes that occur in human memory, particularly within depressed individuals. Past experimental investigations have measured this dissociation between explicit and implicit memory systems by comparing the different responses participants produced on the direct memory tests versus the indirect memory tests, respectively. A *dissociation* is said to occur if one variable affects the performance on the task measuring, for example, explicit memory but has no obvious effect on the indirect test measuring implicit memory or vice versa (Ellis & Hunt, 1993).

In the last decade, cognitive and neuropsychological research demonstrated a variety of striking dissociations between explicit and implicit memory. Under certain conditions, these two memory systems present as entirely separate processes, independent of one another (e.g., Richardson-Klavehn & Bjork, 1988; Schacter, 1987). For example, a study by Tulving et al. (1982) found that priming tasks such as word-fragment completion (indirect memory tasks) and recognition tasks (direct memory tasks) were independent measures of memory. During the test phase, the investigators found that recognition accuracy diminished during the retention interval while memory performance on the word-fragment task remained unchanged. Similarly, Graf, Shimamura, and Squire (1985) reported that the priming effect on their word-stem completion task (i.e., *indirect* test of implicit memory) was reduced by a change in modality of presentation from study phase (auditory) to test phase (visual),

whereas the cued-recall performance (i.e., *direct* test of explicit memory) had not been significantly influenced by this modality manipulation.

The most impressive evidence for the dissociation between explicit and implicit memory has come from studies in neuropsychology. For instance, Graf, Squire, and Mandler (1984) and Warrington and Weiskrantz (1974) both reported that their amnesic patients exhibited impaired scores on standard free- or cued-recall tests (i.e., direct memory tasks) but were still able to display normal scores on the word-stem completion priming tests (i.e., indirect memory tasks). In other words, these amnesic patients demonstrated preserved recall capabilities from implicit memory but displayed poor recollection from explicit memory, evidence of a dissociation between these two memory processes.

Mood State and Memory

During the last 20 years, there has also been considerable research interest in the effects of emotional mood states on memory and learning performance; that is, emotions have been shown to play an important role in memory processes (Bradley, Mogg, & Williams, 1994; Ellis & Hunt, 1993; Hale & Strickland, 1976; Leight & Ellis, 1981). Clinical or induced mood states such as depression have demonstrated a variety of memory effects including mood congruency effects (e.g., Bower, Gilligan, & Monteiro, 1981), mood-state dependency effects (e.g., Bower, Monteiro, & Gilligan, 1978), a reduction in recall of the to-be-remembered information, as well as a reduction in the effectiveness of organization in memory (e.g., Ellis et al., 1984; Weingartner, Cohen, Murphy, Martello, & Gerdt, 1981).

Mood congruency effect. A *mood congruency* pattern refers to a tendency for persons to learn and recall more information that is affectively similar or congruent with their current mood state than information that is affectively incongruent (Ellis & Hunt, 1993). In

other words, a happy person is more likely to remember happy rather than sad material, and conversely, a sad person is more likely to remember sad than happy information. In the study by Bower et al.(1978), for instance, participants who had been hypnotized into happy or sad moods, had identified with and recalled more facts about a character in the story who was in the same mood as they were. In addition, depressed individuals have been observed to have a bias recall of negative, unpleasant memories, whereas the normal control group has shown a bias recall of positive, pleasant memories and these findings have been replicated in a number of studies (e.g., Clark & Teasdale, 1982; Denny & Hunt, 1992; Lloyd & Lishman, 1975; Mathews & Bradley, 1983; McDowall, 1984). Likewise, a study conducted by Frith, Stevens, Johnstone, Deakin, Lawler, and Crow (1983) found that when clinically depressed individuals were instructed to recall past life experiences, they were more likely to recall more self-rated unpleasant memories than pleasant ones. Similar mood congruency results were also found with participants' whose emotions were experimentally manipulated by mood-induction procedures (e.g., Teasdale & Fogarty, 1979; Teasdale, Taylor, & Fogarty, 1980).

Mood-state dependency effect. Another example of the effects of mood on memory is the *mood-state dependency* phenomenon which occurs when material learnt in a particular mood is recalled or recognized best when a person is tested under that same mood state (Ellis & Hunt, 1993). For instance, if a person had learned material while in a sad mood, a mood-state dependency would occur if he or she recalled the material better while in a sad mood than in a neutral or happy mood. It is assumed that the mood at the time of encoding comes to serve as an effective retrieval cue for information during later recall (Mayer & Bower, 1986).

Depressive memory deficits. Recently, there has been a substantial increase in research investigating the detrimental effects of depression (clinical or induced) on cognitive and memory processes (e.g., Beck, 1967; Ellis & Ashbrook, 1988; Hasher & Zacks, 1979; Hertel & Hardin, 1990). Problems with memory are typical of depression, so much so that they are included among the Research Diagnostic Criteria for major depression (RDC; Spitzer, Endicott, & Robins, 1978, as cited in Hertel & Hardin, 1990). Many experimental and clinical studies have provided support for the deficits and cognitive impairments exhibited by depressed individuals. For example, Henry, Weingartner, and Murphy (1973) reported deficits on a free-recall task (i.e., explicit memory) with manic-depressive patients. In a mood-induction study, Ellis et al. (1984) found that the depressed-induced participants displayed poorer recall on the free-recall task than the control group who received a neutral-mood induction. However, these reported detrimental effects of depression have been observed primarily with direct measures of memory such as the free- and cued-recall tasks (e.g., Ellis et al., 1984; Leight & Ellis, 1981; Weingartner et al., 1981). Only a handful of research studies have investigated the effects of depression on indirect tests of memory (e.g., Hertel & Hardin, 1990; Roediger & McDermott, 1992).

Depressives: Dissociation Between Explicit and Implicit Memory?

To date, the evidence for a dissociation between depressives' performance on direct and indirect tests of memory has yet to be fully resolved. Past studies investigated whether depressed individuals (clinical or mood-induced) performed differently on indirect memory tests in comparison to direct memory tasks. In other words, researchers questioned whether the depressives' implicit memory could be spared and left intact, even though they exhibited serious impairments in recall from explicit memory. A review of the literature does not

reveal any consistent findings of a dissociation between explicit and implicit memory in experimentally mood-induced or clinically depressed samples (e.g., Denny & Hunt, 1992; Elliott & Greene, 1992; Hertel & Hardin, 1990). For example, Elliott and Greene (1992) found no evidence of a dissociation between implicit and explicit memory performance since their severely depressed patients had shown impairment on *both* the indirect memory tasks (e.g., word-stem completion and homophone spelling) and the direct memory tasks (e.g., free- and cued-recall). In contrast, Denny and Hunt (1992) reported a significant dissociation between explicit and implicit memory processes. They observed a reliable difference between the depressed and control participants' performance on the direct measure of memory (i.e., free-recall). However, these two groups did not differ in performance on the indirect memory test (i.e., word-fragment completion). Specifically, their depressed participants recalled more unpleasant words than pleasant words on the free-recall task whereas the converse was true for the non-depressed (control) group. However, when memory was tested implicitly with the word-fragment completion test, this differential effect of affective word valence (i.e., pleasant or unpleasant words) disappeared. In other words, even though the depressed group, relative to the control group, had shown a bias recall of unpleasant words on the direct, free-recall task, the investigators found no difference in the number of pleasant and unpleasant words recalled by the depressed and control groups on the indirect, word-fragment completion task.

Confounding variable. The evidence for a dissociation between explicit and implicit tests of memory within depressed individuals is still up for debate. Uncertainty on this point derives from the lack of prevailing consensus as to the best interpretation of these reported findings. Work by several authors (e.g., Bazin et al.,1994; Graf et al., 1984; Reingold &

Merikle, 1990) suggested that one possible reason for the various studies' conflicting results regarding the presence of a dissociation was that the explicit/implicit nature of the instructions for each memory task may have been confounded with another factor, namely, the different retrieval cues provided to participants during the memory test phase. For example, participants in the recognition instruction group (i.e., testing explicit memory) may have received the retrieval cue, *travel,* and were asked if they had seen this word previously whereas the word-stem completion instruction group (i.e., testing implicit memory) may have been provided only with a partial cue, *tra*--- and was instructed to form a word from these first three letters. Consequently, a differential effect in recall of information would emerge during the memory test, with the recognition instruction group having a recall advantage over the word-stem completion instruction group since the recognition group had been provided with twice as many retrieval cues to aid recall. This confounding variable of retrieval cue availability would be most problematic for depression studies since it has been demonstrated that the amount of cues available to depressed participants will influence the degree of deficits these individuals exhibit in recall on a memory task (e.g., Calev & Erwin, 1985, as cited in Watts & Sharrock, 1987; Cohen, Weingartner, Smallberg, Pickar, & Murphy, 1982). In other words, the less retrieval cues provided to these depressed individuals, the worse they will perform on these memory tests. There is some support for this suggestion in the results of a study by Cohen et al. (1982), in which depressed participants, relative to a control group, showed greater impairment in memory on the free-recall task (i.e., no retrieval cues provided) in comparison to the cued-recall task (i.e., partial cues provided). For this reason, several researchers (e.g., Bazin et al., 1994; Merikle & Reingold, 1991) have concluded that the different retrieval cues used with the direct and indirect memory tasks in these past

studies could have produced the observed dissociation between the two underlying memory systems, rather than the actual implicit or explicit nature of the instructions.

The Bazin, Perruccet, De Bonis, and Féline (1994) Study

In order to rule out the confounding variable of retrieval cue availability, Bazin et al. (1994) designed a more tightly controlled study, which matched the direct and indirect memory tasks on all characteristics except task instruction. Their depressed in-patients and matching controls were compared on the cued-recall and the word-stem completion tasks. Both memory tasks presented participants with the same retrieval cues during the memory test phase, but gave different instructions for the recall of past information. The results of Bazin et al.'s study revealed a significant dissociation between explicit and implicit memory: Clinically depressed in-patients exhibited greater impairments on the cued-recall task (i.e., explicit memory) in comparison to their matched controls, whereas performance between the two groups did not differ significantly on the word-stem completion task (i.e., implicit memory).

Limitations of the study. Despite improvements from those of past studies and having additional control measures incorporated into their experimental design, Bazin et al.'s (1994) mixed design research study still exhibited several shortcomings. Their study had the potential problem of an *order effect*. According to Miller (1987), this effect refers to the fact that "the point in time in which the treatment occurred, rather than the specific treatment, may have been responsible for the observed pattern of results" (p. 120). There is the possibility of an order effect in their design because Bazin et al. had adopted a constant order of presentation of the two memory tasks, with both clinically depressed and control groups performing the indirect memory test first, followed immediately by the direct memory test.

Since these investigators had not ruled out this confounding factor by counterbalancing the order of presentation of the memory tasks, it is difficult to determine whether Bazin et al.'s observed dissociation occurred as a result of the explicit/implicit nature of the task instructions or was a direct result of the specific order in which the two memory tasks had been carried out.

Furthermore, it could be argued that Bazin et al.'s (1994) findings were also confounded with the extraneous variable of differential experience between the two experimental groups. During the course of their study, the depressed patients had been hospitalized and medicated with psycho-tropic drugs whereas the matched control group had not received similar treatment.

Overall, it is difficult to state with certainty whether Bazin et al.'s (1994) report of a differential effect of depression on implicit and explicit memory processes was the result of the anticipated explicit/implicit nature of the task and not due to other uncontrolled extraneous variables existing in their study.

The Present Study

The outline of the literature so far stresses the need for further empirical evidence to resolve the controversy of whether or not depression will elicit a genuine dissociation between explicit and implicit memory processes. Therefore, the main purpose of the present study was to confirm and support Bazin et al.'s (1994) finding of a dissociation between explicit and implicit memory processing within depressed individuals. Although the present study attempted to replicate their results, this experiment significantly modified Bazin et al.'s methodology and design. For example, non-depressed B.Ed. students were recruited and induced into a depressed mood by reading Velten's (1967) Mood Statements, instead of using

clinically diagnosed depressed in-patients. The present study also employed a strictly between-subjects design whereby each depressed or neutral participant performed either the direct or indirect memory task. On the other hand, the participants in Bazin et al.'s within-between subjects design completed both the direct and indirect memory tasks. More importantly, the individuals in the present experiment were not informed of an incidental memory test in order to prevent the alteration of behaviour which contrasted against the participants in Bazin et al.'s study who were explicitly forewarned of an upcoming memory test. Thus, the present experiment utilized some noteworthy elements of Bazin et al.'s design, but this experiment also improved upon Bazin et al.'s study by implementing several procedural innovations of its own.

In summary, the goal of the present study was to explore the effects of an experimentally induced-depressed mood state on the recall of information from implicit and explicit memory in a non-clinical population. In this between-subjects research design, depressed-induced and neutral-induced participants were compared on two well-matched memory tasks (i.e., direct and indirect), differing only in regard to the type of instructions given. The direct measure of explicit memory was a cued-recall task and the indirect test of implicit memory was a word-stem completion task. After a study phase in which participants read a list of words and rated the "pleasantness" of each word on a 5-point scale, they were given a list of partial cues (e.g., mon--) which either they had to complete with the first word that came to mind (i.e., word-stem completion task instruction) or they had to use any words they could remember from the study list presented earlier (i.e., cued-recall task instruction). Borrowing the idea from Bazin et al. (1994) and Reingold and Merikle (1990), the memory tasks in the present experiment employed identical retrieval cues in order to rule out the

potential confounding factor of different retrieval cue availability. Therefore, participants in the cued-recall and the word-stem completion instruction group were given the same cues (i.e., word-stems) on the memory test (e.g., "sou--"), differing only in regards to the type of instructions given. The critical question was whether the induced mood states (depressed or neutral) differed from one another in terms of priming scores or the proportions of studied and unstudied words correctly produced on either the cued-recall task or the word-stem completion task.

Limitations of the present study. The primary critique of the present research design may pertain to the ethical dilemma of inducing depression into non-depressed university students. One concern is the potential residual or long-term effects of the depression mood-induction procedure administered to this non-clinical population.

To address this concern directly, the investigator implemented several safeguards throughout the study to prevent and eliminate any potential psychological danger from occurring to participants. First, prior to the start of the experiment, there was a two-level screening process to determine participant eligibility. In order to be accepted as a participant in the present study, each student was screened for depression and depressive symptoms by being administered both the Trait Mood scale and the State Mood scale of the State Trait-Depression Adjective Check Lists (ST-DACL; Lubin, 1994). Potential participants had to obtain acceptable T-scores that fell within the stated inclusion criteria.

Second, all participants' mood status was continuously monitored with State Mood scale (i.e., mood manipulation checks) at three further points in the study. Thus, the State Mood scale was used to aid the investigator in the detection and removal of at-risk participants who exhibited exceedingly high T-scores on the mood assessments and/or

experienced extreme depressive behaviours (i.e., crying, severe somatic complaints) as a result of undergoing Velten's mood-induction procedure.

Third, both the depressed and neutral participants were subjected to the Velten elation mood-induction procedure in which they were instructed to read 58 happy mood statements before leaving the experimental setting. Participants were again assessed with the State Mood scale to determine their current mood levels. Each participant had to achieve a T-score of 55 or lower to indicate at least, a neutral if not happy mood level. Following the assessment, all participants were questioned by the investigator about their current feeling and mood state in an post-experimental interview. The purpose of both of these procedures was to ensure that no student left the study in a depressed or even distressed mood state.

Fourth, all students were provided with a list of contact numbers (i.e., investigator's home number, Acadia Counselling Centre and mental health clinics) in the event that they should experience long-term negative effects as a result of the experiment and required further counselling attention.

Therefore, the present study took into consideration the ethical problem of inducing depression into non-depressed students by implementing precautionary steps to ensure that the investigator did not either recruit and induce a depressed mood state into students who were predisposed to depression and depressive symptoms or to permit participants to continue with the study if they should display depressive behaviours and dangerously high T-scores on the mood assessments.

Another criticism of the present mood-induction study may be the external validity or generalizability of the findings. It is possible that the participants in the depressed mood group were induced only into a *temporary* distressed or sadden mood state which may not

necessarily be the same manifestation of depression typically found in clinically depressed individuals. Thus, there may be a significant difference between induced depressed mood state and clinical depression with respect to intensity and duration characteristics. This clinical-induced mood difference brings up two important questions pertaining to the present study: 1) were the induced depressed groups (i.e., depressed cued-recall or depressed word-stem completion) truly *depressed* per se or more *distressed* in state as they performed their respective memory tests?; and 2) was the induced depressed mood state adequately potent to endure beyond the manipulation checks (i.e., ST-DACL mood assessments)? These two pertinent questions raise the issue of whether a temporary induced depressed mood in the present sample of students should serve as an analogue of depression exhibited by clinical patients. From a practical standpoint, could the present memory results produced by mildly depressed B.Ed. students be extended and generalized to individuals dealing with clinically diagnosed depression?

To date, there is still an ongoing qualitative-quantitative analogue of depression debate of whether depressed-induced college students are adequate substitutes of clinically depressed patients. Researchers (e.g., Hill, Kemp-Wheeler, & Jones, 1987; Vredenburg, Flett, & Krames, 1993) taking the "quantitative-analogue" view of depression argue that mild depressive states in persons drawn from non-clinical populations (e.g., college students) can serve as a useful analogue of clinical depression. In fact, these mild depressed states could be viewed best as representing the mild end of a dimension of severity, whereas the clinical depressives occupy the opposite extreme position. Clark's (1983) ecological study supported this quantitative view as he compared the effects of depressed mood induced by self-referential statements with the effects of clinical depression. The final results revealed a

similarity between clinical and induced depression over a wide range of behaviours, particularly with somatic and physical complaints such as dizziness, heaviness, and fatigue.

On the other hand, there is currently a number of influential researchers (e.g., Coyne, 1994; Coyne & Gotlib, 1983; Depue & Monroe, 1978) arguing against the excessive use of college students in depression research since they do not consider this form of depression to be simply a "scaled-down version of clinical depression" (Hill et al., 1987, p. 114) whereby generalizations can be easily made. Rather, Depue and Monroe (1978) and Coyne's (1994) "qualitative-analogue" view of depression claim that the depressed mood induced in college students is merely a temporary distressed or saddened state which is *qualitatively* different from individuals diagnosed with clinical major or minor depression, according to the DSM-IV (Diagnostic and Statistical Manual of Mental Disorders: American Psychiatric Association, 1994). For this reason, these researchers maintain that induced or even naturally "distressed" college students are not appropriate substitutes for clinically depressed individuals in depression research studies. In concordance, Hertel and Hardin (1990) agreed that mood-inductions did not produce a state comparable to naturally occurring depression. In fact, the investigators reported that their students, after having undergone mood-induction procedures, described themselves as feeling more "lethargic but not really depressed" (p. 46). Consequently, Hertel and Hardin concluded that the results of their mood-induction study could not be generalized to individuals with clinical depression. Therefore, it is conceivable that the present study's induced depressed participants may have been merely distressed in nature and consequently, would not be impaired on the memory tasks to the same degree as clinically depressed patients.

Another criticism of the present mood-induction study may be the potential for the existence of *experimenter bias* (Neuman, 1994) since the investigator was not blind to either the hypotheses or experimental conditions. As emphasized by Sinclair, Mark, Enzle, Borkovec, and Cumbleton (1994), this experimenter bias may "affect the construct validity of cause, because it is uncertain whether the actual cause is induced mood or differential treatment of subjects by the experimenter" (p. 391). The potential for experimenter bias could have been reduced or eliminated if the investigator minimized contact with participants by either providing them with standardized and automated instructions (i.e., tape-recorded or computerized) throughout the experiment or by having a naive research assistant carry out the experimental procedure with all participants.

Delimitations of the present study. The specific design and procedure in the present study was modified from Bazin et al.'s (1994) study in such a way to make this study more manageable to carry out. For instance, the investigator chose to induce depression into a non-clinical college student population by having them read structured sets of Mood Statements, instead of using clinically diagnosed depressed individuals. Given the time constraints of this thesis project, it would have been unfeasible to recruit clinically depressed in-patients from hospitals who would have had to be diagnosed by a psychiatrist or a psychologist and who were also medicated with antidepressants. The investigator also chose to use the brief, Velten (1967) mood-induction technique to induced depressed and neutral moods into the B.Ed. students in order to systematically control the manipulation of mood state and to determine its effect on the retrieval of information from explicit and implicit memory. This view is also echoed in the following statement by Leight and Ellis (1981):

> Although it is important to understand memory processes of clinically diagnosed depressives, there is an inherent limitation in this endeavor; it does not involve the explicit manipulation of mood state. And without a direct manipulation of mood state, there is no clear way of separating these effects from any confounding related to the general syndrome associated with the clinical entity of depression (p. 251).

Another delimitation of the present study was the need to use the *convenience sampling* method (Neuman, 1997) to select potential participants. Students were recruited from the School of Education (viz., Bachelor of Education program) at Acadia University, which was a population easily accessible to the investigator. Although it was simpler and more efficient to use this non-random sampling technique, it is possible that this method of recruitment may have also created a highly biased sample and more importantly, a sample that was non-representative of the population. Thus, a *selection bias* (Miller, 1987) may exist in the present study.

Resource Allocation (Capacity) Model

The present study's hypotheses were built upon the theoretical framework of the *resource allocation or capacity model,* developed by Ellis and his colleagues (e.g., Ellis & Ashbrook, 1988; Ellis et al., 1985; Ellis et al., 1984). This resource account is based on the idea of allocating certain amount of attentional capacity or effort to a cognitive task, depending on the encoding demands of the particular task. This approach has been most fully developed by Ellis and Ashbrook (1988) who characterize their model as follows:

> The model adopts the concept of capacity or resource allocation which is part of general capacity models of attention.[These models] have assumed that there is a limited, momentary pool of capacity (attentional resources) which can be allocated

> to any given task..From this perspective, it is our position that emotional states can affect the amount of attentional capacity that can be allocated to a given cognitive or motor task. Thus we are considering the effect of emotion on attention but from the view of capacity (resource) models of attention..The essence of the resource allocation model, in accounting for the effects of generally disruptive mood states on memory, is to assume that emotional states regulate the amount of capacity that can be allocated to some criterion task. Most tasks involving memory of information require some allocation of capacity and thus the effect of a disruptive mood state is to reduce the amount of capacity available for processing the criterion task (p. 26).

Thus, one of the most important predictions of this resource allocation model is that there is an interaction between depressed mood state and encoding difficulty. For example, with simple tasks that required fewer encoding demands or less effort, being in a depressed mood state will have little or no effect on the individual's memory performance. However, as the task becomes more difficult or demanding, the detrimental effects of depression will become more apparent. In other words, the resource allocation theory predicts that depression will have its greatest impairment in the recall of demanding or difficult tasks. This resource account of depressive deficits originated from a distinction between automatic and effortful processes (Hasher & Zacks, 1979) and was developed by Ellis and Ashbrook's (1988) with an emphasis on resource allocation. Both paradigms derived their theoretical roots from the work of Kahneman (1973, as cited by Hertel & Rude, 1991) who asserted that there was a fixed or limited capacity of cognitive resources available for performing memory tasks. Empirical support for this resource/capacity view of depressive deficits comes from work with clinically depressed patients (e.g., Cohen et al., 1982; Weingartner et al., 1981) and

college students whose moods were induced by the Velten procedure (e.g., Ellis et al., 1984; Leight & Ellis, 1981). In addition, Weingartner and Silberman (1982, as cited in Watts & Sharrock, 1987) stated that depression creates memory impairment "in those situations or tasks that require effort, particularly sustained effort" (p. 34) and their study illustrated this point with depressed participants exhibiting more severe impairment on the free-recall task than on the recognition task. In explaining their finding of a greater impairment on the free-recall task, Weingartner and Silberman (1982, as cited in Watts & Sharrock, 1987) reasoned that their depressed participants found the free-recall task to be more demanding and difficult to perform since no retrieval cues were given. On the other hand, the participants found the recognition task to be less effortful since partial cues were provided which helped them to recall previously presented words. Similarly, past research has shown that depressed (clinical or mood-induced) and amnesic patients, alike, were impaired primarily on memory tasks that involved elaborative and effortful processing (e.g., Ellis et al., 1984; Graf et al., 1984). For example, Graf et al.'s (1984) study observed that the amnesic individuals' performance, when given explicit memory instructions to use word-stems as cues for recalling previously studied words (i.e., *high-effort* cued-recall task), was impaired in comparison to the normal control group. However, when they were given implicit memory instructions to complete the word-stems with the first word that came to mind (i.e., *low-effort* word-stem completion task), the amnesic individuals and the normal controls demonstrated equal levels of recall. Therefore, the fact that both depressed and amnesic patients perform similarly to the normal control group on the word-stem completion task adds further support to the large body of evidence showing that indirect tests of implicit memory tap primarily automatic processes and therefore, are less effortful and demanding

to perform (e.g., Jacoby, Ste-Marie, & Toth, 1993). Direct tests of explicit memory, on the other hand, tap primarily into elaborative processes which require more cognitive resources and effort to complete (e.g., Williams, Watts, MacLeod, & Mathews, 1988, as cited in Denny & Hunt, 1992).

Hypotheses

The main hypothesis of the present study was based on Ellis and his associates' ((e.g., Ellis & Ashbrook, 1988; Ellis et al., 1985; Ellis et al., 1984) resource allocation (capacity) framework and it was composed of the following two sub-hypotheses:

Hypothesis 1. The present study predicted that relative to the neutral group, the depressed group would show greater recall deficits on the cued-recall task (i.e., direct memory test). The rationale for this prediction rests on the well-documented tendency for depressed people to show memory impairments on difficult, high-effort tasks such as free- and cued-recall (e.g., Ellis et al., 1984; Weingartner & Silberman, 1982, as cited in Watts & Sharrock, 1987; Weingartner et al., 1981). According to the resource/capacity model, it explains this outcome by stating that a depressed mood will interfere with the encoding of material because it takes away some of the resources that might otherwise be allocated to performing the high-effort memory task. Therefore, when a task is very demanding, there will be fewer resources to process the task and if a person is already depressed, then there are insufficient resources available to process it (Ellis & Ashbrook, 1988; Ellis et al., 1984).

Hypothesis 2. The present study also predicted that the depressed group would show little or no memory deficits on the word-stem completion task (i.e., indirect memory test), in comparison to the neutral mood group. Indirect tests of memory are assumed to be automatic, unconscious and low-effort type tasks (e.g., Ellis et al., 1984; Williams et al.,

1988, as cited in Denny & Hunt, 1992). According to the resource allocation model, these low-effort tasks should not be affected by depression because there is usually sufficient cognitive capacity for these tasks to be completed. Therefore, it was hypothesized that the depressed and neutral mood groups would show comparable levels of recall (i.e., priming scores) on the word-stem completion task.

The present hypothesis parallels Bazin et al.'s (1994) observation of a clear dissociation between the (impaired) performance on the effortful direct memory task and the (unaffected) performance on the indirect memory test involving automatic processing. In summary, the present study predicted that the participants in the depressed group, relative to the neutral group, were expected to show impaired recall on the high-effort cued-recall task as a result of their reduced capacity to perform such operations. However, the effects of mood-induced depression would have little or no impact on their ability to complete the low-effort word-stem completion task. Thus, a dissociation between these two memory processes was expected to occur whereby participants in the depressed group would be impaired on the cued-recall task (explicit memory), but their capacity to perform on the word-stem completion task (implicit memory) would be spared.

Methodology

At present, the majority of social science research journals only report the "method" section by outlining the specific procedures for research in a detailed and orderly manner so that others may replicate the study at a future time. The method section may, for instance, include the research design, participant characteristics, sampling technique and experimental procedure.

However, in the present climate of renewal of methodology, researchers are realizing that it is just as important to understand and address the "why" of their designs as well as the "how" to carry them out. Although some researchers may possess only one research tool which they attempt to use to solve all research problems, Polkinghorne (1983) emphasized the need for researchers, regardless of theoretical approach, to analyse and discuss the methodological considerations for the use of one research strategy over another. Similarly, Sjoberg and Nett (1968) asserted that researchers cannot merely choose their particular method of inquiry and assume it is appropriate and valid. Rather, they must actively begin to work at a deeper level whereby their built-in assumptions themselves are examined and questioned. In other words, it places a responsibility on the researcher to fully understand and explain the assumptions that have been incorporated into his or her particular approach. This deeper level of enquiry will inevitably provide the investigator with a broader range of methods and tools to choose from (e.g., experiments, surveys, case studies, etc.) and the option to employ one research strategy over another. Ultimately, the research question posed, as emphasized by Polkinghorne (1983), will determine which strategy or procedural design will be most useful in answering the specific question at hand, within practical and ethical constraints.

The present study--a classic experiment--employed the quantitative, logical-empirical research design which involved determining the effects of certain factors, and systematically varying those factors while holding other potentially important factors constant. This study attempted to incorporate many of the components of a positivist, hypothetical-deductive model of explanation and prediction to create "control" and "objectivity" over the experimental setting. The design was set up within the typical experimental framework,

beginning with a stated hypothesis, operationally-defined independent and dependent variables, unit of analysis, and then gathering empirical data as evidence to confirm or reject the hypothesis.

Brewer, Doughtie, and Lubin (1980) argued that the problem of depression was multifaceted and therefore, researchers needed to depend on empirical methods that would allow them maximum control and precision to sort out the complexities of the depression phenomenon, let alone its effect on memory. For this reason, an experimental design was appropriately employed by the present investigator in order to manipulate the independent variables (i.e., induced mood states and memory tasks) and to determine their effects on the dependent variable (i.e., memory performance) as well as eliminating various confounding variables that would prevent the deduction of a possible cause-effect relationship between mood and memory. Mood states were induced within a laboratory setting to ensure maximum control of the manipulation of this independent variable. There were various methods to choose from to induce depression or elation within the participants. For example, the investigator could have induced individuals into a happy or sad mood by creating a win-loss experience in computer games (e.g., Isen, Shalker, Clark, & Karp, 1978), using the Music Induction Procedure (MIP; Sutherland, Newman, & Rachman, 1982, as cited in Riskind & Rholes, 1985), by Autobiographical Recollections (e.g., Mosak & Dreikurs, 1973, as cited in Brewer et al., 1980), and by asking participants to remember or imagine a happy or sad event (e.g., Snyder & White, 1982). However, the present study chose to use the Velten (1967) mood-induction technique because a considerable amount of converging evidence was available to document its widespread use and effectiveness[1] (e.g., Hale & Strickland, 1976; Natale, 1977; Velten, 1968).

Logical-empiricist researchers often use experiments, surveys, and statistics as a way of seeking rigorous, precise quantitative data and achieving objectivity in research. What is the meaning of "objectivity" in research? In making a clear distinction between science and non-science, the logical-empiricists consider their form of scientific enquiry as "the 'best' way....[since it is not] sloppy, logically inconsistent, unsystematic, and full of bias" (Neuman, 1997, p. 65). According to Derksen and Gartrell (1992, as cited in Neuman, 1997), the positivist's use of the term "objectivity" has two meanings:"that observers agree on what they see [i.e., replication] and that science is not based on values, opinions, attitudes, or beliefs" (p. 66). Thus, the positivist approach presumes that there is a distancing between the researcher and the participants which is necessary to create a setting whereby only objective, empirical observations can be attained. It goes on to say that the researcher must adopt the proper role of a "disinterested scientist" (Couch, 1987, as cited in Neuman, 1997, p. 67) which can be achieved only if "the observer is able to remove himself from what he observes, that he can and [will] function" (Sjoberg & Nett, 1968, p. 63). In other words, there should be an attempt on the researchers' part to eliminate, or at least minimize themselves as variables in the research design so that they may remain detached, neutral, and objective as they examine and interpret the data evidence.

However, one of the criticisms levelled against the positivist, logical-empiricist approach is their narrow view of an objective, "value-free" and all-powerful paradigm deemed only worthy of mention. Within the social science community, the three major approaches (i.e., positivism, interpretive social science and critical social science) have debated the use of the rather vague term "objectivity" and the various interpretations of its meaning. Within the positivist framework, the word "objective" has been contrasted against

the word "subjective" and taken to mean unbiased and error-free (Rudner, 1966, chap. 3). The positivists claimed that their paradigm stands alone in equating the pursuit of objectivity in research with the search for truth and honesty in scientific endeavours (Neuman, 1997, chap. 4). The shortcoming of this view is clear. To claim that one method of inquiry is more objective, reliable, and worthy than another is in itself laden with its own value judgements and bias which certainly contradicts their "value-free" position. Moreover, some critics have charged that an objective, value-free social science is impossible to achieve since all knowledge, including the methods of inquiry and specific data collection techniques, are socially determined (Surkin, 1970, chap. 2). These critics questioned whether scientists, as human beings, can strictly apply rational thinking and systematic observation in ways that would override any personal prejudices, biases, and values that are deeply ingrained into individuals by the prevailing social and cultural norms. In concordance, Gouldner (1968, chap. 4) argued that the pursuit of objectivity should not be based upon a "value-free science" notion but rather, it should rest upon the *having* of values and for researchers to be honest and truthful in reporting these values.

Method

Participants

Sixty-two B.Ed. students at Acadia University received course bonus points in exchange for participation in the present study, approximately 1 hr 30 min in duration. Each participant was given a code number. Data from two students were excluded from the final analysis because of an unsuccessful depressed mood-induction procedure at the start of the experiment. The total sample of 60 participants (44 females, 16 males[2]) was composed of 30 induced-depressed students and 30 students who received a neutral mood-induction. The

depressed group contained 7 males and 23 females and the mean age of this group was 24.63 (SD = 2.91) years. The neutral group was comprised of 9 males and 21 females with the mean age of 25.13 (SD = 3.15) years. The study was disguised as an investigation of "the effects of induced mood states on the perception of word meanings and word generating skills". Participants were initially misled about the true purpose of the study in order to minimize the contamination of the memory data obtained. Students were also told that they would complete 3 word-type tasks in the course of the study. All students were native speakers of English and none had previously participated in a mood-induction experiment. Participants were fully debriefed on the purpose and hypotheses of the study after they had completed the experiment.

Screening Procedure

Before being accepted for participation in the study, all students were assessed for depression and depressive symptoms by completing first the Trait Mood scale (e.g., *how do you feel in general*?) and subsequently the State Mood scale (e.g., *how do you feel right now*?) of the State Trait-Depression Adjective Check Lists (Lubin, 1994).

Trait Mood scale. Prior to the study, the initial phase of recruitment required that all participants complete the Trait Mood scale: specifically, T-List F (see Appendix A) which asked them to check off the adjectives that were most descriptive of their feelings in general. Higher T-scores were indicative of more negative mood and conversely, lower T-scores reflected more positive mood. Students who obtained T-score of 65 or higher on this Trait Mood scale were not permitted to participate in the present experiment since scores of this nature were indicative of "much above average" level of depressed mood, according to the interpretative guidelines of Lubin's (1994) ST-DACL Professional Manual. This arbitrary

high cut-off score was initially chosen to obtain an adequate sample size in the first phase of the recruitment. The Trait Mood scores obtained by the students assigned to the depressed group ranged from 33 to 59 with a mean of 43.41 ± 7.52. Students assigned to the neutral group produced similar scores, ranging from 31 to 63 with a mean of 44.55 ± 8.18. All eligible participants who obtained T-scores below 65 were called and scheduled to return for the second phase of the recruitment--State Mood scale--at a later date.

State Mood scale. On the day of the experiment (approximately 2-3 weeks later), students were administered the State Mood scale: S-List E (see Appendix B) in order to assess their current emotional mood state and to determine final participant eligibility. This mood scale instructed students to check any adjectives that described their feelings at the present moment. Again, high T-scores represented more negative mood states whereas low T-scores reflected more positive mood states. The State Mood scale's *exclusion criteria* was lowered from the Trait Mood score of T-score ≥ 65 to a T-score > 60. As a precautionary measure, this *state* measure T-score was made more stringent in order to screen out individuals with even "slightly above average" level of depression at the moment of testing. On the State Mood scale, participants in the depressed group obtained T-scores ranging from 38 to 60 with a mean of 48.67 ± 6.90. Similarly, participants in the neutral group produced T-scores ranging from 40 to 59 with a mean of 46.90 ● 5.47. It should be noted that one student had acquired a T-score greater than 60 on this State Mood scale (i.e., S-List E) and initially, was not allowed to participate in the study. However, this student disclosed that she was having an "extremely bad day" and this was affecting her usual "happy disposition". Therefore, the student was asked to come back another day to be retested with the State Mood scale and if successful, be admitted into the study. On the second administration of

the S-List E, a few days later, this student obtained a T-score well below 60 and thus, was allowed to participate in the study.

This initial two-step screening procedure was included to ensure the identification and exclusion of those students who exhibited general and transitory depressive moods and feelings. For ethical reasons, the investigator did not want to further induce a depressed mood state into students who may already be predisposed or currently dealing with depression and depressive symptoms.

Materials

Overall, the stimulus materials consisted of the Velten (1967) mood-induction instructions and self-referential Mood Statements, two sets of word lists (Lists A and B), memory test word-stems and the State Trait-Depression Adjective Check Lists (Forms A, B, C, D, E, and F).

Velten mood statements. The replicated Velten (1967) pre-instructions and three sets of 58 Mood Statements (depression, neutral, and elation) were typed entirely in capital letters on white blank 8-in. x 5-in. index cards. However, it should be mentioned that two of Velten's original 60 depressive statements were considered inapplicable and unrealistic to the present participants reading them and thus were removed from the set. To ensure equivalency among the three sets of statements, two statements were also arbitrarily removed from each of the neutral and elation statements sets.

Word lists. A set of words containing 68 five-letter nouns was selected from the Kucera and Francis (1967) norms. The selected words occurred with moderate to high frequency in the English language. Sixty words served as to-be-studied items in the word lists and the remaining 8 were used as buffer items (see Appendix C).

For purposes of counterbalancing, the 60 words were randomly assigned to two study lists of 30 items each (Lists A and B). In order to minimize the influence of *primacy* and *recency effects* on the learning and recall of the 30 words in the study list, 4 buffer words were placed at the beginning as well as at the end of the assigned list. All participants were exposed to the same 8 buffer words, regardless of which study list they were assigned to read. By adding the buffer items at the beginning and the end of each list, this prevented the first (i.e., primacy effect) and the last few words (i.e., recency effect) encountered in the study list from being recalled more frequently since they could be easily retrieved from a person's short-term memory (Ellis & Hunt, 1993). Therefore, each participant was presented with either List A or List B which was a 38-word study list (i.e., a deck of cards) comprised of the following: 4 primacy word buffers, 30 to-be-studied words and 4 recency word buffers. For all participants, the order of presentation of the 30 words were randomized whereas the 8 buffer items remained in a fixed position.

It should be mentioned that the present experiment did not control for the affective valence of words (i.e., pleasantness or unpleasantness of word meaning) in either of the two study lists: Negative words (e.g., *agony* or *blame*) and positive words (e.g., *money* or *prize*) were not counterbalanced in either List A or List B. Even though previous studies, including Bazin et al. (1994) had counterbalanced the negative and positive words in their word lists, the present investigator chose not to because a number of research studies had demonstrated no significant difference in recall of pleasant and unpleasant words by depressed individuals. In one study, for example, Roth and Rehm (1980) found that both the depressed and non-depressed groups were similar in terms of the number of positive (pleasant) and negative (unpleasant) words they had recalled. Similarly, in a study conducted by Frith et al. (1983),

clinically depressed participants were shown both pleasant and unpleasant words and were required to rate each word on a 7-point pleasantness rating scale. Again, the results of this study failed to indicate that depressed participants produced a biased recall towards unpleasant words vs. pleasant words in an incidental memory test. Thus, Frith et al. concluded that "these effects [were] restricted to pleasant and unpleasant memories and experiences [italics] of subjects and [could] not be investigated using the rather artificial paradigm involving single words which [were] assumed to have a general affective connotation" (p. 615).

Studied and unstudied word lists (e.g., Lists A and B or vice versa) were counterbalanced within each mood condition. For example, half of the participants in the depressed group (e.g., odd code numbers) were exposed to or studied List A words while List B words were left unstudied. On the other hand, the other half of the depressed group (e.g., even code numbers) studied only List B words and therefore words from List A were never seen. Thus, each participant was exposed only to one word list while the second list was left unstudied and designated the baseline measure. Again, the same counterbalancing of word lists was performed with participants in the neutral mood group.

Word-stem memory test. In the memory test, participants were presented with a set of 60 word-stems (see Appendix D). Each word-stem represented the first three letters of a studied *or* unstudied word, with two adjacent dashes to indicate the missing letters (e.g., yac-- for *yacht*). Each of the three-letter word-stems used at test were unique within the experiment (i.e., no two word-stems were identical) and could be completed with at least two different English words (e.g., whe--: wheel, wheat, where). All participants were presented with the same word-stems, which were randomly intermixed before being

presented. These 60 test word-stems corresponded to the 30 words that each participant had seen earlier in the pleasantness rating task (i.e., studied list), and 30 words that he or she had never seen before (i.e., unstudied list). Therefore, the total 60 word-stems were derivatives of words from both List A (30 words) and List B (30 words). Buffer items were not tested in the memory test phase. Study words, buffer words, and word-stems were printed in lowercase letters in the centre of 3-in. x 5-in. white blank index cards (one word or stem per card).

Mood-Induction and Assessment

Velten mood-induction procedure (VMIP). The present study employed the VMIP, a widely used method of mood-induction designed to create depressed, elated or neutral mood states. The VMIP was reported by Velten (1967; 1968) to be a brief, non-hypnotic, reliable, and valid method to induce *transient* mood states. Past researchers have successfully employed the VMIP to temporarily induce mood states without placing participants at psychological risk (e.g., Ellis et al., 1985; Hale & Strickland, 1976; Leight & Ellis, 1981).

The Velten procedure was self-administered orally and individually. Mood state was induced by instructing each participant to read a set of 58 negative, neutral or positive statements, printed one to a card. The negative and positive statements described bodily states or expressions of self-concept appropriate to the mood state to be induced. The presentation of the 58 negative and positive statements were ordered so that the statements began rather neutrally and became progressively more depressed or elated in content, respectively.

The depressive cards contained negative self-referent statements connoting low self-worth, pessimism or lack of energy and motivation. A few samples of depressive statements are "I'm getting tired out. I can feel my body getting exhausted and heavy", or "I've doubted that I am a worthwhile person" (see Appendix E). The positive or elation cards contained positive self-referent statements indicating confidence, optimism, and energy. A few samples of positive statements are "I'm full of energy and ambition---I feel like I could go a long time without sleep (see Appendix F). Neutral statements were non-self-referential and did not refer to either somatic well-being or sense of accomplishment and competency. A sample neutral statement is "West Samoa gained its independence in 1965" (see Appendix G). It is important to mention that the purpose of reading the neutral statements was not intended to induce this group into a *neutral* mood per se, but rather to keep the neutral mood group in a non-depressed, neither happy nor sad state throughout the experiment. Another purpose of the neutral mood group was to serve as a control group against which the depressed group could be contrasted.

Prior to reading the Velten (1967) mood statement cards, participants were asked to read introductory or preparatory cards which instructed them on how to use the mood statements to most effectively talk themselves into their assigned mood state (see Appendix H).

State Trait-Depression Adjective Check Lists (ST-DACL). The ST-DACL (1994) is a current revision of the Depression Adjective Check Lists (DACL; Lubin, 1965) which have been developed, refined and used for more than 25 years. One or more forms of the DACL have been used in over 300 published articles and doctoral dissertations in the area

of mood-induction (e.g., Alexander & Guenther, 1986; Hale & Strickland, 1976; Leight & Ellis, 1981).

The ST-DACL (1994) is comprised of two separate mood scales: State Mood (describe how you feel today) and Trait Mood (describe how you generally feel). The State Mood and Trait Mood scales can be administered in 2-3 min each and can be scored and interpreted in approximately 5 min. The ST-DACL consists of seven alternate yet equivalent adjective lists: State-Lists A, B, C, D, and E; and Trait-Lists F and G. The State-Lists A, B, C, and D each contain 22 negative mood adjectives (e.g., *distressed*, *hopeless*, *exhausted*) and 10 positive mood adjectives (e.g., *lively*, *joyous*, *easygoing*). On the other hand, State-List E and Trait-Lists F and G each contain 22 negative adjectives and 12 positive adjectives. Participants were told that they should be completely honest when checking off adjectives on the ST-DACL forms throughout the study. More importantly, they were instructed to respond the way they actually *felt* and not the way that they *thought* the investigator wanted them to feel.

Following completion of the adjective checklist, the total raw score for either the Trait Mood or State Mood scale was calculated by summing the number of *negative adjectives checked* together with the number of *positive adjectives unchecked*. Raw scores were then converted into standardized scores (i.e., both T-scores and percentile scores). Higher T-scores on either of these mood scales were indicative of a more negative mood state whereas lower scores represented a more positive mood state. In this fashion, a positive-negative mood state continuum was established by which each participant was evaluated.

According to Lubin (1994; ST-DACL Professional Manual), there is substantial evidence for the reliability and validity of the ST-DACL State Mood and Trait Mood scales.

Reliability of the ST-DACL. *Reliability* refers to the "consistency or repeatability of a measurement" (Miller, 1987, p. 24). One form of reliability over time is the *test-retest method* which refers to giving the same measurement on two separate occasions and still obtaining identical or highly similar values (Miller, 1987, chap. 2). Overall, the evidence for the test-retest reliability of the State Mood scale scores was reported to be good over *short* periods of time. However, the reliability of these *state* measure scores over *longer* periods diminished, as would be expected for an instrument which was intended to measure how the respondents felt at a particular moment. For example, in a study by Lubin, Whitlock, Swearngin, and Seaver (1993, as cited in Lubin, 1994), their non-referred group of adolescents (N = 106) obtained a test-retest reliability coefficient of .27 for a 3 day interval on the S-List E but this coefficient diminished to .13 after a 11 day interval between test and retest. However, these correlations should be compared with the higher test-retest reliability coefficients found with the Trait Mood scale. For example, Desouza, Lubin, and Whitlock (1991, as cited in Lubin, 1994) reported that their adolescent sample (N = 101) acquired test-retest correlations for the Trait Mood scale which ranged from .47 to .76. The lowest correlation was for a 3 week interval and the highest correlation was for an interval of 5 weeks.

Another form of reliability is the *internal consistency* of the measure which refers to the extent to which the different items on the measurement produce similar responses (Miller, 1987, chap. 2). Cronbach's alpha is a frequently used index of internal consistency, ranging from 0 (no internal consistency) to 1 (perfect internal consistency). In a study by

Lubin et al. (1993; as cited in Lubin, 1994), their non-referred group obtained alpha coefficients ranging from .82 for elderly adults (N = 173) on S-List D to .93 for adolescents (N = 159) on S-List D. Another method of assessing the internal consistency is to calculate the *split-half* reliability (Miller, 1987, chap. 2). In other words, how well do the two columns of a single ST-DACL list correlate with one another or provide the same results. In the study by Lubin et al. (1993, as cited in Lubin, 1994), their non-referred groups obtained Pearson correlation coefficients which ranged from .74 for adults (N = 148) on S-List A to .95 for adolescents (N = 159) on S-list D.

Alternate forms are different versions of a measure that are designed to be equivalent. Alternate forms that yield similar results provide additional evidence of the scale's reliability (Miller, 1987, chap. 2). Again, Lubin et al.'s (1993; as cited in Lubin, 1994) study showed that their non-referred groups of adolescents and adults (N = 307) had acquired correlations ranging from .85 between State-Lists A and D to .93 between State-Lists A and B.

Validity of the ST-DACL. In general, convergent correlations between the ST-DACL lists and other depression instruments were moderate to high. Higher correlations were associated with other self-report adjective checklists that measured *depressive mood*, such as the Depression(D) scale of the State for of the Multiple Affect Adjective Check List (MAACL D; Zuckerman & Lubin, 1965). For example, when Lubin (1967, as cited in Lubin , 1994) correlated the seven ST-DACL lists with the MAACL D scale, the correlations ranged from .76 to .86 for males (n = 56) and from .74 to .87 for females (n = 89). In a study by Giambra (1977, as cited in Lubin, 1994), the State-Lists A, B, C, and D were also correlated with the 21 individual items of the Beck Depression Inventory (BDI; Beck, Ward, Mendelson, Mock, & Erlbaugh, 1961) and with the 20 items of the Self-Rating Depression

Scale (SDS; Zung, 1965). The correlation between the total score for all four lists and the BDI score was .71 and the correlation between the four lists and the SDS score was .65. This study also revealed that when the ST-DACL was correlated with the individual depressive symptoms on the BDI or the SDS, correlations with their *affective* symptoms (e.g., depressed mood, pessimism, sense of failure) were highest, while correlations with their *physiological* symptoms (e.g., weight loss, sleep disturbance, loss of libido) were lowest.

Overall, the correlations of the ST-DACL with other indices of depression were moderately high, demonstrating an acceptable level of concurrent validity within the ST-DACL.

Design

The present experiment was a 2 x 2 factorial design: the combination of two mood conditions (depressed and neutral) and two memory tasks (cued-recall and word-stem completion), yielding four between-subjects experimental conditions. Sixty participants were randomly assigned to one of the four conditions (n = 15 per cell) and each participant was given a code number. The performance of the depressed and neutral mood participants were compared on the cued-recall (direct) task and the word-stem completion (indirect) task. The dependent variable was the size of each group's *priming effect* which was calculated by subtracting the proportion of test word-stems correctly completed with unstudied (unprimed) words from the proportion of word-stems correctly completed with studied (primed) words on the memory test. Thus, the variable of interest was the percent priming score (*i.e., % studied - % unstudied*). Rather than using the total percentage of correct target (i.e., studied *and* unstudied) words produced on the memory test, the priming score was emphasized because it excluded the number of correct unstudied words that participants may have

produced purely by luck. Consequently, the proportion of unstudied words recalled came to serve as a baseline or chance variable against which the proportion of studied words was measured. Thus, the recollection of past information was accurately measured by comparing the correct recall of primed, studied words over recall of new, unstudied words.

Procedure

During the initial phase of recruitment, students were administered the Trait Mood scale (i.e., Trait-List F) of the ST-DACL within a group setting. Eligible students had acquired T-scores below 65 and were contacted to return in 2-3 weeks time to perform the experiment. On the day of the study, each participant was tested individually in a session lasting 1 hr 30 min. Participants were first given a brief rationale of the final screening procedure and then instructed to complete the State Mood scale: S-List E. They were asked to select the adjectives on the list that most accurately described their current feelings (e.g., *how do you feel right now?*). The T-score obtained from this State Mood scale served two purposes in the present study: First, it was the screening tool that determined final participant eligibility. Secondly, this score was used as a baseline pretest measure of the participant's mood state prior to the Velten mood-induction procedure (i.e., pre-VMIP score). Following completion of the screening procedure, all participants were instructed to read the consent form which detailed the purpose of the study, the specific protocol to be followed, and their rights as participants (see Appendix I). The investigator again reiterated to the participants that the purpose of the study was to determine the effects of various mood-induced states on word-generating skills and perception of word meanings. Deception was used in the present study to control each of the participants' definition and knowledge of the experimental situation. By intentionally misleading the participants, it attempted to prevent

them from learning the true hypothesis of the experiment and from altering their behaviour (viz., memorizing words from the study list) since they were unaware of the incidental memory test. It is important to mention that all participants were fully debriefed at the end of the experiment.

In the consent form, the students were informed that they would be temporarily induced into either a depressed or neutral mood state simply by reading the Velten's (1967) Mood Statements. However, they were reassured that they would be induced back into a more positive, elated mood upon completion of the experiment. The consent form also clearly stated that their participation was strictly voluntary and if they desired to withdraw at any point in the study, they could do so without penalty (i.e., no loss of bonus points).

Participants were assigned to one of the four experimental groups as they came along in sequence:

1) depressed-word stem completion (DWS)

2) neutral-cued recall (NCR)

3) depressed-cued recall (DCR)

4) neutral-word stem completion (NWS)

Before administering the Velten (1967) mood-induction procedure, all participants were told that their full cooperation was needed in order to talk themselves into a mood, and that they were free to terminate the experiment at any time should they choose to do so. The appropriate mood, depending on the participant's assigned mood condition was then induced by the Velten mood-induction technique. In this procedure, the participants were given 20-30 min to read 58 Velten Mood Statements (depressed or neutral) both silently and aloud. Each participant sat alone in the testing room and read at his or her own pace. Immediately

following this procedure, all participants were administered a second State Mood scale: S-List A (see Appendix J) in order to assess the effectiveness of the mood-induction procedure (i.e., mood manipulation check). Participants in the depressed group were expected to obtain a T-score of 60 or higher on this state mood checklist in order to be classified as depressed.[3] However, if a depressed participant had scored less than 60 on S-List A, he/she was required to re-read the 58 depressed mood statements and then complete S-List C (see Appendix K). On the other hand, participants in the neutral group were expected to obtain T-scores below 60 in order to be categorized as "neutral" in mood.

The study phase immediately followed the mood-induction and mood assessment. Each participant was given a rating sheet (see Appendix L) and 38 index cards (one word per card) which was comprised of 30 to-be-studied words from either List A or List B and 8 buffer words. Before presenting the words to each participant one at a time, the investigator mixed the deck of cards, making sure to keep the buffer words in a fixed position. Participants were instructed to read each word silently as it was presented and then to rate the pleasantness of each word on a 5-point Likert-type scale, ranging from 1 (very unpleasant) to 5 (very pleasant). They were instructed to work at a steady pace and not to dwell on individual words for any length of time. Respondents recorded their answers on the rating sheet provided. There was a maximum allotted time of 15-min to complete the pleasantness rating task. Participants were not informed that they would be subjected to an incidental memory test at a later time.

Immediately following the study phase, participants were engaged in a 5-min distractor task (see Appendix M) in order to prevent any participants from rehearsing words from the study word list, particularly if they were cognizant of the incidental memory test.

In this distractor task, participants were given a set of 20 word-stems and required to complete as many word-stems as possible with the appropriate Canadian city names. In addition, this distractor task familiarized the participants to the upcoming memory test which also involved the completion of word-stems.

The memory test was introduced immediately after the distractor task. The investigator visually presented to each participant a total of 60 test word-stems that corresponded to target words pooled equally from List A and List B. Depending on their assigned experimental condition, the participants performed either the indirect test of implicit memory (i.e., word-stem completion) or the direct test of explicit memory (i.e., cued-recall). In the *word-stem completion* condition, participants were instructed to complete each three-letter word-stem with *the first five-letter word that came to mind.* No explicit reference was made to the list of words previously presented during the pleasantness rating task. In the *cued-recall* condition, participants were instructed to use the test word-stems as cues to help them recall as many of the words on the study list they had seen earlier. Participants in both instruction conditions were encouraged to guess in order to ensure reasonable efforts at recall.

Both direct and indirect memory tasks were matched on all characteristics except instructions; that is, both memory tasks used the same set of 60 word-stems to test memory performance. For example, during the test phase, participants in either the cued-recall or word-stem completion group were shown the same cue (e.g., "mon--"), but received different recall instructions. No proper names or plurals were allowed as completions for these test word-stems. If a participant was unable to generate a response to a particular word-stem and did not want to continue guessing, he or she could state "pass" and move to the next word-

stem. If a test word-stem was not completed within a 20 s time limit, the investigator prompted for an answer before proceeding to the next test word-stem. In order for the investigator to classify the correctness of the response, the correct target word and its corresponding word list (A or B) were printed on the back of the word-stem index card (i.e., visible only to the investigator). As the participant provided a verbal response to each word-stem, the investigator classified each answer as either 1 (correct), 2 (incorrect) or 0 (no response) on the data sheet (see Appendix N). For example, if the participant had correctly completed the word-stem *mon--* with the word, *money* (from List B), then the investigator would have written down "1B". No feedback as to the correctness of the response was given to the participants during the memory test. The entire memory test took approximately 15-20 minutes to complete.

The memory test was immediately followed by a third State Mood scale rating: S-List B (see Appendix O) which was administered to participants[4] in order to check the extent to which their assigned mood had maintained its intensity. In other words, it was important to determine the *stability* of the VMIP by examining whether the induced mood states had been maintained from the point of mood induction to the end of the memory test (approximately 30-40 min. interval).

Before they were debriefed on the true nature of the present study, participants in both the depressed and neutral mood conditions read 58 positive self-referential statements from the VMIP to get them into a happier mood state. Immediately following this elation mood-induction procedure, all participants completed a fourth State Mood scale: S-List D (see Appendix P) in order to assess their current mood state. The procedural sequence of the present experiment is illustrated in Figure 1, presented below.

Figure 1. Procedural sequence in the present experiment.

1) Trait Mood scale: T-List F
2) State Mood scale: S-List E
3) Velten Mood Induction Procedure (VMIP) - depressed or neutral
4) State Mood scale: S-List A
5) Re-read Velten Depressed Mood Statements, if necessary; then administer State Mood scale: S-List C
6) Study phase - pleasantness rating task
7) Distractor task - Canadian cities
8) Memory test phase - cued-recall or word-stem completion task
9) State Mood scale: S-List B
10) Read Velten Elation Mood Statements
11) State Mood scale: S-List D
12) Debriefing and post-experimental questions[5]

During the debriefing process, all participants were asked about their subjective feelings while engaged in the present experiment (see Appendix Q) and this also ensured that no students, particularly in the depressed group, left the study in a depressed or saddened mood state. As part of the post-experimental interview, students were questioned whether they were aware of the true purpose of the present study (i.e., the effects of emotions on memory) which was used as a check on the validity of the present data. At the end of the

session, students were asked to refrain from discussing the purpose and procedure of the study with future participants in order to avoid contaminating and invalidating the results. In order to address any potential long-term negative effects of the experiment, all participants were given a list of services and contact numbers (the investigator's home number, the Acadia Counselling Centre, and hospitals) at the end of the study in the event that they should experience distress and require counselling and support at a later time. A debriefing letter and abstract of the present study were provided to all interested participants (see Appendix R).

Results

A significance level of .05 was used for all statistical comparisons in this experiment. The F and MS_e were reported for all univariate analyses of variance.

Demographic characteristics of the depressed and neutral mood groups are presented in Table 1, seen below. The results of the t test revealed no significant difference in age between the depressed group ($X = 24.63 \pm 2.91$) and the neutral group ($X = 25.13 \pm 3.15$), $t(57) = -0.58$, $p > .05$.

Table 1

Demographic Variables

			B.Ed. level	
		Age	Year I	Year II
Participants	N	Years (SD)	N	N
Depressed	30			
Males	7	24.63 (2.91)	2	28
Females	23			
Neutral	30			
Males	9	25.13 (3.15)	7	23
Females	21			

Effectiveness of Mood-Induction

In the present study, the Velten mood-induction procedure was considered effective if the induced-depressed participants were able to obtain T-scores of 60 or higher. On the other hand, participants in the neutral group were expected to obtain T-scores below 60 to be considered as neutral, neither happy nor sad in mood state. Table 2 presents the means and standard deviations of the State Mood scores of the ST-DACL which was administered four times throughout the experiment: time 1 (pre-VMIP: S-List E); time 2 (post-VMIP: S-List A); time 3 (after memory test: S-List B); time 4 (after elation VMIP S-List D). Higher scores (T-score > 60) indicated more negative affect, whereas lower scores (T-score < 60) indicated more positive affect.

Table 2

Means and Standard Deviations of the State Mood Scores of the ST-DACL

	Time			
Group[a]	T1-List E	T2-List A/C	T3-List B	T4-List D
Depressed				
cued-recall	49.87 (5.78)	68.53[b] (8.58)	65.13 (7.52)	47.80 (4.43)
word-stem	47.47 (2.04)	68.07[c] (7.06)	58.50 (10.01)[d]	44.73 (6.08)
Neutral				
cued-recall	46.27 (6.05)	50.07 (5.26)	47.80 (3.17)	43.67 (4.82)
word-stem	47.53 (4.96)	49.60 (6.20)	47.93 (6.57)	45.33 (5.50)

Note. ST-DACL = State Trait-Depression Adjective Check Lists. Standard deviations are indicated in parentheses.

Time (T1): S-List E was administered prior to the mood-induction procedure and was used as a baseline measure (i.e., pre-VMIP).

Time 2 (T2): S-List A was mood manipulation check, administered after the depressed or neutral mood-induction procedure had been completed (i.e., post-VMIP).

Time 2 (T2): If a depressed participant had scored less than 60 on S-List A, he/she re-read the depressed mood statements and was administered S-List C.

Time 3 (T3): S-List B was mood maintenance check, administered upon completion of the memory test.

Time 4 (T4): S-List D was administered upon completion of the elation mood-induction procedure.

[a]n = 15 for each group.

[b]five participants from DCR group were re-administered the Velten depressive statements to elevate ST-DACL scores and then were reassessed with S-List C.

[c]five participants from DWS group were re-administered the Velten depressive statements to elevate ST-DACL scores and then were reassessed with S-List C. The DCR and DWS participants' newly elevated ST-DACL scores were incorporated into their respective final group mean score.

[d]eight participants in the DWS group were only administered the mood maintenance check (i.e., S-List B) due to an erroneous oversight in the procedural sequence.

Depressed and neutral mood. A one-way analysis of variance (ANOVA) was performed on the scores obtained from the State Mood scale (S-List E) which was administered prior to the mood-induction procedure in order to check for pre-existing differences in depression levels among the four experimental groups (i.e., pre-VMIP scores). The results showed no reliable difference in depression levels between the four experimental groups prior to the mood-induction procedure, $F(3,56) = 0.87$, $MS_e = 39.2$, $p > .10$.

The Velten (1967) mood-induction procedure was an effective method of inducing depressed and neutral mood states in the participants. A mixed-model 2 (mood group: depressed vs. neutral) X 2 (time: 1 [pre-VMIP] vs. 2 [post-VMIP]) analysis of variance (ANOVA) was conducted. As expected, the results revealed a reliable main effect for *mood group*: Participants in the depressed mood condition reported greater negative affect (X =

58.48 ● 12.28) in comparison to the participants in the neutral mood group (X = 48.37 ± 5.71) immediately after the mood-induction procedure, $F(1, 116) = 72.60$, $MS_e = 42.3$, $p < .001$. In addition, there was a main effect for *time:* Both mood groups were more negative in affect as a result of undergoing the VMIP (Time 2; X = 59.07 ± 11.48) in comparison to their pre-VMIP mood levels (Time 1; X = 47.78 ± 6.24), $F(1, 116) = 90.31$, $p < .001$. More importantly, there was a highly significant mood group x time interaction, $F(1, 116) = 49.46$, $p < .001$. Specifically, the results of t tests indicated that the depressed group, as predicted, reporte a more negative affect after the depressed VMIP (Time 2; X = 68.30 ± 7.72) than at pre-VMIP level (Time 1; X = 48.67 ± 6.90), $t(57) = -10.38$, $p < .0001$. Unexpectedly, a weak but statistically significant difference in the neutral group's mood rating was also observed between the point after the neutral VMIP (Time 2; X = 49.83 ± 5.65) and pre-neutral VMIP level (Time 1; X = 46.90 ± 5.47), $t(57) = -2.04$, $p = .05$. In other words, the participants in the neutral mood group became slightly more negative in affect as a result of the "neutral" mood-induction procedure. This finding is supported in part by the participants' subjective responses to the structured debriefing question, "Were the Velten Neutral Statements effective in inducing a neutral mood?". Participants reported that it was difficult to be in a "neutral" mood and that reading these neutral statements had brought their mood "down slightly". In fact, a few students expressed having felt "more anxious and confused" after reading a few of the neutral statements.

Maintenance of induced mood states. In order to assess the maintenance of the induced mood of each of the four experimental groups, independent t tests were conducted to compare scores on S-List A (completed *after* VMIP) and scores on S-List B (completed *after* the memory test). The results showed that the depressed-cued recall (DCR) group

exhibited no significant difference in scores between Time 2 (after VMIP; X = 65.69 ± 4.35) and Time 3 (after memory test; X = 62.92 ± 5.02), $t(23) = 1.50$, $p > .10$ (two outliers were each excluded from S-List A and S-List B, resulting in the analysis of n = 13). In other words, participants in the DCR group were able to maintain their depressed mood state in the 25-30 min intervening time between the point of mood-induction and the end of the memory test.

To assess the stability of mood within the depressed-word stem group (DWS), a nonparametric, Mann-Whitney U test was employed with pair-wise deletion of 7 missing cases which resulted in the analysis of n = 8 cases. The results revealed that the DWS group's median mood rating was significantly higher at Time 2 (after VMIP; M = 65.60) than at Time 3 (after memory test; M = 58.50), $t(13) = 2.11$, $p < .05$, which suggests that participants in the DWS group did not maintain their depressed mood state to the very end of the memory test. In fact, their moods gradually decreased in negative or depressive affect at some undetermined point between the end of the mood-induction procedure and the end of the memory test. Thus, after 25-30 min of working on intervening word tasks, the DWS group arrived at a group median score of 58.50 which technically placed it in the arbitrarily designated neutral area (T-score < 60) of the depressed-neutral mood continuum.

In terms of the stability of the neutral mood state, the results of independent t tests revealed that both the neutral-word-stem completion (NWS) group and the neutral-cued recall (NCR) group maintained their mood state from the point of mood-induction (49.60 ± 6.20 and 50.07 ● 5.26, respectively) to the end of the memory test (47.93 ± 6.57 and 47.80 ± 3.17, respectively), $t(22) = 1.43$, $p > .10$ and $t(27) = 0.71$, $p > .10$, respectively.

Elation mood-induction. For ethical reasons, both depressed and neutral mood groups were instructed to read a set of 58 positive, elated statements prior to leaving the experimental room. The scores from S-List E (i.e., pre-VMIP) and S-List D (i.e., post-elation VMIP) were subjected to a two-way analysis of variance with mood group (depressed vs. neutral) as between-subjects variable and time [1 (pre-VMIP) vs. 4 (after elation VMIP)] as a within-subject variable. The results revealed a significant main effect only for *time*: Mood groups, on average, reported being in a slightly happier mood state after completing the elation mood-induction procedure ($X = 45.38 \pm 5.21$) in comparison to pre-VMIP levels ($X = 47.78 \pm 6.17$), $F(1, 116) = 5.17$, $Ms_e = 33.45$, $p < .05$. However, there was no reliable effect of mood group, $F(1, 116) = 2.80$, $p = .10$; and the interaction of mood group x time did not approach significance, $F(2, 116) = 3.63$, $p > .10$.

Memory Performance

Priming scores. The variable of interest in the present experiment was the percent *priming score* of each of the four groups, which was computed by subtracting the proportion of memory test word-stems completed correctly with *unstudied words* from the proportion of test word-stems correctly completed with *studied words* (i.e., % priming score = % studied words - % unstudied words). Table 3, shown below, presents the means and standard deviations of the priming scores of each of the four groups. Also included are the proportion of correct studied words produced and the proportion of unstudied words correctly produced by chance.

Table 3

Mean proportion of Correct Word-Stem Completions as a Function of Mood Condition, Memory Task and List Type

Memory Task	Mood Condition	
	Depressed	Neutral
	List A	
Cued-Recall		
Studied	0.3958 (0.12)	0.3905 (0.12)
Unstudied	0.2875 (0.08)	0.3000 (0.12)
Priming	**0.1083 (0.06)**	**0.0905 (0.20)**
Word-Stem Completion		
Studied	0.3792 (0.08)	0.3714 (0.10)
Unstudied	0.2875 (0.12)	0.3476 (0.10)
Priming	**0.0917 (0.13)**	**0.0238 (0.13)**
	List B	
Cued-Recall		
Studied	0.6000 (0.10)	0.6042 (0.15)
Unstudied	0.2952 (0.12)	0.2708 (0.06)
Priming	**0.3048 (0.14)**	**0.3334 (0.14)**
Word-Stem Completion		
Studied	0.4952 (0.06)	0.4792 (0.13)
Unstudied	0.2667 (0.07)	0.2292 (0.08)
Priming	**0.2285 (0.12)**	**0.2500 (0.17)**

Note. Standard deviations are indicated in parentheses. The data were grouped according to List Type to distinguish the memory performance results obtained with exposure to Word List A in contrast with exposure to Word List B.

Multiple regression analysis. It was hypothesized that there would be an interaction effect between the independent variables of mood group and memory task: The DCR group was predicted to have a lower priming score than the NCR group whereas the DWS and NWS groups were expected to exhibit similar priming scores. A close inspection of the data in Table 3 revealed no apparent interaction effect between mood group and memory task for the data in List A or in List B. However, it was apparent there was a difference in priming scores between participants exposed to List A and those exposed to List B. Higher priming scores were produced by the participants in the four experimental groups who were exposed to List B words in comparison to those who were presented with List A words. A multiple regression analysis was conducted in order to quantify the relationship between these three existing predictor variables (i.e., mood group, memory task, and list type) and the criterion variable (i.e., memory performance or priming score). More specifically, the type of regression analysis to analyse this 2 x 2 x 2 between-subjects data was a *direct solution* which was used to examine the extent to which the combination of these predictor variables jointly contributed to the explanation of the variability in the priming scores obtained. The results of this analysis revealed that only 36.4% of the total variation in the priming scores was explained by using all three predictor variables (Adj. $R^2 = .364$, $F(6, 53) = 6.63$, $MS_e = 0.012$, $p < .001$. As shown in Table 4, all predictor variables, as well as their interactions with one another, failed to reach significant levels ($p > .05$), with the exception of list type

[t(56) = 2.25, p = 0.029]. Overall, the multiple regression analysis did not demonstrate a reliable two-way interaction between mood group and memory task [t(56) = 0.20, p = .844]. However, the analysis did expose list type as a significant predictor of the priming scores produced.

Table 4

Summary of Simultaneous Regression Analysis for Variables Predicting Priming Scores (N = 60)

Variable	Beta (SD)	T	P
Memory Task	0.012 (0.05)	0.26	0.798
Mood Group	-0.012 (0.05)	-0.25	0.807
List Type	0.111 (0.05)	2.25	0.029
Memory Task x Mood Group	0.011 (0.06)	0.20	0.844
Memory Task x List Type	0.097 (0.06)	1.69	0.096
Mood Group x List Type	0.001 (0.06)	0.01	0.992

In order to confirm the results of the multiple regression analysis and to further clarify the nature of these relationships, independent t tests were carried out on the priming scores across the mood groups and memory tasks for List A and separately for List B. Once again, the results of these tests failed to reveal any significant differences between the depressed and neutral mood groups' recall for List A words on the cued-recall task, t(7) = 0.22, p > .10 or on the word-stem completion task, t(12) = 1.04, p > .10. For List B, the depressed and neutral groups' priming scores also did not differ significantly on the cued-recall task, t(12) = -0.39, p > .10 or on the word-stem completion task, t(12) = -0.29, p > .10.

As demonstrated in the multiple regression analysis results, there was a main effect of list type (A or B). Further analyses were performed in order to investigate the nature of this unanticipated effect. The result of a one-way ANOVA confirmed that the depressed and neutral participants exposed to List B produced significantly higher priming scores on the memory test ($X = 0.28 \pm 0.14$) than individuals presented with List A ($X = 0.08 \pm 0.13$), $F(1, 58) = 31.31$, $MS_e = 0.02$, $p < .001$. More specifically, independent t tests revealed that the DCR group-List B ($X = 0.3048 \pm 0.14$) obtained a higher priming score than compared to DCR group-List A ($X = 0.1083 \pm 0.06$), $t(8) = -3.32$, $p < .05$; and the priming score of the DWS group-List B ($X = 0.2290 \pm 0.12$) was statistically higher than that of DWS group-List A ($X = 0.092 \pm 0.13$), $t(12) = -2.21$, $p = .05$. Similarly, paired t tests revealed that the NCR group-List B ($X = 0.333 \pm 0.14$) produced a higher priming score than NCR group-List A ($X = 0.090 \pm 0.20$), $t(10) = -2.68$, $p < .05$; and the priming score of the NWS group-List B ($X = 0.250 \pm 0.17$) was statistically higher than that of the NWS group-List A ($X = 0.024 \pm 0.13$), $t(12) = -2.91$, $p = .01$.

In order to accrue possible explanations for the higher priming effect with List B, a t test was performed on the average "pleasantness" score given by participants for all words in List A ($n = 900$) versus the average score given to all words in List B ($n = 900$) in order to examine whether these two lists of words differed significantly in affective valence (i.e., pleasantness vs. unpleasantness). High scores (5) indicated pleasant, positive valence of words (e.g., *holiday, happiness*) whereas low scores (1) indicated unpleasant, negative valence (e.g., *terror, murder).* Surprisingly, the results of this test revealed that the words on List B, on average, were in fact rated more negatively ($X = 2.72 \pm 1.23$) than the words

on List A ($X = 3.06 \pm 1.06$), $t(1760) = 6.28$, $p < .0001$. Therefore, List B appeared to contain more negative and unpleasant-type words than List A.

Discussion

Depressed and neutral participants' memory for previously presented words was assessed with both the cued-recall task, a direct test of explicit memory, and the word-stem completion task, an indirect test of implicit memory. Returning to the hypotheses outlined in the Introduction section, the present study predicted that the induced-depressed group would show a memory impairment on the cued-recall task in comparison to the induced-neutral group (i.e., DCR < NCR). However, both mood groups were expected to show similar levels of priming on the word-stem completion task (i.e., DWS = NWS).

Summary of Findings

In summary, the results failed to yield an interaction effect between mood group and memory task. In other words, the depressed-cued recall group (DCR) did not differ significantly from the neutral-cued recall group (NCR) in overall priming scores (i.e., DCR = NCR) on explicit memory processing. Similarly, the depressed-word stem completion group (DWS) and the neutral-word stem completion group (NWS) demonstrated equivalent levels of priming on implicit memory processing (i.e., DWS = NWS). Thus, the present results did not replicate or confirm Bazin et al.'s (1994) finding of a dissociation between explicit and implicit memory processes, within the present sample of induced-depressed university students. The only significant main effect revealed in the analysis was that of list type (A or B), with the individuals exposed to List B showing higher priming scores in comparison to those presented with List A words.

Explanations of the Findings

Higher priming effect with List B words. The present study yielded a few unexpected findings: (a) individuals exposed to List B words produced higher priming scores than individuals presented with List A words; (b) List B words were rated as more unpleasant and negative in valence in comparison to words from List A. One possible explanation for the higher priming scores obtained with List B words is due to a mood congruency effect. As mentioned before, this mood-memory phenomenon refers to the fact that depressed individuals are more likely to recall negative, depressing words, memories or information that are congruent with their current depressed mood state (e.g., Bower et al., 1978; Clark & Teasdale, 1982; Denny & Hunt, 1992; Teasdale et al., 1980). Thus, the mood congruency effect would explain the results by stating that, after having been exposed to List B words, the depressed participants (i.e., DCR and DWS groups) were able to recall many of the negative studied words found on this list, and consequently, obtained higher priming scores in comparison to those depressed individuals who had been presented with the less negatively valenced words on List A. This mood congruency explanation is supported by the self-reports made by the depressed participants during the post-experimental interview. For example, 9 of the 14 depressed individuals (DCR = 5/7; DWS = 4/7) stated that the negative (e.g., *heavy, agony*) or unusual words (e.g., *mucus*) on List B stood out in their mind and were easier to recall. By contrast, of the 16 depressed individuals who were exposed to List A, only 5 individuals (DCR = 4/8; DWS = 1/8) had reported the negative words to be easier to remember and recall.

As mentioned before, the participants in the neutral mood groups (i.e., NCR and NWS) were slightly more negative or depressed in affect after their neutral mood-induction

procedure. Thus, it is plausible that the same mood congruency pattern occurred within the neutral groups since their slightly negative mood levels may have enabled them to recall more of the negative-type words found on List B. In the post-experimental interview, 8 of the 16 neutral mood participants (NCR = 4/8; NWS = 4/8) reported that they found the negative words in List B easier to recall from memory. On the other hand, only 4 neutral participants (NCR = 2/7; NWS = 2/7) stated that the negative words on List A had any biased effect on their recall performance.

Thus, there appeared to be a biased recall of negative words from List B with both depressed and neutral participants. In hindsight, the present mood study could have counterbalanced the negative words (e.g., *agony* and *blame*) and positive words (e.g., *money* and *prize*) within both study lists in order to eliminate this mood congruency effect from occurring.

Word-stem completion task. As predicted, the depressed and neutral mood groups' recall performance did not differ significantly on this indirect measure of implicit memory. There are two possible interpretations of this null hypothesis: First, it could be viewed as concrete support for Hypothesis 2 which stated that the depressed and neutral mood groups should produce similar priming scores on the word-stem completion task because a depressed mood will have little or no effect on recall from a low-effort indirect memory task which tap primarily into automatic processes (i.e., resource allocation theory; Ellis & Ashbrook, 1988). On the other hand, it is also possible that there was no observed difference in memory performance between the DWS and NWS group because the DWS group had not maintained the same intense level of depression throughout the entire study. As stated earlier, the DWS group's score had decreased substantially by the end of the memory test

(i.e., T-score = 58.50) in comparison to its mood rating immediately following the depressed mood-induction procedure (i.e., T-score = 68.07). Since the DWS group had obtained a mean T-score of 58.50 upon the completion of the memory test, it technically placed it in a "neutral" mood state since it had scored within the neutral mood state criteria (i.e., T-score < 60). Therefore, this suggests that the DWS group's depressed mood level could have diminished to a point where it became a closer approximation of a "neutral", rather than depressed mood state.

Did this loss of depressed mood level in the DWS group affect or confound the recall data produced in the memory test? Indeed, this decrease in depressed mood level for the DWS group may have given their participants an improved chance of recalling more studied words, more than they would have if they had been in a truly "depressed" state. Thus, the diminished depressed mood state may have enabled the participants in the DWS group to produce an equivalent priming score to that of the NWS group on the memory test.

Because the depressed mood level for the DWS group was lost at some undetermined point between the end of the mood-induction procedure and the end of the memory test, this complicates the interpretation of whether depressed mood state actually affects memory recall. For example, the DWS participants' mood states had been measured upon completion of the memory test but not *prior* to the memory test and for this reason, it is difficult to determine when their depressed moods had actually begun to diminish and whether this had any impact on the final memory data. Therefore, it is uncertain whether the DWS group's depressed mood had actually weakened in intensity *before*, *during* or *after* the memory test had already been completed. It is possible that the DWS participants' depressed mood had decreased before or during the memory test. This reduction in depressed mood

state would certainly confound with the memory performance data since past studies have reported that the severity of the depressed mood will determine the degree of deficits individuals exhibit in memory recall performance (Johnson & Magaro, 1987, as cited in Hertel & Rude, 1991). However, there is also a chance that the group's depressed mood had begun to diminish *after* the memory test had been completed which would have little bearing on the recall data obtained because the memory test was performed while the participants were still in a "depressed" mood state. Consequently, without having absolute certainty of when the DWS group began to wane in its depressed mood intensity, this creates problems with the analysis and interpretation of the DWS group's performance on the memory test. The mood variable, particularly depressed mood, could have been monitored more closely and carefully since the purpose of the present study was to examine whether the induced depressed mood had any effect on memory recall performance on both the cued-recall and word-stem completion memory test. For this reason, the present study should have assessed the depressed groups' mood level at points both *before* and *after* the memory test in order to determine the maintenance of the depressed state throughout the memory test phase.

Cued-recall task. Unexpectedly, the depressed group failed to demonstrate an overall reduction in memory performance on the cued-recall task in comparison to the neutral group. The lack of depressive deficit on this direct memory task is interesting for several reasons: (a) it is not typical of the results of past studies on depression and recall; and (b) it is not what would be expected according to the resource allocation (capacity) theory of mood effects on memory.

The present findings contrasts with past clinical studies which have provided a vast amount of evidence for the deficits and cognitive impairments demonstrated in depressive

individuals. For example, Beck (1967) observed that depressed persons frequently reported problems with memory and concentration, due to their limited amount of resources available for cognitive processing. Other empirical research studies have shown clear recall deficits on direct memory tests by naturally depressed college students (e.g., Hasher & Zacks, 1979), by college students who experienced depressive mood-induction (e.g., Ellis et al., 1984; Leight & Ellis, 1981) and patients who experienced minor or major depression (e.g., Weingartner et al., 1981). In addition, the present study's findings contrasts with results reported by Bazin et al. (1994) and Elliott and Greene (1992) who independently found that their depressed patients were severely impaired on the cued- and free-recall tasks, relative to the non-depressed group. This present lack of evidenc for a depressive impairment on the cued-recall task also challenges the assumptions of Ellis and Ashbrook's (1988) resource allocation model upon which the present study's hypotheses are based. According to this model, depressed individuals were expected to exhibit decrements in memory recall due to insufficient resources available to process a high-effort, demanding task such as the cued-recall. Thus, this lack of difference between the depressed and neutral group on the cued-recall task contradicts the findings of earlier studies on memory and depressed mood as well as fails to provide further support for the resource allocation (capacity) model of cognitive functioning within depressed individuals.

Why then did the present study fail to find evidence of a depressive deficit on the cued-recall memory test? Since there may have been uncontrolled confounding factors present in the study, there are several possible competing explanations for the lack of depressive deficits on this direct memory task. However, the most compelling explanation is that the mild depressed mood, induced via Velten's (1967) Mood Statements, in otherwise

normal individuals may have left these students with sufficient cognitive capacity to handle the direct memory task at hand. In a review of memory and clinical depression, Johnson and Magaro (1987, as cited in Hertel & Rude, 1991) pointed out that the severity of depression was an important factor in determining the number of words recalled by participants. Therefore, the more severe the depressed mood, the less number of words will be recalled. Similarly, the resource/capacity framework argued that moderate levels of emotional arousal were unlikely to impair memory ability, especially with undemanding tasks. However, only strong levels of emotion would hinder memory recall, particularly with more difficult tasks. Therefore, it is possible that the severity of the induced depressed mood created in the present experiment may have been too mild to produce any significant detrimental effects on the memory recall performance. The participants in the depressed-cued recall (DCR) group may not have been *depressed* per se, but rather were in a *distressed* state which was insufficient to produce a noticeable impairment on the cued-recall task, in comparison to the neutral-cued recall (NCR) group. There were two situations in the experiment that illustrated the instability and transitory nature of the present induced mood states: First, the DWS group had shown a gradual but significant decrease in negative affect after the administration of the Velten depressed mood-induction procedure which had been unanticipated. It is questionable whether the similar memory performance between the DWS and NWS group would have resulted if there had been no loss in intensity of depressed mood by the DWS group at the end of the memory test. Second, the neutral mood groups (i.e., NCR and NWS) were slightly negative in affect after the neutral VMIP. However, the neutral participants' T-scores began to shift automatically towards its baseline measure (i.e., pre-VMIP scores) by the end of the memory test after an intervening time of 25-30 min. Therefore, the mood

states induced in the present study wre not as resilient and stable in intensity and duration as had been expected.

Even though the Velten mood-induction procedure has been widely used and demonstrated to be effective, it is possible that the intensity of the depressed mood induced by this Velten technique was not sufficient to produce a significant depressive deficit on the cued-recall task in the DCR group, relative to the NCR group. Thus, a weak mood variable may be one explanation for the present lack of difference between the depressed and neutral group on both cued-recall and word-stem completion task. It is possible that the mood states induced in the present experiment were short-lived and transient which supports Polivy and Doyle's (1980) belief that the effects of the VMIP will diminish with time, with "little evidence regarding the absolute duration of [the] effects" (p. 342).

In the present experiment, the maintenance of the depressed mood state, in terms of duration and intensity was certainly a problem, particularly for the DWS group. However, before dismissing the Velten's technique completely, one must appreciate that most of the participants in the neutral and depressed mood groups had, in fact, reported feeling the mood implied by the Velten Mood Statements. Although some of the depressed participants commented that it was very difficult to get into a depressed mood initially and a few even admitted to "fighting against the depressed mood-induction", most of them reported feeling generally "gloomy, down, and sad" and had somatic complaints such as feeling "sleepy", "tired" and "heavier" immediately following the depressed mood-induction.

Another possible factor that might help explain why there were similar levels of priming between the depressed and neutral group on both the cued-recall and the word-stem completion task (i.e., producing no dissociation between explicit and implicit memory) is the

present study's failure to separate the contributions of *automatic* (unconscious) and *intentional* (conscious) uses of memory recall within different cognitive tasks (i.e., cued-recall and word-stem completion). According to Jacoby (1991), the problems associated with the interpretations of direct-indirect task dissociations have resulted mainly from paralleling particular underlying memory processes (i.e., unconscious and automatic vs. conscious and intentional) with certain tasks (i.e., indirect vs. direct) and then treating those tasks as if they were to provide *pure* measures of those memory processes. In other words, performance on the cued-recall task was assumed to require individuals to tap exclusively into conscious, intentional forms of memory whereas performance on the word-stem completion task supposedly relied completely upon the unconscious, automatic form of recall. However, the intentional or conscious forms of processing have been shown to contaminate performance on the indirect tests with the results taken as evidence for an underlying unconscious process at work. Conversely, it is possible that the automatic or unintentional forms of processing may, unexpectedly, contribute to the performance on the direct tests of memory (e.g., Holender, 1986, as cited by Jacoby, 1991).

For this reason, if a person's performance on a cognitive task inevitably involves a mixture or combination of both automatic and intentional processes, this would be quite problematic for the analysis and interpretations of the present study since no calculations were done regarding the proportion of automatic processing versus intentional processing involved in the cued-recall or in the word-stem completion task. It is entirely conceivable that participants in the present study had not followed the specific instructions; that is, they may have performed the opposite of what was instructed or they may have combined both the automatic and intentional recall strategies on their designated memory tasks. For

example, some participants assigned to the cued-recall task may have, in fact, resorted to generating the first word that came to mind if they could not think of a studied word to fit the partial cue. For the word-stem completion task, some participants may have recognized that their completions had come from the list of words shown earlier and then consciously tried to recall as many studied words as they could remember to complete the test word-stems.

This hypothesis was supported by many of the participants' self-reports during debriefing. Most of the participants under the word-stem completion instruction had stated that although they had initially started giving the first words that came to mind, they soon realized that the words they were generating were the same words they had seen previously on the study word list. Once they had made this connection, they consciously used this additional strategy, especially if no words came to mind, and recalled all studied words they could remember to fit the word-stems. By contrast, the participants instructed to use each of the test word-stems as cues to remind them of any studied words (i.e., cued-recall condition) had complied and followed these explicit instructions. However, many of these individuals stated that when they found it more difficult to recall the previously presented (studied) words, they began to use simpler strategies such as guessing or giving the first word that came to mind that completed the test word-stems. Therefore, there was no constraints strictly enforced for how the two memory tasks should or should not be performed. Many of the participants were performing their assigned memory task by using whatever strategies necessary to complete the word-stems, regardless of the instructions given. Many individuals had either switched between explicit and implicit memory instructions or blended a combination of both strategies together. Thus, it is reasonable to speculate that if the participants had not followed the memory task instructions completely or accurately, this

inevitably would influence and confound the memory performance results produced on the word-stem test.

Jacoby's (1991) *process dissociation model* made the assumption that automatic and intentional uses of memory were independent of each other and the performance on a cognitive task always depended upon a mixture of both automatic and intentional processes. Thus, instead of examining the *task distinction* between direct and indirect memory tests as had been done in the present study, Jacoby argued that it would be more advantageous for researchers to explore the *process distinction* between automatic and intentional processes. By employing this process dissociation procedure, it would allow the accurate measurement of the participant's intentional recollection by examining the "difference between performance when [he or she] was *trying to* as compared with *trying not to* engage in some act" (Jacoby, Toth, & Yonelinas, 1993, p. 141). Support for this process dissociation framework can be found in the study by Jacoby et al. (1993) who tested participants under two conditions: inclusion and exclusion. For example, in the *inclusion* condition (i.e., testing automatic processing), participants were instructed to complete word-stems with *studied words* or, if they could not do so, to complete stems with the first word that came to mind. Under the *exclusion* condition (i.e., testing intentional processing), participants were asked *not* to use studied words to complete stems. Hence, Jacoby et al. reasoned that if "recollection were perfect, subjects would always complete stems with old [studied] words for the inclusion test and never complete stems with old [studied] words for the exclusion test; that is, responding would be under complete intentional control" (p. 141). Thus, the probability of recollection could be estimated as the probability of responding with a studied

word in the inclusion condition minus the probability of responding with a studied word in the exclusion condition:

Recollection = Inclusion - Exclusion

Taken together, the present lack of difference between depressed and neutral group's performance on the two memory tasks could be due to the noncompliance or combining of task instructions, rather than the actual implicit or explicit nature of the instructions given. By employing Jacoby's process dissociation procedure in future studies, this would eliminate any alternative or competing explanations about the specific probability of recollection (i.e., priming scores) obtained among the four experimental groups as well as less ambiguity in the interpretations of these present findings.

Another simple but logical explanation for the lack of depressive deficits on the direct memory task was that the cued-recall task may have been too easy and undemanding which subsequently did not deplete or exhaust the depressed participant's pool of cognitive resources. According to Weingartner and Silberman's (1982, as cited in Watts & Sharrock, 1987) effort hypothesis, the degree of impairment found on a cued-recall task depend on the level of effort required by the task. If effort was a crucial factor, then a low-effort cued-recall task would show only slight impairment. Whether or not a task was considered "demanding", as emphasized by Ellis (1985), depended on the "list length, the cognitive effort demands, and the opportunities to category organization" (p. 394). It is possible that the previously shown list of study words was easy for the depressed participants to categorize or organize and consequently, they were able to develop an elaborate organization scheme to effectively retrieve the studied words during the cued-recall memory test. According to Graf and Mandler (1984), the cued-recall task involved *elaborative processing* in which the

individual linked presented words to other material in memory to form new memorable relationships. These words then became more retrievable because there were more paths or retrieval cues which could be used to aid recall. This view was supported by Graf and Mandler's study, Experiment 3 which found that the elaborative processing involved in the performance on a prior semantic task (i.e., words rated on a "pleasantness" scale) later helped to raise recall performance on a cued-recall test because the semantic task provided the additional retrieval paths to the previously studied words and thus, increased word accessibility. According to this view, the depressed participants in the present study were able to recall many of the studied words because these words had been rated earlier in terms of their pleasantness or unpleasantness (i.e., semantic task) during the study period. Thus, the studied words were made more accessible and retrievable as a result of undergoing semantic, and elaborative processing. For this reason, the depressed participants were able to recall studied words from memory at a comparative level to the neutral mood participants.

It is also possible that the cued-recall task was not as demanding and difficult to perform since the participants were provided with retrieval cues (i.e., mon--) during the memory test. In addition, the cued-recall task was well-structured with clearly specified instructions on how to use the cues to aid their retrieval of words from memory. This strategy helped the depressed participants to focus on the task and boost their recall performance to a level comparable to that of the neutral mood group. Overall, it appeared that the cued-recall task in the present study was not as demanding which consequently did not deplete the depressed participant's total cognitive resources. The end result was little or no impairment in performance on the cued-recall task, in comparison to the neutral mood group.

Another possible explanation for the lack of memory deficit on the cued-recall task is that the depressed participants were truly able to preserve memory retention on this direct memory task. Contrary to the assumptions of the resource (capacity) allocation model, the depressed group may have been able to handle this task because they had enough resources to fully attend and encode the studied words into memory. Granted that the participants were in a sufficiently "depressed" mood state and working on a challenging cued-recall task, the present null results between depressed and neutral mood group's recall performance exemplifies the depressed individuals' ability to possess the necessary cognitive capacity to perform adequately on this direct memory task. The present study had initially predicted that, relative to the neutral mood group, the depressed participants would be significantly impaired on the cued-recall task (explicit memory), but their recall performance on the word-stem completion task (implicit memory) would be unaffected. Yet, the present results indicated that the depressed participants were able to perform equally to the neutral mood group on the direct (cued-recall) as well as on the indirect memory (word-stem completion) task. In other words, the present study demonstrated that not only could implicit memory be spared within depressed individuals but that explicit memory was also preserved and left intact.

Although serious memory deficits have been shown in a number of experiments (e.g., Ellis et al, 1984; Ellis & Ashbrook, 1988; Hertel & Hardin, 1990), depression does not necessarily impair memory. There have been a number of studies which have failed to reveal such detrimental effects of depression. For example, independent studies by Hasher, Rose, Zacks, Sanft, and Doren (1985), Bower et al., (1981), and Einstein and Ellis (1987, as cited in Ellis & Ashbrook, 1988) found that the recall of their depressed participants did not differ

significantly from the non-depressed individuals in terms of overall recall of stories, memories or text. In research with experimentally-induced depressed college students, Hertel and Hardin (1990) found that under unstructured situations, the depressed individuals did not spontaneously choose the appropriate strategies necessary to complete the recognition test. In other words, when they were not explicitly guided through the procedure, these depressed individuals diverted from the task and engaged in task-irrelevant strategies and subsequently obtained lower recall performance in comparison to the non-depressed individuals. However, when they were directly instructed on how to use more appropriate and beneficial strategies during retrieval, Hertel and Hardin improved the recognition performance of these depressed students. Similarly, another study found that when their clinically depressed participants were provided with strategies for problem solving, this was an effective way to reduce the typical impairment (e.g., Abramson, Alloy, & Rosoff, 1981, as cited in Hertel & Rude, 1991). Interestingly, a study by Hertel and Rude (1991) demonstrated a *depressive advantage* on their free-recall task. The depressed participants were given a surprise memory test after reading incomplete sentence frames in which they had to determine if a word properly completed a sentence. In the *unfocussed* condition, the depressed participants simply read the sentence and decided if the word fit. However, depressed participants in the *focussed* condition were required to read aloud the word both at the beginning and end of the presentation which forced them to attend to the studied words more closely. The results showed that depressed participants in the unfocussed condition recalled fewer words on the incidental memory test than did the control group, but this memory deficit disappeared when the depressed participants were instructed to pay close attention to the studied words (i.e., focussed condition). Along the same line of reasoning,

there was no significant depressive deficits on the present cued-recall task because the participants in the DCR group had paid close attention to the studied words in the pleasantness rating task (i.e., elaborative processing) and they were able to use whichever retrieval strategies they found beneficial and helpful in recalling previously seen words.

Confounding Variables in the Present Study

Overall, it is difficult to interpret the present results conclusively since there were a number of possible variables that were uncontrolled for in the study. These extraneous variables could have easily influenced the recall performance on the memory test, and until these variables have been identified and eliminated, one cannot interpret the present findings with certainty. For example, one potential confounding factor within this mood-induction study was demand characteristics (see Polivy & Doyle, 1980, for criticisms of the Velten procedure). Ellis et al. (1985) espoused a strict demand characteristic view that "mood-induction participants [would] respond to all tests according to their perceptions of what [was] expected within the experimental context" (p. 369). In other words, it is possible that the present mood-induction procedure did not produce a true depressed mood state, for instance, but rather produced the desired mood through the demand or expectations of the mood instructions. Thus, it is uncertain whether the depressed participants were truly "depressed" or whether they were trying to be in a depressed mood state because it was expected of them while they completed the ST-DACL mood assessments. However, there are several lines of evidence to argue against this demand-characteristic interpretation. First, an inspection of Table 2, as shown in the Results section, illustrates a natural trend of the depressed and neutral groups towards lower ST-DACL scores from Time 2 (i.e., post-VMIP) to Time 3 (i.e., end of memory test). In other words, both the depressed and neutral groups

gradually decreased in negative affect as shown by their T-scores moving automatically towards their original baseline scores. This decrease in negative mood state over time could be interpreted as an argument against an experimental demand explanation since there is no reason to believe that such demand characteristics should naturally dissipate over time. Interestingly, this decrease in depressed affect is consistent with Schwartz's (1981, as cited in Isen, 1984) general view that "it [is] difficult to make a normal person depressed and perhaps also to keep a temporarily depressed normal person depressed....where possible, people try to avoid depression (not necessarily irrationally so) and naturally try to make themselves feel better if they become depressed" (p. 209). Similarly, Martin (1990) and Clark (1983) supported the use of mood-induction experiments by asserting that the influence of experimental demand effects would be least likely to occur in recall experiments with VMIP self-statements since this technique proved to create a similar state of mild, naturally occurring depression. Likewise, a study by Goldstein, Leight, and Ellis (1982, as cited in Ellis et al., 1985) reported that a mood state induced by the Velten procedure continued to persist even when participants were told that the experiment was finished, which was intended as a demand-release maneuver. Even though one cannot completely rule out the possibility of demand characteristics contributing to the outcome in the present experiment, it is unlikely, however, that such demand effects played a significant role in producing the final recall performance on the memory test.

Another extraneous variable in the present mood-induction study was the potential for experimenter bias. The investigator was not blind to either the hypotheses or experimental conditions as the study was carried out and this could have influenced the participants' behaviours during the mood-induction procedure and more importantly,

performance on the memory test. There is one example in the present study to support this claim. For example, if the depressed participants did not acquire T-scores of 60 or greater on the first mood assessment (i.e., S-List A), they were instructed to reread Velten's 58 depressed mood statements. When told to check off adjectives on the subsequent S-List C given, two participants later disclosed in the post-experimental interview that they felt "pressured" to check off more negative adjectives to ensure that they were depressed enough to continue with the experiment. Thus, it is possible that these two individuals assigned to the depressed group may not have been *depressed* per se but only responded on the ST-DACL form in such a way as to appease the experimenter and comply with the expectations of being in a depressed mood state. Therefore, it is plausible that there was an influence of the experimenter and the experimental conditions on the participants' behaviours and this would have inevitably confounded the present results.

Conclusion and Recommendations

The purpose of embarking on the present research study was to contribute further understanding to the theoretical relationship between emotion and memory by identifying the specific components of memory that were impaired or spared within depressed individuals. Initially, the present study attempted to replicate and support Bazin et al.'s (1994) finding of a dissociation between explicit and implicit memory processes: Their clinically depressed patients had reportedly experienced serious impairment in explicit memory processing (i.e., cued-recall task) but their performance was unaffected in the implicit memory processing (i.e., word-stem completion task). However, the present study did not provide evidence of this dissociation between the two memory processes. In fact, the depressed mood group was spared from a memory deficit not only on the word-stem completion task (i.e., implicit

memory) but on the cued-recall task (i.e., explicit memory) as well. Thus, there was no difference in recall performance between the depressed and neutral mood group on either the cued-recall or word-stem completion task.

It should be clearly stated that these results are not presented as conclusive since there were a number of uncontrolled confounding factors in the procedural design. Possible extraneous factors may have been a weak mood variable, individuals' idiosyncratic retrieval strategies and a less-than-demanding cued-recall memory task. However, if the present data are taken at face-value, then the lack of depressive deficits on both the cued-recall or word-stem completion task suggests that depression does not always lead to memory impairments; the strengths and capabilities of depressed individuals can be preserved. For example, participants in the depressed group had shown no significant decrease in recall performance of studied words on the word-stem completion task, relative to the neutral group which demonstrated that the implicit memory of these depressed individuals had not been affected. Since they had been exposed or primed to the study words, they were able to keep the encoded material intact within their implicit memory system. When prompted with partial cues on the memory test, the depressed participants automatically recalled and retrieved these words without conscious awareness of their stored memory capacity.

In terms of the cued-recall task, the depressed participants were able to perform at a comparative level to the neutral group regardless of the debilitating effects of the depressed mood. Their intact ability to perform on this high-effort direct memory task occurred under two conditions in the present study: First, the depressed participants had paid close attention to the studied words which involved elaborative processing of words (i.e., pleasantness rating task) and subsequently increased the retrievability of these words. Second, the depressed

participants had not only used the task instructions provided but instead, employed whatever strategy(s) they found most helpful to solve the memory task at hand. Overall, one could interpret the present findings as a demonstration of the depressed participants' ability to preserve sufficient cognitive capacity in order to perform explicit *and* implicit memory processing, if required to do so. Thus, these findings exemplified the greater flexibility within depressed individuals to allocate resources to cognitive tasks, even high-effort ones such as the cued-recall task, than what had been originally implied by the resource allocation (capacity) theory.

In closing, there are various plausible interpretations of the present data which make it difficult to determine with certainty which factor(s) contributed to the lack of depressive deficits on either the direct or indirect memory test and consequently, the lack of dissociation between the explicit and implicit memory processes. For this reason, future studies need to incorporate methodological improvements to minimize extraneous variables and thus, eliminate competing explanations of the data. Further research in this emotion-memory area is warranted before any conclusive statements can be made about the underlying memory processes that are impaired or preserved within depressed individuals.

Last, additional research is also needed to clarify the strategies by which depressed individuals selectively recall information from their explicit and implicit memory systems. By focussing on the strategies that are employed by depressed individuals, this will have direct implications for the treatment of depression. Depression does not necessarily have to impair memory and cognitive capacity. Researchers need to identify the beneficial retrieval strategies that individuals in a depressed mood state can use to tap into their strengths, rather

than their weaknesses, thereby instilling therapeutic feelings of competence and success within these individuals.

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Footnotes

[1]Several researchers have successfully enhanced the effectiveness of the Velten (1967) technique by combining the mood statements with music to increase the intensity and duration of the mood state (Albersnagel, 1987; Mathews & Bradley, 1983). Sinclair et al. (1994) also modified Velten's technique to improve the maintenance of the induced mood state by combining the Velten's mood statements with a set of incubation instructions and 3-min incubation period prior to the first time that the participants' moods were measured. For example, after completing the last Velten mood statement, participants read instructions designed to facilitate "incubation" or maintenance of the mood. For instance, Sinclair et al.'s incubation instructions in the elation condition were as follows:

> Now that you're feeling very happy, concentrate on this feeling. Let it flow. Let in build. Feel the mood. Feel it get stronger. Think about other things that have happened in your life that have made you very, very happy, like doing something you love to do, or being with good friends doing fun, enjoyable things. Concentrate on it. As you do, you'll feel your mood build. It'll become more intense, more happy. This, in turn, will make you think of other things in your life that have made you very, very happy. The mood will build. Let it. Feel it become more intense Feel it become stronger. It will happen. Do and think whatever you can to build this mood. Feel very, very happy. Close your eyes. Begin now. (p. 395)

As a result of their study, Sinclair et al. (1994) concluded that this incubation period was successful in creating temporary mood shifts lasting up to at least 25 to 30 minutes. However, they admitted that their technique demonstrated to be more effective at inducing long-lived elated moods than depressed moods.

[2]Although some earlier studies of mood memory (e.g., Leight & Ellis, 1981) have used only female participants based, in part, on Natale's (1977) report that female participants were more responsive to the Velten mood-induction procedure (VMIP), subsequent studies (e.g., Ellis et al., 1985; Ellis et al., 1984) have shown that male participants were equally receptive to the mood-induction by the VMIP. Therefore, both males and females were recruited in the present experiment for this reason as well as to obtain an adequate sample of participants in the study.

[3]Ten depressed participants (five from DCR and five from DWS) had obtained scores below 60 on the S-List A checklist. These individuals were instructed to reread the 58 depressive statements and were re-administered S-List C. Subsequently, all ten participants were able to obtain a T-score greater than 60 which, for the purpose of the present study, was indicative of a "depressed" mood state. However, this re-administration of the 58 Velten depressive statements had still proven unsuccessful in inducing a depressed mood state within two participants (i.e., T-score still below 60). These two individuals continued the study to completion but their data were not used in the final analyses.

[4]It is important to mention that prior to the conduction of the experimental trials, the significance of assessing the stability of mood states was erroneously overlooked. In hindsight, the present study should have administered the State Mood scale (S-List B) to all participants immediately following completion of the memory test. Unfortunately, this error was not detected until after the study had already proceeded and the first 7 participants in the DWS group had performed the experiment to completion. Thus, to correct for this error, the final analyses of the data took the 7 missing datum points into account.

[5]In the present study, the post-experimental questions were posed during the debriefing period after the entire experiment had been completed. However, pertinent questions relating to the memory strategies used by participants should have been asked upon completion of the critical memory test so that participants could comment, without losing much detail on the specific method they used to recall words.

Appendix C

Target Words

(Studied and Unstudied)

List A		List B	
white	earth	money	learn
south	watch	stage	claim
train	alone	short	spend
event	chief	dream	grant
block	green	cross	heavy
clean	wheel	chair	broad
truck	cloud	guess	sharp
quick	thick	stone	trend
brain	Plain	angle	chest
twist	drama	wound	humor
blame	bread	rough	stuff
ghost	beard	mucus	flame
gross	serum	prize	label
curse	weird	ranch	agony
folly	yacht	devil	candy

Buffer Words

drive	mount	basic	shine
coach	widow	guilt	motel

Appendix D

Memory Test Word-Stems

whi--	ear--	mon--	lea--
sou--	wat--	sta--	cla--
tra--	alo--	sho	spe--
eve--	chi--	dre--	gra--
blo--	gre--	cro--	hea--
cle--	whe--	cha	bro--
tru--	clo--	gue--	sha--
qui--	thi--	sto--	tre--
bra	pla--	ang	che--
twi--	dra--	wou--	hum--
bla--	bre--	rou--	stu--
gho--	bea	muc	fla--
gro--	ser--	pri--	lab--
cur--	wei--	ran	ago--
fol--	yac--	dev--	can--

Appendix E

Depressive (Negative) Mood Statements

1. Today is neither better nor worse than any other day.
2. I feel rather sluggish now.
3. Every now and then I feel so tired and gloomy that I'd rather just sit than do anything.
4. Sometimes I wonder whether school is all that worthwhile.
5. I can remember times when everybody but me seemed full of energy.
6. Too often I have found myself staring listlessly into the distance, my mind a blank, when I definitely should have been studying.
7. It has occurred to me more than once that study is basically useless, because you forget almost everything you learn anyway.
8. People annoy me; I wish I could be my myself.
9. I've had important decisions to make in the past, and I've sometimes made the wrong ones.
10. I do feel somewhat discouraged and drowsy----maybe I'll need a nap when I get home.
11. Perhaps college takes more time, effort, and money than it's worth.
12. I just don't seem to be able to get going as fast as I used to.
13. I couldn't remember things well right now if I had to.
14. Just a little bit of effort tires me out.
15. I've had daydreams in which my mistakes kept occurring to me---sometimes I wish I could start over again.

16. I'm ashamed that I've caused my parents needless worry.

17. I feel terribly tired and indifferent to things today.

18. Just to stand up would take a big effort.

19. I'm getting tired out. I can feel my body getting exhausted and heavy.

20. I'm beginning to feel sleepy. My thoughts are drifting.

21. At times I've been so tired and discouraged that I went to sleep rather than face important problems.

22. My life is so tiresome----the same old thing day after day depresses me.

23. There have been days when I felt weak and confused, and everything went miserably wrong.

24. I can't make up my mind; its' so hard to make simple decisions.

25. I want to go to sleep----I feel just closing my eyes and going to sleep right here.

26. I'm not very alert; I feel listless and vaguely sad.

27. I've doubted that I'm a worthwhile person.

28. I feel worn out. My health may not be as good as it's supposed to be.

29. It often seems that no matter how hard I try, things still go wrong.

30. I've noticed that no one seems to really understand or care when I complain or feel unhappy.

31. I'm uncertain about my future.

32. I'm discouraged and unhappy about myself.

33. I've lain awake at night worrying so long that I hated myself.

34. Things are worse now than when I was younger.

35. The way I feel now, the future looks boring and hopeless.

36. My parents never really tried to understand me.

37. Some very important decisions are almost impossible for me to make.

38. I feel tired and depressed; I don't feel like working on the things I know I must get done.

39. I feel horribly guilty about how I've treated my parents at times.

40. I have the feeling that I just can't reach people.

41. Things are easier and better for other people than for me. I feel like there's no use in trying again.

42. Often people make me very upset. I don't like to be around them.

43. It takes too much effort to convince people of anything. There's no point in trying.

44. I fail in communicating with people about my problems.

45. It's so discouraging the way people don't really listen to me.

46. I've felt so lonesome before, that I could have cried.

47. Sometimes I've wished I could die.

48. My thoughts are so slow and downcast. I don't want to think or talk.

49. I just don't care about anything. Life just isn't any fun.

50. Life seems too much for me---my efforts are wasted.

51. I'm so tired.

52. I don't concentrate or move. I just want to forget about everything.

53. I have too many bad things in my life.

54. Everything seems utterly futile and empty.

55. I feel dizzy and faint. I need to put my head down and not move.

56. I don't want to do anything.

57. All of my unhappiness of my past life is taking possession of me.

58. I want to go to sleep and never wake up.

Note. From "The induction of elation and depression through the reading of structured sets of mood-statements, by E. Velten, 1967, Dissertation Abstracts, 28(4). Permission to reproduce waived.

Appendix F

Elation (Positive) Mood Statements

1. Today is neither better nor worse than any other day.
2. I do feel pretty good today, though.
3. I feel light-hearted.
4. This might turn out to have been one of my good days.
5. If your attitude is good, then things are good, and my attitude is good.
6. I feel cheerful and lively.
7. I've certainly got energy and self-confidence to share.
8. On the whole, I have very little difficulty in thinking clearly.
9. My parents are pretty proud of me most of the time.
10. I'm glad that I'm in college----it's the key to success nowadays.
11. For the rest of the day, I bet things will go really well.
12. I'm pleased that most people are so friendly to me.
13. My judgment about most things are sound.
14. It's encouraging that I get farther into my major, it's going to take less study to get good grades.
15. I'm full of energy and ambition----I feel like I could go a long time without sleep.
16. This is one of those days when I can grind out schoolwork with practically no effort at all.
17. My judgment is keen and precise today. Just let someone try to put something over me.

18. When I want to, I can make friends extremely easily.

19. If I set my mind to it, I can make things turn out fine.

20. I feel enthusiastic and confident now.

21. There should be opportunity for a lot of good times coming along.

22. My favourite songs keep going through my mind.

23. Some of my friends are so lively and optimistic.

24. I feel talkative----I feel like talking to almost anybody.

25. I'm full of energy, and am really getting to like the things I'm doing on campus.

26. I feel like bursting with laughter---I wish somebody would tell a joke and give me an excuse.

27. I feel an exhilarating animation in all I do.

28. My memory is in rare form today.

29. I'm able to do things accurately and efficiently.

30. I know good and well that I can achieve the goals I set.

31. Now that it occurs to me, most of the things that have depressed me wouldn't have if I'd just had the right attitude.

32. I have a sense of power and vigour.

33. I feel so vivacious and efficient today---sitting on top of the world.

34. It would really take something to stop me now.

35. In the long run, it's obvious that things have gotten better and better during my life.

36. I know in the future I won't over-emphasize so-called "problems".

37. I'm optimistic that I can get along very well with most of the people I meet.

38. I'm too absorbed in things to have time for worry.

39. I'm feeling amazingly good today.

40. I am particularly inventive and resourceful in this mood.

41. I feel superb! I think I can work to the best of my ability.

42. Things look good. Things look great!

43. I feel that many of my friendships will stick with me in the future.

44. I feel highly perceptive and refreshed.

45. I can find the good in almost everything.

46. In a buoyant mood like this one, I can work fast and do it right the first time.

47. I can concentrate hard on anything I do.

48. My thinking is clear and rapid.

49. Life is so much fun; it seems to offer so many sources of fulfilment.

50. Things will be better and better today.

51. I can make decisions rapidly and correctly; and I can defend them against criticisms easily.

52. I feel industrious as heck---I want something to do!

53. Life is firmly in my control.

54. I wish somebody would play some good loud music!

55. This is great---I really do feel good. I am elated about things!

56. I'm really feeling sharp now.

57. This is just one of those days when I'm ready to go!

58. God, I feel great!

Note. From "The induction of elation and depression through the reading of structured sets of mood-statements, by E. Velten, 1967, Dissertation Abstracts, 28(4). Permission to reproduce waived.

Appendix G

Neutral Mood Statements

1. Oklahoma City is the largest city in the world in area, with 631.166 square miles.
2. Japan was elected to the United Nations almost fourteen years after Pearl Harbour.
3. At the end appears a section entitled "bibliography notes".
4. We have two kinds of nouns denoting physical things: individual and mass nouns.
5. This book or any part thereof must not be reproduced in any form.
6. Agricultural products comprised seventy percent of the income.
7. Saturn is sometimes in conjunction, beyond the Sun from the Earth, and is not visible.
8. Some streets were still said to be listed under their old names.
9. The system is supervised by its board of regions.
10. There is a large rose-growing centre near Tyler, Texas.
11. Many states supply milk for grammar school children.
12. The typography, paper, and the bind were of the highest quality.
13. The machine dominated county posts for as long as anyone could remember.
14. The desk was old, and scratched into its surface was a profusion of dates, initials, and pleading messages.
15. The orient express travels between Paris and Istanbul.
16. When the banyan bent down under is own weight, its branches began to take root.
17. There isn't a scientific explanation for every U.F.O. sighting.
18. The Hope diamond was shipped from South Africa to London through the regular mail service.

19. The review is concerned with the first three volumes.

20. Slang is a constantly changing part of the language.

21. The ship was ancient, and would soon be retired from the fleet.

22. There is a small article in the local newspaper which indicates acceptance of the kidnappers' terms.

23. There is some forms in which no oath is required.

24. Intramatics finds mates for the lonely.

25. 99.1% of Alaska is owned by the federal government.

26. Two men dressed up as repairmen will appear shortly after the van pulls up.

27. The wood was discoloured as if it had been held in a fire.

28. A light is noticed in the dark outside, and it moved eerily towards the house.

29. Painting in a few other non-European countries is treated in a separate volume.

30. Provoked arousal and orientation are accompanied by steeper negative shifts.

31. The names of the Christmas mailing list are alphabetically ordered.

32. Significantly, these changes occur during the full moon.

33. The magazine's report was slanted, as usual.

34. West Samoa gained its independence in 1965.

35. The map would prove useless as beginning guide.

36. The speaker outlined a plan whereby the current deficits could be eliminated.

37. Black and white pictures are arranged in ten sections.

38. The papers had been front-paging it for days.

39. No man worked harder than he.

40. The notice made it clear that coffee breaks were being limited.

41. Potter wrote numerous satires on social cynicism.

42. Boeing's main plant in Seattle employs 35,000 people.

43. The doorkeeper was dressed in red.

44. During the next ten year, the group participated in politics.

45. The organization depended on the people for support.

46. In 1965, Elizabeth made the first state visit by a British monarch to Germany in 56 years.

47. It was their sixth consecutive best seller.

48. It all fitted in with the officer's story.

49. The merger did not change the company's policy.

50. The mansion was rented by the delegation.

51. Ninety occupations were listed as eligible for the grads in business.

52. Utah is the beehive state.

53. Changes were made in transport of lumber after the border incident.

54. The Chinese language has many dialects, including Cantonese, Mandarin, and Wu.

55. Things were booming once again in the little gold rush town of Angel.

56. At low tide the bulk of the old ship could be seen.

57. A free sample will be given to each person who enters the store.

58. The voices come only at night, and whisper words, terrible words.

Note. From "The induction of elation and depression through the reading of structured sets of mood-statements, by E. Velten, 1967, Dissertation Abstracts, 28(4). Permission to reproduce waived

Appendix H

Introductory or Preparatory Instructions

Please read each of the following cards to yourself. Then read each of the cards out loud. Let's start with this card. But to avoid repetitiousness, begin with the statements below the line of dashes. After you have read what follows to yourself, read it aloud.

I will read each of the following cards to myself. Then I will read each of the cards out loud, and I won't worry about the reading errors which often occur in unfamiliar situations.

In the first part of this experiment, I will be shown a series of cards with statements typed on them. These statements represent a certain mood. My success will be largely a question of my willingness to be receptive and responsive to the idea in each statement, and to allow each idea to act upon me without interference. These ideas are called suggestions.

First, as each statement is placed in front of me, I will simply read it to myself, and then I will read it once out loud in a manner appropriate to its intended seriousness, Then I'll go over each statement again and agin in my head with the determination and willingness to really believe it. I will <u>experience</u> each idea. I will concentrate my full attention on it. And I will exclude other ideas which are unrelated to the mood---like, "I'll see if this will work".

I will always attempt to respond to the <u>feeling</u> suggested by each item. I will then try to think of myself with as much clarity and realism as possible as definitely being and <u>moving into</u> that mood state. I am letting myself be receptive to these feelings. Different people move into moods in different ways. Whatever induces the mood in me fastest and

most deeply is the best way for me. Some people simply repeat the statements over and over again to themselves with the intention of experiencing them.

Some people find it natural and easy for them to visualize a scene in which they had or would have had such a feeling or thought. Or, perhaps some easy combination of repeating the statement and imagining the scenes will come to me. Very likely, I will begin to feel the way I do when I'm in that mood. I will continue to concentrate my full consciousness on experiencing and retaining the mood as each is presented. A certain amount of time will be devoted to each suggestion. I will continue to discipline and train myself in inducing a mood in myself by concentrating my full attention on the mood-statements during any time interval.

To sum up: The whole purpose of this exercise is to see whether a person can talk himself into a mood. Some of these mood-statements may have no relation to anything I have ver thought, said, or done. Yet, exactly in the manner of hypnosis, I will find it quite easy to accept and feel these emotions. I will be concentrating on doing so, rather than comparing each single statement to my life experience and then deciding whether it applies to me. I will let and strive to let them apply to me. I can do this.

I experience each statement as if it were especially written for me. At first I may feel the impulse to compare a singe mood-statement to life experience, or to resist statements which seem to be or are contradictory to what I feel myself to be. But, most people feel this at first. It will become apparent to me that if I am able to talk myself into a mood, then obviously I know how to talk myself out of one. If I find that I can do these things, then I have learned something valuable about myself: I can learn to control my moods to an extent.

If I feel the urge to laugh, it will probably be because humour is a good way to counteract unwanted feelings----or, it might be because I am surprised that I really am going into the mood. I will try to avoid these reactions, however, by keeping in mind that I have the chance of acquiring extremely useful information about myself out of undesirable moods that occur in everyday life. If for any reason I feel I cannot continue, I will so indicate.

The next card will begin the series of statements. I will read each to myself, then I will read it out loud. Then I will try to experience the mood as well as I can and continue to do so as the cards are presented to me and as I move further into the mood. After the cards will be a brief series of simple tasks to perform.

Note. From "The induction of elation and depression through the reading of structured sets of mood-statements, by E. Velten, 1967, Dissertation Abstracts, 28(4). Permission to reproduce waived.

Appendix I

Informed Consent Form

This study is being conducted by Lan Mee Hong in partial fulfilment of the requirements for the M.Ed. (Counselling) degree in the School of Education. under the supervision of Drs. David MacKinnon and Margaret Brown.

The purpose of this study is to investigate the influence of mood-induced states on the perception of word meanings and word generating skills. You will be randomly assigned to one of two groups (depressed or neutral mood) and will be induced into that particular mood state by reading the Velten Mood-Induction self-referential statements. The induced mood is a transitory state and will last only for the duration of this study. At the end of the study, you will read the Velten happy self-referential statements to induce you back into a happier mood state.

To be eligible to participate in this study, you will be required to first complete the State Mood scale of the State Trait-Depression Adjective Check Lists (ST-DACL) to assess your current mood state and to ensure that you are not at high-risk for depression. The State Mood scale will be required to be filled out on three more occasions during the study to periodically check on your current mood status.

Then there will be three word-type tasks to be completed in the study. The first task will be to read a list of words and then rate the pleasantness of each word on a 5-point scale. The second task will be to generate as many Canadian city names as possible. The final task will be to generate words from only the first three letters given. The study will require a

maximum of 1 hr 30 min of your time. You will be compensated with **three** course bonus marks in return for your cooperation and time committed to this study.

Your participation is completely voluntary and you have the right to withdraw at any point during the study if you should desire and will still be able to obtain full bonus marks for your participation. Your individual datum is completely anonymous and confidential since a number coding system will be used and the results will be analyzed as a group aggregate score.

If you are interested in obtaining a copy of the results once they are available, please leave your name and address in the space provided at the bottom. If you have additional questions, concerns or comments, please contact either Lan Mee Hong (542-9459), Dr. David MacKinnon (ext. 1394) or Dr. Margaret Brown (ext. 1489). Thank-you for your cooperation.

I, _____ (please print) hereby acknowledge that I have read the above protocol and consent to participate in this study. I have been informed about the nature and procedure of this study and understand that I am free to withdraw at any time that I wish to do so.

_____ Date: _____

(signature of participant)

_____ Date: _____

(signature of investigator)

Address for results and information to be sent to:

Appendix L

"Pleasantness" Rating Sheet

code number:___
study word list: ___

Rate the pleasantness of the following presented words on a 5-point rating scale:

1 = very unpleasant

2 = slightly unpleasant

3 = neutral

4 = pleasant

5 = very pleasant

1) _____	10) _____	19) _____	28) _____
2) _____	11) _____	20) _____	29) _____
3) _____	12) _____	21) _____	30) _____
4) _____	13) _____	22) _____	31) _____
5) _____	14) _____	23) _____	32) _____
6) _____	15) _____	24) _____	33) _____
7) _____	16) _____	25) _____	34) _____
8) _____	17) _____	26) _____	35) _____
9) _____	18) _____	27) _____	36) _____
			37) _____
			38) _____

Appendix M

Distractor Task

Canadian Cities:

Instructions:

Think of a Canadian city that will match each three-letter word-stem and the number of dashes adjacent to it. Write down your answers in the spaces provided. Complete as many word-stems as you can in the next 5 min.

TOR-- -- -- --:	SYD-- -- --:
VIC-- -- -- --	KIN-- -- -- -- --:
WIN-- -- -- -- --:	EDM-- -- -- -- --:
OTT-- -- --:	SAS-- -- -- -- -- --:
REG-- -- --:	CAL-- -- -- --:
LON-- -- --:	GAN-- -- --:
FRE-- -- -- -- -- -- -- --:	BRA-- -- -- --:
VAN-- -- -- -- -- --:	DAW-- -- --:
MON-- -- -- -- --:	BAN-- --:
HAL-- -- -- --:	DAR-- -- -- -- --:

Appendix N

Experimenter Data Sheet

code number: ____
sex/age: ____
study list: ____

0 = pass
1 = correct
2 = incorrect

1) ____	16) ____	31) ____	46) ____
2) ____	17) ____	32) ____	47) ____
3) ____	18) ____	33) ____	48) ____
4) ____	19) ____	34) ____	49) ____
5) ____	20) ____	35) ____	50) ____
6) ____	21) ____	36) ____	51) ____
7) ____	22) ____	37) ____	52) ____
8) ____	23) ____	38) ____	53) ____
9) ____	24) ____	39) ____	54) ____
10)____	25) ____	40) ____	55) ____
11)____	26) ____	41) ____	56) ____
12)____	27) ____	42) ____	57) ____
13)____	28) ____	43) ____	58) ____
14)____	29) ____	44) ____	59) ____
15)____	30) ____	45) ____	60) ____

Appendix Q

Post-experimental Questions

1) Was the Velten Mood Statements effective in inducing a depressed or neutral mood within you? How did you feel during the mood-induction?
2) How did you find the type of adjectives and the range of adjectives used in the ST-DACL?
3) What was your general strategy in completing the word-stem completion memory test?
4) Did you notice any relationship between the words you saw earlier and the words you produced on the stem completion memory test?
5) Did you notice a difference between the number of negatives or positive adjectives you recalled?
6) What was your impression of the study?
7) Had you known that this study involved a memory test?
8) How do you feel right at this moment?

Appendix R

Debriefing Letter

Dear Research participant,

You will recall that last January-February ('97) you were a participant in a research study that investigated the effects of induced moods (e.g., depression or neutral state) on memory processes.

The following is a description of the purpose of the study and the final results obtained. Since your individual datum was coded in an anonymous coding system, the results are analysed and reported as a group aggregate score.

The purpose of the present study was to investigate whether induced depression would have different retrieval effects on two types of memory systems: conscious (explicit) and unconscious (implicit). The present study hoped to replicate Bazin, Perruchet, De Bonis and Féline's (1994) findings of a dissociation between explicit and implicit memory within depressed individuals. In this between-subjects research design, there were a total of 60 participants involved and each were randomly assigned to one of four groups:

1) depress-word stem completion (DWS)
2) neutral-cued recall (NCR)
3) depress-cued recall (DCR)
4) neutral-word stem completion (NWS)

As a participant, you were induced into an assigned mood state by reading Velten mood statements and were then instructed to complete three word tasks: study phase (pleasantness rating task), distractor (Canadian Cities task), and test phase (memory test). Prior to the memory test, you were exposed to words during the study phase from either List A or List B. During the memory test phase, you were asked to complete each word stem

(i.e., mon--) with either the first five-letter word that came to mind (word-stem completion instruction) or with a previously shown word from the study phase (cued-recall instruction). The dependent variable being measured was the percentage of correct target (studied and unstudied) words you produced as solutions to the word-stems presented during the memory test.

Hypotheses:

1) In terms of explicit memory processing (i.e., cued- recall), the depressed group were predicted to replicate previous findings of poorer recall of previously studied words in comparison to the neutral mood group.

2) In terms of implicit memory processing (i.e., word-stem completion), it was hypothesized that both the depressed and neutral groups would show similar recall performance; that is, both mood groups were expected to produce equivalent priming levels on the memory test.

Results

Overall, the results of this study did not confirm or provide further support to Bazin et al.'s main hypothesis of a dissociation between explicit and implicit memory processes. The findings are as follows:

Memory performance:

1) The study found that the mood group, memory task and, more importantly, the interaction between these two variables were not significant predictors of the percentage of priming scores produced on the memory test. In other words, there was no difference between the depressed and neutral (control) groups' memory performance on either the cued-recall task or on the word-stem completion task.

Thus, there was no differential effect of depression on the retrieval of information from explicit and implicit memory.

2) Unexpectedly, the analyses revealed a significant correlation between List Type (A or B) and the priming scores obtained. On average, any individuals exposed to List B were able to generate a higher percent priming score on the memory test than individuals presented with List A.

Success of Mood Induction:

1) Overall, participants in the depressed group were successfully induced into a "depressed" mood state by reading the Velten Depressed mood statements.

2) Unexpectedly, after reading the Velten Neutral statements, participants in this group became slightly more negative in affect than they had been at the beginning of the study, rather than being in a neither "happy nor sad" mood.

3) Assessments made immediately upon completion of the memory test showed that individuals in the depressed-word stem completion (DWS) group did not maintain the same intensity of depressed mood as their depress-cued recall counterpart (DCR). It is uncertain at what point in the study (time from mood-induction to memory test) that the DWS group had actually diminished in their depressed mood level. On the other hand, the DCR group was able to maintain a depressed mood and both the NCR and NWS groups were able to maintain their neutral mood states until the end of the memory test (last task).

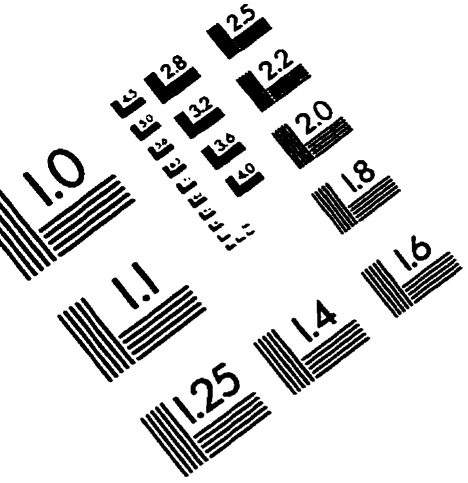
4) After reading the Velten Elation statements, participants from both depressed and neutral mood groups reported being in a happier mood state than they had been at the start of the study.

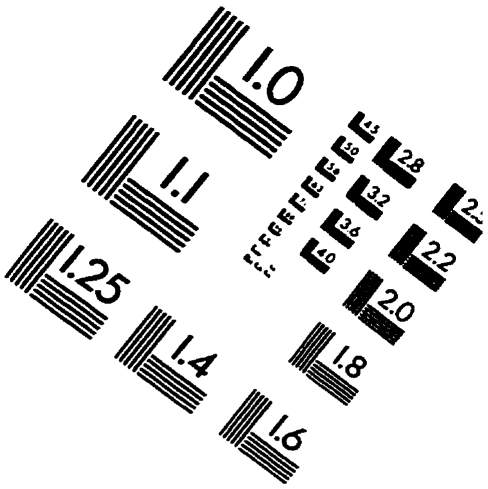
Once again, I would like to thank you for your help and participation in this study. Without your cooperation and interest, this research project would not have been possible. If you have further questions or comments, please contact either myself at lhong@beothuk.swgc.mun.ca, Dr. David Mackinnon at d.mackinn@acadiau.ca or (585-1394) or Dr. Margaret Brown at margaret.brown@acadiau.ca or (585-1489).

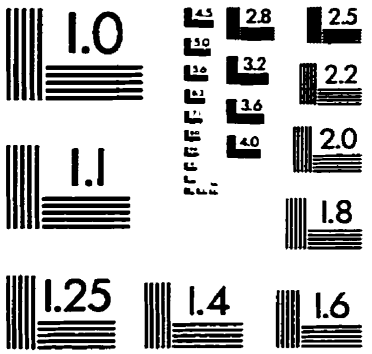
Sincerely

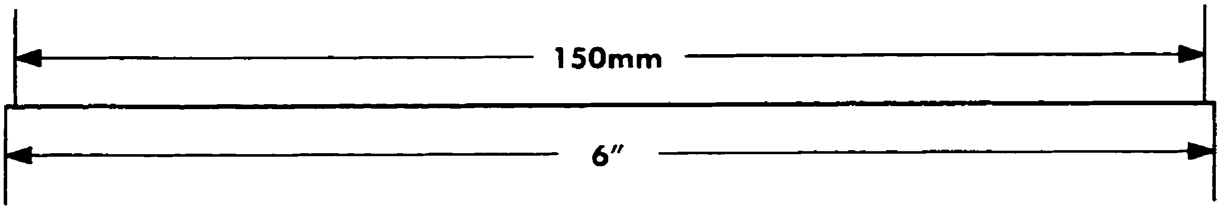
Lan Mee Hong

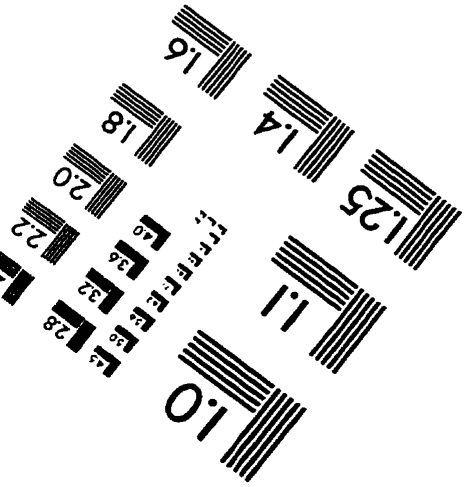
IMAGE EVALUATION
TEST TARGET (QA-3)

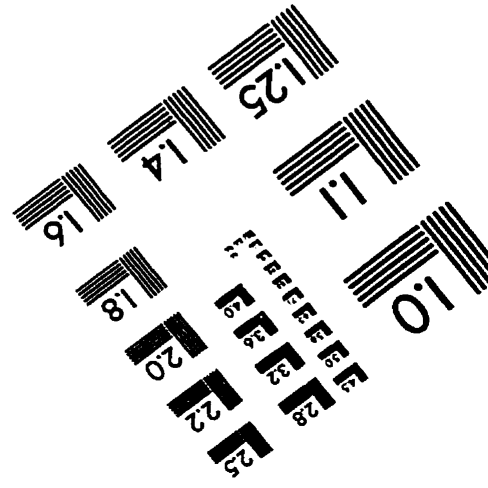












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