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Running head: THE EFFECTS OF DEPRESSION

The Effects of Depression on Susceptibility to Misleading Postevent Information

Tracy K. Gilbert ©

Lakehead University

1998

A Thesis Submitted in Partial Fulfilment for the Degree of Master of Arts in Clinical Psychology

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Abstract

The purpose of the present research was to examine whether depression affects susceptibility to misleading postevent information and to evaluate the extent to which divided-attention might produce a similar pattern of responses in the misinformation effect. Three groups of participants (i.e., focused-attention, divided-attention, and depressed) were presented with an audiotaped narrative describing a day in the life of a woman. The narrative consisted of 15 positive, 15 neutral, and 15 negative events. After listening to the narrative, participants were exposed to a summary of the story that contained misleading information. Finally, participants were given a cued recall test of their memory for the original events. The results indicated that the misleading postevent information led to significant misinformation acceptance in all three groups, but no significant memory impairment (i.e., retroactive interference). Participants in the divided-attention and depressed groups were generally less accurate and more susceptible to the misinformation than the focused-attention controls. Analysis of the depressed participants' performance indicated that they were significantly more accurate for negative events than positive or neutral events. Compared to the divided-attention participants, depressed participants were more accurate for negative events and, subsequently, less susceptible to negative misleading information. The findings provide information about the effects of depression on memory and have implications for eyewitness testimony.

Introduction

The malleable nature of memory has been extensively documented and, at this point, is difficult to dispute (e.g., Lindsay, 1990; Loftus, Donders, Hoffman, & Schooler, 1989). There is less consensus, however, on the specific factors that cause a deterioration in memory performance. Two factors that have received much attention are exposure to misleading postevent information and depression. Exposure to misleading postevent information can have detrimental effects on an individual's ability to accurately recall related information (Loftus, Miller, & Burns, 1978; Loftus & Palmer, 1974; Weingardt, Loftus, & Lindsay, 1995). Misleading information, presented after a witnessed event, can impair memory in at least two possible ways: (1) it can result in the impairment of memory for witnessed events; and/or (2) it can result in the inaccurate acceptance of the misleading details about the event and the adoption of these facts as part of the memory of the original experience (Loftus & Hoffman, 1989). Depression, both dysthymia and major depression, is associated with deficiencies in various aspects of long-term memory (Channon, Baker, & Robertson, 1993). Specifically, depression has been found to affect performance on list-learning tasks, free recall memory tests, and tests of memory for positive information (e.g., Cole & Zarit, 1984; Denny & Hunt, 1992; Williams, Little, Scates, & Blockman, 1987).

Thus, both depression and misleading postevent information can impair memory performance. However, little, if any, research has been conducted to determine the combined effects of these two variables on memory. One of the direct implications for such research involves eyewitness testimonies from individuals suffering from

depression. The lifetime prevalence of major depressive disorder ranges from 10% to 25% for women and 5% to 12% for men (American Psychiatric Association, 1994). Considering this high prevalence rate, one would expect a significant number of depressed individuals to be involved in making eyewitness testimonies. Such individuals who witness an important event (e.g., a crime) are likely to be exposed to new information regarding that event (e.g., through the media or police interrogations). If this new information subsequently becomes incorporated into the person's memory, thereby leading to inaccurate recall, the effects on courtroom testimonies can be detrimental (Greene, Flynn, & Loftus, 1982). Despite evidence demonstrating that eyewitness accounts are often inaccurate (Anderson, 1995; Lindsay, 1990), eyewitness testimony continues to play a significant role in our justice system. Thus, it is important to determine whether there are specific factors (e.g., depression) that can increase an individual's vulnerability to the misinformation effect, thereby increasing the risk of making false testimonies.

The primary purpose of the present research was to explore the relationship between depression and susceptibility to misleading postevent information. A secondary purpose was to evaluate the extent to which divided-attention might also impair memory performance and, thus, might be used to explain or predict the changes in memory performance observed in the eyewitness reports of depressed participants. That is, the experiment examined whether depression and divided-attention would affect eyewitness testimonies by increasing susceptibility to misinformation in similar ways.

The Effects of Misleading Postevent Information on Memory

Misleading postevent information can be defined as information that is presented after a witnessed event, which suggests the existence of details that were not presented in the original scene. Such information has been found to alter individuals' eyewitness reports (Loftus et al., 1978; Loftus & Palmer, 1974). Typically, a three-stage procedure has been used to study the effects of misleading postevent information on memory. Initially, research participants are shown an event by means of a film, videotape, or sequence of slides. Next, they receive a verbal description of the event that contains misleading information. Finally, participants are asked to complete a memory test (Belli, 1989; Lindsay, 1990; Lindsay & Johnson, 1989). Using this procedure, Shaughnessy and Mand (1982) demonstrated that exposure to misleading postevent information had a debilitating effect on test performance. Misleading information presented after a witnessed event can alter individuals' recollection and lead them to make erroneous eyewitness reports. This phenomenon is typically referred to as the "misinformation effect" (Loftus & Hoffman, 1989; Tousignant, Hall, & Loftus, 1986).

Research on the misinformation effect has found it to be a robust phenomenon. Loftus et al. (1978), for example, conducted a series of experiments to investigate how postevent information influences a person's memory for that event. In one of the experiments, some of the participants were presented with a series of slides depicting a car stopped at a stop sign. The postevent information, presented in the form of a questionnaire, incorrectly suggested that the car was stopped at a yield sign. In a subsequent forced-choice recognition test, over half of these participants came to recall

the stop sign as being a yield sign. The overall results indicated that the participants produced less accurate responses when they were presented with misleading information, suggesting that information presented after an event can become integrated into event reports. Similarly, Loftus et al. (1989) found that on a standard test consisting of the misled item and the original item, participants were significantly more accurate for items that had not been misled.

Loftus and Palmer (1974) confirmed these results by manipulating the wording of questions concerning a witnessed event. Participants were presented with films of automobile accidents that were followed by a series of questions. It was discovered that the way in which the question was asked had an enormous impact on the answer that was given. For example, participants who received the word "smashed" had a 32% chance that they would report having seen broken glass when, in fact, no broken glass had been shown in the scene. In contrast, for those receiving the word "hit," there was only a 14% chance of remembering broken glass. The word "smashed" may have misled the participants by suggesting that the accident was more severe than it actually was. This may have altered the participants' memory of the original event.

One of the primary concerns of research on the misinformation effect involves the extent to which individuals truly believe that the misled details were part of the original event. It is possible that participants simply respond according to what they think the experimenter wants. This is referred to as "demand characteristics" (Weingardt et al., 1995). McCloskey and Zaragoza (1985) argued that participants are often led to believe that information contained in the postevent narrative is correct. Thus, participants may be

responding according to information they know was obtained in the postevent narrative rather than to a genuine belief that the misled items were presented in the event. Lindsay (1990) attempted to control for this problem by using the "logic-of-opposition" paradigm. Participants were informed that any information contained in the postevent narrative was wrong and should not be reported on the final test. The results of this study demonstrated that participants' ability to remember event details can be impaired by exposure to misleading postevent information. A later study conducted by Weingardt et al. provided additional support for the misinformation effect. Using a variation of the logic-of-opposition paradigm, it was found that individuals who receive misleading postevent information can come to believe that they actually saw those misled items. In other words, participants can misattribute a memory derived from one source to another source. For example, one might remember something that Kathy said and mistakenly think that Liz was the speaker (Lindsay, 1990). Lindsay defines such failures in memory as "source monitoring errors."

Several factors can increase the likelihood of source monitoring errors. The passage of time, for example, allows the original memory of an event to fade and increases an individual's susceptibility to misleading postevent information (Loftus et al., 1978). When the original memory trace is weak, it becomes difficult for individuals to distinguish between memories from different sources. Immediately following a witnessed event, however, the memory for particular items may be quite strong. At this time, misleading suggestions may not have a significant impact on recollection. Loftus (1979) discovered that when participants had an essentially perfect memory for an item,

they were virtually unaffected by misleading information. Thus, some memories can never be modified when they are fresh in one's mind. However, such memories will eventually fade to the point where modification becomes possible (Loftus & Hoffman, 1989).

Although more focus has been placed on the situational factors that increase vulnerability to the misinformation effect (e.g., the passage of time), some studies have examined the influence of individual characteristics. In a study conducted by Loftus, Levidow, and Duensing (1992), it was discovered that age was an important variable in determining memory performance. Participants in this experiment varied between the ages of 5 and 75. Interestingly, the youngest and the oldest groups showed the greatest misinformation effects.

Another characteristic that can affect memory is mood. Particularly in therapy, the clients' mood can affect what they recall and what they do not recall (Lynn & Nash, 1994). Although it has been extensively documented that depression lowers memory performance (see next section), little is known about the effects of depression on the misinformation effect. It is hoped that the proposed study will provide some insight into this issue.

In summary, there is substantial evidence to support the claim that misleading postevent information can impair an individual's memory for an original event (Greene et al., 1982; Loftus et al., 1978; Tousignant et al., 1986). As Loftus et al. (1989, p. 607) concluded, the misinformation effect has been obtained "in numerous laboratories... and there seems to be little doubt that erroneous reporting is easy to induce."

The Effects of Depression on Memory

Cognitive deficits. Experimental research reveals that depression is associated with deficits in memory and learning (for a review, see Williams, Watts, MacLeod, & Mathews, 1988). On standard memory tests, depressed individuals tend to display poorer memory performance. For example, memory deficits in depression have been found on the Wechsler Memory Scale (Breslow, Kocsis, & Belkin, 1980; Hart, Kwentus, Taylor, & Harkins, 1987), word-learning tasks (Cole & Zarit, 1984; Coughlan & Hollows, 1984), and free recall memory tests (Williams et al., 1987). More specifically, Breslow et al. (1980) performed an experiment in which depressed patients were diagnosed according to the Research Diagnostic Criteria for major depressive disorder. The results demonstrated that depressed participants had significant and widespread deficits on the Wechsler Memory Scale. In another study, it was found that depressed patients were impaired on effort-demanding cognitive tasks but performed the same as controls on effortless measures (Roy-Byrne, Weingartner, Bierer, Thompson, & Post, 1986). Some studies, however, failed to find any memory deficits in depression (e.g., Davis & Unruh, 1980; Koh & Wolpert, 1983). According to Wright and Salmon (1990), this failure resulted from the use of inadequate screening criteria for depression or the testing of participants when they were not depressed. These authors further claimed that "all studies in which the diagnosis of depression was firmly established by recognized criteria have found evidence for learning and memory impairment in depression" (p. 218).

The extent of memory impairment in depression seems to be dependent on the type of test that is given. Research suggests that free recall tends to be more sensitive to the

effects of depression than recognition. This has been demonstrated even when the recall and recognition tests are matched according to general difficulty. Calev and Erwin (1985), for instance, used a matched-task procedure and found that depressives performed significantly better on recognition than on recall. Several other studies have demonstrated memory deficits in depression under conditions of free recall but not under conditions of recognition, cued recall, or reminded recall (e.g., Hart, Kwentus, Hamer, & Taylor, 1987; Williams et al., 1987). One explanation that has been offered to account for such findings involves the level of effort that is required to perform the task. According to Weingartner and Silberman (1982), cognitive deficits in depression occur in situations that require effort, particularly prolonged effort. Because free recall is typically thought to require more effort than cued recall and recognition, it is more likely to result in memory deficits among depressed individuals. However, some studies have found depressive deficits in recognition and cued recall. Watts, Morris, and MacLeod (1987), for instance, found a strong effect of depression on recognition memory; depressed participants produced significantly fewer hits than control participants. This finding was supported by Deijen, Orlebeke, and Rijsdijk (1993), who also found a basic deficit in recognition memory among depressed outpatients. Similarly, Golinkoff and Sweeney (1989) conducted an experiment in which depressed inpatients showed impaired performance relative to controls on both recognition and recall memory tests. Watts and Sharrock (1987) examined the effects of depression on free recall, cued recall, and recognition memory for a prose passage. It was discovered that depressed participants scored significantly lower than controls on both free and cued recall. However, for this

particular experiment, no significant difference between the two groups was found on the recognition test.

In summary, there is strong evidence to suggest that depressed individuals show substantial memory impairment. This impairment, however, does not appear to be global. In the aforementioned studies, depressed participants sometimes performed as well as controls on certain tasks. The most consistent pattern that seemed to emerge is that the degree of impairment depends on the effortfulness of the task, with more impairment being demonstrated on effortful measures (e.g., recall as opposed to recognition; Wright & Salmon, 1990).

State-dependent memory. Two main phenomena that must be considered in order to understand the effects of depression on memory are state-dependent memory and mood-congruent memory. State-dependent memory can be defined as a process whereby memory for all types of information is enhanced if one's mood at encoding matches one's mood at retrieval (Dalgleish & Watts, 1990). Although there is a considerable amount of research demonstrating state-dependency in drug-induced states (e.g., Eich, Weingartner, Stillman, & Gillin, 1975; Goodwin, Powell, Bremer, Hoine, & Stern, 1969), there are a limited number of relevant studies involving state-dependency in depression. Of the research that has been conducted to test for affective state-dependency (also referred to as mood-dependency or mood state-dependency), typical experiments make use of either one or two learning lists of words. With the use of one list, participants are required to learn the list while in one mood (i.e., happy or sad) and recall it either in the same mood

or a different one. The use of a single list is typically referred to as a "noninterference paradigm." When two lists are presented, participants must learn the first list in one mood and the second list in a different mood. Participants are subsequently put back into one of the two moods and asked to recall only the first list of words. According to the state-dependent memory hypothesis, recall should be the greatest when mood at recall matches mood at learning (Eysenck & Keane, 1990). However, numerous studies have failed to support this prediction, particularly with the use of a noninterference paradigm. For example, Bower, Monteiro, and Gilligan (1978) made use of a list-learning task that consisted of 16 positive or negative words. Participants were hypnotized to induce happy or sad moods. Memory was measured by recording the number of list words recalled. In their first two studies, no state-dependent effects were found for a single-word list. Only in the third study, when they made use of an interference paradigm, did state-dependent memory become evident. Specifically, participants learned two lists of words - one while sad, the other while happy. At the time of recall, one of these moods was reinstigated; participants showed significantly greater recall when learning and testing moods matched. Similar results were reported by Schare, Lishman, and Spear (1984). Using a noninterference paradigm, they were unable to demonstrate state-dependent effects on word-list recall. However, state-dependency occurred with the use of an interference paradigm (i.e., the use of two lists) and a free recall test of memory.

Overall, findings regarding mood state-dependent memory are mixed, and many authors have suggested that the phenomenon is not reliable (Dalgleish & Watts, 1990; Watkins, Mathews, Williamson, & Fuller, 1992; Wetzler, 1985). Eich (1995), however,

argued that the problem of unreliability does not lie with the phenomenon itself but with the methods used to detect it. According to this view, reliable and robust mood-dependent effects can be found under a restricted range of circumstances. For example, participants must take an active role in generating target events as well as experience authentic, strong, and stable mood alterations. Further research needs to be conducted to verify this opinion; presently, the majority of the literature on affective state-dependency demonstrates mixed findings.

Mood-congruent memory. In contrast to state-dependent memory, mood-congruent memory (MCM) in depression appears to be a fairly robust phenomenon (Watkins et al., 1992; Watkins, Vache, Verney, Muller, & Mathews, 1996). Unlike state-dependent memory, MCM does not require a concordance between mood at exposure and mood at recall; instead, it is the affective valence of the material that is important in MCM, which is subsequently irrelevant to state-dependent memory (Blaney, 1986). More specifically, Watkins et al. (1996) defined MCM as the tendency for depressed individuals to recall particular types of information that are congruent with their mood (i.e., unpleasant or negative memories). Of course, MCM does not occur exclusively among depressed individuals; it has been demonstrated that individuals in a positive or elated mood are more likely to recall pleasant memories as opposed to unpleasant ones (Teasdale & Taylor, 1981). A typical study on MCM was conducted by Teasdale and Russell (1983). They presented participants with a word list containing neutral, negative, and positive trait words. Subsequently, an elated or depressed mood state was induced, and

participants were asked to recall the previously learned list of words. The results provide strong support for MCM; participants recalled significantly more positive words in the good-mood condition than in the bad-mood condition. Conversely, more negative trait words were recalled in the depressed mood than in the elated mood. The recall of neutral words, however, was not affected by the induced mood states. Further support for mood-congruency has been offered by Denny and Hunt (1992). Using a free recall test of memory, they found that depressed individuals recalled significantly more negatively valenced words than positively valenced ones. For the nondepressed control participants, the opposite pattern was observed. Similar findings were reported by McDowall (1984). In one experiment, he demonstrated that clinically depressed inpatients recalled more unpleasant words than pleasant words under free recall instructions. In a second experiment, McDowall presented depressed participants with pleasant and unpleasant words either mixed together or in separate lists (i.e., a list of pleasant words or a list of unpleasant words). It was discovered that only the participants who received the mixed list of words were biased in their recall. Participants presented with only pleasant words recalled approximately the same number of words as those presented with only unpleasant words. According to McDowall, this suggested that depressed individuals have no trouble recalling positive words, provided they are not competing with negative words for attention.

The previously mentioned experiments are similar in that they all made use of a list-learning task. However, different procedures have elicited similar results. For example, using a story recall paradigm, Breslow, Kocsis, and Belkin (1981) found that

hospitalized, depressed patients recalled significantly fewer positive themes than the control group. In contrast, recall of negative and neutral themes by depressed individuals was slightly, but not significantly, lower than that of the control participants. Overall, the results support the mood-congruent phenomenon; depressed participants' memory for negative and neutral themes remained intact, but their recall of positive themes was deficient.

Other studies have tested for MCM by making a distinction between implicit and explicit memory testing. According to Watkins et al. (1992), explicit memory tests involve asking the participant to explicitly remember some previously learned material. Implicit memory measures, on the other hand, make no explicit reference to the earlier learned material, yet they still demonstrate evidence of learning. Typical experiments studying MCM make use of explicit memory tests (e.g., free recall, recognition, and cued recall). Watkins et al. (1996), however, conducted a study to investigate an implicit MCM bias in individuals who were clinically depressed. Participants were tested for their memory of a list of words (i.e., positive, negative, and neutral) by using a free association task (i.e., an implicit memory test). The results of the study provided evidence of an implicit MCM bias in depression. It was found that depressed individuals had a greater priming of negative words and less priming of positive words than controls. These findings conflict with those reported by Denny and Hunt (1992) and Watkins et al. (1992). Both of these studies demonstrated MCM using explicit tests (i.e., free recall and cued recall) but failed to find a mood-congruent effect using an implicit test of memory. According to Watkins et al. (1996), the most logical explanation for the difference in

findings involves the type of implicit memory test that was used. The two previously cited studies made use of a perceptually driven implicit memory test. In other words, the tasks involved cognitive activities that were guided by the perceptual features of the stimuli, as opposed to the meaning. In contrast, Watkins et al. (1996) employed a conceptually driven implicit task whereby meaningful processing of the stimuli was required. It can be argued, therefore, that MCM in depression exists for conceptually driven implicit memory tests but not for perceptually driven ones.

Overall, the phenomenon of MCM in depression has been extensively documented (for further examples, see Teasdale, 1983; Teasdale & Taylor, 1981; Williams & Scott, 1988). Numerous studies have demonstrated that depressed individuals show a greater tendency to recall unpleasant or negative memories rather than pleasant or positive ones. It has also been extensively documented that depressed individuals tend to show substantial memory impairment (see section on cognitive deficits). However, as discussed previously, this impairment is not global; it seems to depend on the effortfulness of the task. So the question remains, why is effortful processing affected by depression but not automatic processing? This question will be addressed in the next section.

Depression and Attention

Many theories have been proposed to explain why depression tends to affect effortful processing but not automatic processing. For example, Johnson and Magaro (1987) suggested that the deficits in effortful processing among depressed patients may simply be a consequence of a conservative response style. In other words, depressed patients may remember as well as normals but they tend to be less willing to report the actual content of their memories. Hasher and Zachs (1979), on the other hand, argued that the deficits result from reduced cognitive capacity. This theory implies that depressed individuals have fewer cognitive resources available for performing various effortful tasks (Hertel & Rude, 1991).

It is also possible that memory deficits in depression are caused by attentional disturbances (Lemelin et al., 1996). According to the narrowing of attentional focus hypothesis, the total cognitive capacity of depressed individuals remains intact, but their attention is restricted to a smaller subset of cognitive tasks (Hartlage, Alloy, Vazquez, & Dykman, 1993). This hypothesis seems to provide a logical explanation for some of the effects of depression on memory. As Hartlage et al. explained, effortful processes require attentional capacity, whereas automatic processes do not. It is the effortful tasks requiring a great deal of attention that seem to present the most difficulties for depressed individuals. Furthermore, the more attention and effort that are required, the greater the deficiencies in performance. Hartlage et al. also argued that depressed individuals use the cognitive resources they have to focus their attention on material that is congruent with their mood. On tasks that are neutral (e.g., traditional intellectual tasks), the performance

of depressed individuals tends to be related to the degree of effortfulness as well as to the severity of the depression. With the use of valenced material, however, depressives tend to perform better than controls for unpleasant rather than pleasant material. Thus, they tend to allocate their attentional resources to a small portion of the material to be learned, namely, that which is consistent with their mood.

An experiment conducted by Hertel and Rude (1991) confirmed the importance of attention in depression. They hypothesized that compared to nondepressed participants, depressed participants would be less likely to maintain attention on a specific task when they were not explicitly required to do so. This hypothesis was based on well-documented research demonstrating the tendency for depressed individuals to focus their attention on task-irrelevant thoughts or to display chronic levels of self-focused attention (cited in Hertel & Rude, 1991; see Ingram, 1990). The results of this study challenge the arguments that depressed individuals have uniform impairments in memory or an overall reduction in cognitive capacity. It was found that depressed participants displayed poorer performance than controls in an unfocused condition; however, when the focus of attention among depressed individuals was constrained, these memory deficits disappeared. In the focused-attention condition, depressed individuals recalled as many words as the controls. This study illustrates that the depressed participants did have the cognitive capacity and resources to perform an effortful memory task. What appeared to be missing was the initiative to allocate these resources to maximize memory performance (Hertel, 1994).

The primary purpose of the present study was to explore whether depression affects susceptibility to misleading postevent information. Specifically, an attempt was made to determine whether depressed participants were more susceptible to the influence of misinformation than controls and whether there was an interaction between depression and the valence of the misinformation (i.e., negative, positive, or neutral). For example, if there was an interaction, one might expect there to be a greater effect for negative information, as opposed to positive or neutral.

A secondary purpose of this experiment was to evaluate the extent to which divided-attention might lead to a similar pattern of differences in the misinformation effect (i.e., differences between misled and control items), as observed with the depressed participants, when compared to a nondepressed, focused-attention control group. Because of research indicating that depressed individuals have difficulty allocating their attention (Hertel & Rude, 1991), the divided-attention (nondepressed) group was tested as a control for the effects of reduced attention in depressed individuals. It was hypothesized that the divided-attention control group, when required to allocate their attention on two tasks simultaneously, would have reduced memory similar to that observed in depressed participants. Thus, a comparison of the memory performances between the two groups, relative to a focused-attention control group, would provide insight into the effects of depression on memory.

Because the present study was an exploratory study, there was little research on which to base specific hypotheses. Nevertheless, based on research suggesting that depression decreases memory performance and that susceptibility to misleading

information increases with weaker memory traces, it was predicted that the depressed participants would show greater misinformation effects than the focused-attention controls. Whether they would be more likely to accept positive, negative, or neutral misinformation remained uncertain. With respect to the divided-attention group, it was hypothesized that the divided-attention task would lower their memory performance and result in a greater susceptibility to misleading postevent information. In comparison to the depressed group, it was unknown whether the degree of susceptibility and the pattern of responses between the two groups would be similar.

Method

Participants

Three groups of participants were used in this study: one group of clinically depressed individuals and two groups of nondepressed controls. The depressed group had to satisfy the following criteria: (1) a score of 23 or greater on the Beck Depression Inventory - Second Edition (BDI-II; Beck, Steer, & Brown, 1996); and (2) a diagnosis of either major depression or dysthymia, as defined by the revised third edition of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-III-R; American Psychiatric Association, 1987). Individuals reporting current mania were excluded. Diagnosis was determined with a computerized interview, the Quick Diagnostic Interview Schedule III-R (Quick DIS-III-R; Marcus, Robins, & Bucholz, 1991). All interviews of depressed participants were conducted by a graduate student in clinical psychology.

The depressed individuals were recruited from outpatients attending Thunder Bay Regional Hospital, Lakehead Psychiatric Hospital, and members of support groups in the Thunder Bay area. A total of 25 depressed individuals volunteered to participate in the study; however, only 20 of them met all of the criteria described previously. Of the 20 participants, 15 were currently taking some type of medication. Participants' names were entered into a draw in which they could win one of three cash prizes (i.e., $100, $75, or $75).

The two control groups were recruited from students enrolled in undergraduate psychology classes; they received one bonus point for their participation. Control participants were screened to ensure that they had a BDI-II score of 10 or less. Control

participants were randomly assigned to either the focused- or divided-attention conditions, with the constraint that there were approximately 20 individuals in each of the two groups. A total of 65 individuals volunteered to participate; however, only 42 scored below the specified criterion on the BDI-II. An additional 6 participants (of the 65) obtained BDI-II scores between 10 and 15; a subsequent comparison of means revealed no observable differences between the two groups (i.e., the 42 participants who met the original criterion and the 6 participants who did not). Consequently, the 6 individuals were included in the study for a total of 48 participants (24 in each control group).

Materials

Narrative. The narrative, created by the author, was an approximately 1000-word story describing a day in the life of a woman. There were two versions of this narrative, that is, narrative 1 and narrative 2 (see Appendixes A and B). Each narrative consisted of 15 positive, 15 neutral, and 15 negative events. The positive and negative events were carefully selected to be interesting but not strongly arousing. Examples of positive events included finding money and winning a game of cards. Examples of neutral events were making a cup of coffee and reading the business section of the newspaper. Negative events included being caught in the rain and having a headache.

The two narratives differed only slightly. Of the 45 events, small details of 10 positive, 10 negative, and 10 neutral events were altered. For example, narrative 1 revealed that Kelly found $20; in narrative 2, she found $10. Other than the 30 altered pieces of information, all other parts of the story remained constant between the two

versions. The 45 events for each narrative were selected from a pool of 60 events (i.e., 40 pairs of related events and 20 independent events) that were independently rated as being positive, neutral, or negative. There were a total of 17 raters (i.e., 10 for narrative 1 events and 7 for narrative 2 events) recruited from a third-year psychology class. The raters had to read each event and rate it on a scale from 1 to 15 (see Appendixes C and D). Based on the results, 30 pairs of events were selected (i.e., one member of the pair for narrative 1, the other member for narrative 2), according to those that were rated as being the most negative, neutral, and positive (i.e., there was a nonoverlapping distribution of means). Using the same criteria, an additional 15 events were selected from the pool of 20 independent events to be used in both narratives. The overall mean ratings were 12.6 for positive events (range was 11 to 15), 3.6 for negative events (range was 1 to 5), and 8.5 for neutral events (range was 6 to 10). The events were used to construct the narrative based on two main criteria: (1) no more than two positive or two negative events could occur in succession; and (2) the story had to follow a logical sequence of events. A summary of all of the events and a description of those used in each narrative are presented in Appendix E.

The two narratives were recorded on an audiocassette in a female voice. Tape-recorded narratives were used, rather than printed text, to avoid problems associated with individual differences in reading speed. The total time required to play each narrative was approximately 7 minutes.

Misleading postevent information. The postevent information was a verbal description of the aforementioned narratives. This description contained a summary of 30

events from the original narrative: 15 pieces of consistent information (i.e., 5 positive, 5 negative, and 5 neutral) and 15 pieces of misleading information (i.e., 5 positive, 5 negative, and 5 neutral). For example, if the original story indicated that Kelly dropped a bottle of ketchup, the misleading postevent information referred to a jar of jam.

There were four audiotaped versions of the postevent information: version 1a, version 1b, version 2a, and version 2b (see Appendixes F, G, H, and I). Versions 1a and 1b corresponded to narrative 1, whereas versions 2a and 2b were based on narrative 2. The purpose of developing four postevent narratives was to ensure that the assignment of events to the control versus misled condition was counterbalanced across participants. For all four versions, the 15 pieces of consistent information (i.e., information that was consistent with the original narratives) were identical. This information was derived from the 15 events that were repeated in both of the original narratives. The remaining 15 pieces of misleading information differed for each version of the postevent narratives. For example, version 1a was created by altering 15 events from narrative 1; version 1b was constructed by changing a different set of 15 events from narrative 1. Versions 2a and 2b were similarly created by using different sets of 15 events from narrative 2. Appendix E presents a detailed summary of the events that were selected for each of the four versions.

Divided-attention task. The divided-attention task employed a tape-recording of a series of 220 numbers spoken at a rate of one every 3 seconds. The numbers were recorded in a male voice to make them perceptually distinct from the narratives recorded in a female voice. The numbers were selected to ensure that at random intervals, a series

of 3 odd numbers occurred in succession. Participants were required to indicate when they heard this target sequence. A similar procedure was employed by Craik (1982).

Memory test. The memory test was a cued recall test consisting of 45 questions (see Appendix J). Each question referred to some detail of the original 45 events. The same memory test was used for all participants. However, four different scoring keys were required, depending on the version of the postevent information that the individual was given (see Appendixes K to N).

Beck Depression Inventory - Second Edition. The 21-item BDI-II (Beck, Steer, & Brown, 1996) was used to measure the severity of self-reported depression.

Quick Diagnostic Interview Schedule III-R. The Quick DIS-III-R is a computerized interview that makes lifetime diagnoses based on the criteria for the DSM-III-R (Marcus et al., 1991). This interview was used for the present study to confirm or rule out a diagnosis of depression among the participants; it was also used to identify participants reporting mania as well as depression. In order to discern if there was a difference between these two groups of participants, the initial analysis considered the group with mania and depression separately from the group with depression only. Because no significant difference was found, the two groups were collapsed for further analysis.

Design and Procedure

The experiment was a 3 x 3 x 3 factorial design (3 between and 3 x 3 within). The between subject variable was mental state (i.e., focused-attention, divided-attention, or depressed) and the within subject variables were valence (i.e., positive, neutral, and

negative) and type of manipulation (i.e., nonrepeated control events, repeated consistent events, and misled events).

Participants who volunteered to participate in this experiment were asked to sign a consent form indicating that they were aware that they were free to withdraw from the study at any time (see Appendix O). They also completed a general information questionnaire (see Appendix P). The basic procedure was the same for all three groups of participants (i.e., focused-attention, divided-attention, and depressed). Participants were told that the purpose of the experiment was to examine the effects of mood and attention on memory. It was explained that they would be given a story and later asked to remember events from the story. After listening to the story once, the participants engaged in a 10-minute filler activity. Participants were then told that they would be given an audiotaped summary of the story. Participants were warned to consider the information in the summary as potentially inaccurate because it was written by an individual some time after hearing the initial story. For this reason, it was emphasized that participants listen to the postevent information critically. A similar forewarning procedure was used by Greene et al. (1982) and Gilbert (1996) in order to reduce demand characteristics.

Participants were then given the misleading postevent information, which was followed by another 10-minute filler activity. Next, the cued recall memory test and the BDI-II were administered. For participants in the depressed group, the Quick DIS-III-R was also conducted. The measures of depression were always administered after the memory test to ensure that the items did not sensitize participants to negative story

content. Following the completion of testing, all participants were given a debriefing form that provided the telephone numbers of various places to contact in the event of distress (see Appendix Q).

All three groups (i.e., focused-attention, divided-attention, and depressed) received this basic procedure, with the exception of one step that was added for the divided-attention group. Participants in this group were presented with the divided-attention task (described previously) while they were listening to the narrative and the postevent information. The participants were asked to monitor the numbers being presented in a male voice from an audiocassette recorder (different from the audiocassette recorder playing the narrative in a female voice). Their task was to indicate every time they heard three odd numbers occur in succession while simultaneously trying to remember the events taking place in the story. All other tasks and procedures were identical to those in the focused-attention group.

The participants' responses were scored according to the scoring keys presented in Appendixes K through N. Participants received a score between 1 and 6 for each of the 45 questions on the cued recall memory test. The responses were categorized according to the following criteria: (1) 1 for responses that were a paraphrase or rewording of the original narrative; (2) 2 for responses that were identical in wording to the original story; (3) 3 for responses that were a paraphrase or rewording of the postevent information; (4) 4 for responses that were identical in wording to the postevent information; (5) 5 for chance responses that were consistent with the postevent information presented in other versions; and (6) 6 for any other response (e.g., no response or wrong response). The data

were subsequently analyzed using the Statistical Package for the Social Sciences (i.e., SPSS).

Results

The results will be described in two main sections: (1) participant characteristics; and (2) cued recall. Cued recall will be reported in three sections: (1) correct responses for control and misled events; (2) misled responses; and (3) correct responses for consistent events. All interactions and main effects are reported at $p < .05$, unless stated otherwise.

Participant Characteristics

Table 1 presents a summary of participant characteristics. The three groups of participants (i.e., focused-attention, divided-attention, and depressed) were not significantly different in terms of sex ratio. However, the depressed group differed from the focused- and divided-attention control groups in terms of age, years of education, and BDI-II score. The mean age and range for the depressed group (M = 35.90, range = 19-62) was greater than that of the focused- (M = 20.71, range = 18-40) and divided-attention (M = 19.92, range = 19-25) control groups. Only 10% of the depressed participants had ages less than or equal to 25, compared to 96% of the focused-attention group and 100% of the divided-attention group. Thus, the depressed group was older than the two control groups. On average, the depressed group had fewer years of education but a greater range (M = 12.53, range = 8-17) than the control groups (M = 13.92, range = 13-16; M = 14.29, range = 13-17). Because the difference in range led to nonhomogeneity of variance, a parametric test was not conducted. Observation of the data revealed that 50% of the depressed group had less than 13 years of education. Therefore, half of the depressed sample had fewer years of education than the control

groups who, as university students, had at least 13 years of education. More importantly, the depressed participants scored significantly higher on the BDI-II (M = 32.50, range = 23-48) than the control participants (M = 6.08, range = 0-15; M = 6.58, range = 0-15). Because the BDI-II scores for the depressed group were nonoverlapping with those of the control groups, no further statistical tests were required.

Cued Recall

The effects of misleading postevent information on memory (i.e., cued recall) were measured in four main ways: (1) by recording the number of exact correct responses on the cued recall memory test (i.e., those that were identical in wording to the original narrative); (2) recording the number of paraphrase correct responses (i.e., those that were a rewording of the original narrative events that maintained the gist); (3) recording the number of exact misled responses (i.e., those that were identical in wording to the misleading postevent information); and (4) recording the number of paraphrase misled responses (i.e., those that were a rewording of the misleading postevent information that maintained the gist). Correct responses refer to responses that were consistent with the original narrative information. Misled responses, on the other hand, refer to responses that were consistent with the misleading postevent information.

Analyses were conducted first using the scores generated from the exact wording and those generated from the combined exact and paraphrase wording. Because the two analyses produced the same pattern of results for all variables, only the combined scores are reported.

Correct responses for control and misled events. Table 2 presents the means and standard errors for the number of correct responses as a function of mental state (i.e., focused-attention, divided-attention, or depressed), valence (i.e., positive, neutral, and negative), and type of manipulation (i.e., control and misled events).

A 3 (state) x 3 (valence) x 2 (manipulation) mixed analysis of variance (ANOVA) was conducted to test the hypotheses: (1) that the divided-attention group would have lower memory performance than the focused-attention group; and (2) that the depressed group would show similar memory performance to the divided-attention group, relative to the focused-attention group. The results revealed significant main effects of state and valence, $F(2,65) = 47.41$, $MSe = 3.45$, $p < .001$, and $F(2,130) = 10.90$, $MSe = 0.91$, $p < .001$, respectively, and a significant state by valence interaction, $F(4,130) = 6.30$, $MSe = 0.91$, $p < .001$. A Fisher's LSD test was conducted to compare means using a common error term, the MSe for state. The between subjects critical difference was computed to be 0.94 (one-tailed, $p < .05$) and 1.12 (two-tailed, $p < .05$). Using the value derived from the one-tailed test, it was found that both the divided-attention ($M = 1.83$) and depressed ($M = 2.86$) groups produced fewer correct responses than the focused-attention group ($M = 3.97$). Using the value derived from the two-tailed test, it was found that the depressed participants produced significantly more correct responses than the divided-attention group only for material with negative valence ($M = 3.33$ and 1.54 for depressed and divided-attention, respectively). The present advantage of the depressed over the divided-attention group for material with negative valence was not significant for material with

positive (M = 2.83 and 2.17 for depressed and divided-attention, respectively) or neutral valence (M = 2.43 and 1.80, respectively).

Using the MSe for the interaction, the within subjects critical difference was computed to be 0.48 (one-tailed, $p < .05$) and 0.57 (two-tailed, $p < .05$). Using the critical difference derived from the two-tailed test, it was discovered that the effect of valence depended on the specific state. For the focused-attention state, positive (M = 4.11) and negative events (M = 4.30) were more accurate than neutral events (M = 3.5). For the divided-attention state, positive events (M = 2.17) were significantly more accurate than negative ones (M = 1.54), and neutral events (M = 1.80) were intermediate. In contrast, for the depressed state, using a one-tailed test to assess mood-congruency effects, negative events (M = 3.33) were significantly more accurate than neutral (M = 2.43) and positive events (M = 2.83). The latter difference was confirmed by a t-test comparing positive and negative events for depressed participants [$t(20) = -2.56$, $p < .01$, one-tailed]. The overall state by valence interaction is presented in Figure 1.

No significant main effect was found for type of manipulation ($F < 1$). Thus, participants were not more accurate for control events compared to misled events. There were also no significant interactions between state and type of manipulation ($F < 1$), valence and type of manipulation ($F < 1$), or state and valence and type of manipulation, $F(4,130) = 1.30$, MSe = 1.03.

Misled responses. Table 3 presents the means and standard errors for the number of misled responses as a function of mental state (i.e., focused-attention, divided-attention, or depressed) and valence (i.e., positive, neutral, and negative). Simple inspection of the

means and standard errors confirms that the mean number of misled responses was significantly greater than zero in all nine cells [$t(23) = 1.72$, $p < .05$, one-tailed].

A 3 (state) x 3 (valence) mixed ANOVA was conducted to test two hypotheses: (1) that the divided-attention group would be more susceptible to the misleading postevent information than the focused-attention group; and (2) that the depressed participants would show greater misinformation effects than the focused-attention controls. The analysis revealed a significant main effect of state, $F(2,65) = 9.07$, $MSe = 1.82$, $p < .001$, a nonsignificant main effect of valence ($F < 1$), and a significant state by valence interaction, $F(4,130) = 2.86$, $MSe = 0.86$, $p < .03$. A Fisher's LSD test was conducted using the MSe for state and the between subjects critical difference was computed to be 0.68 (one-tailed, $p < .05$) and 0.82 (two-tailed, $p < .05$). Using the value derived from the one-tailed test, it was found that the divided-attention group made a significantly greater number of misled responses than the focused-attention group for neutral ($M = 1.38$ and 0.58 for divided-attention and focused-attention, respectively) and negative events ($M = 1.96$ and 0.42, respectively), but not for positive events ($M = 1.25$ and 0.71, respectively). Participants in the depressed group were not significantly different from the focused-attention controls for neutral ($M = 1.25$ and 0.58 for depressed and focused-attention, respectively), positive ($M = 1.10$ and 0.71, respectively), or negative events ($M = 0.80$ and 0.42, respectively); however, there was a clear trend in all three conditions for depressed participants to produce more misled responses than the focused-attention group. The two-tailed comparison between the depressed and divided-attention groups revealed that the depressed participants made significantly fewer misled responses for

negative events (M = 0.80 and 1.96 for depressed and divided-attention, respectively), but there were no significant differences for positive (M = 1.10 and 1.25, respectively) or neutral events (M = 1.25 and 1.38, respectively).

Using the MSe for the interaction, the within subjects critical difference was computed to be 0.56 (two-tailed, $p < .05$). It was found that participants in the divided-attention group made a significantly greater number of misled responses for negative events (M = 1.96) compared to positive (M = 1.25) and neutral events (M = 1.38). There were no significant differences among the focused-attention controls (M = 0.71, 0.58, and 0.42 for positive, neutral, and negative events, respectively) or the depressed group (M = 1.10, 1.25, and 0.80, respectively) for the levels of valence. Figure 2 presents the state by valence interaction for misled responses.

Because of the difficulty in interpreting a 3 x 3 interaction, three additional ANOVAs were conducted to compare the following two groups: (1) the focused-attention group with the depressed group; (2) the focused-attention group with the divided-attention group; and (3) the depressed group with the divided-attention group. In the first comparison, focused-attention versus depressed, there was a main effect of state, $F(1,42) = 4.69$, MSe = 1.65, $p < .04$, where focused-attention (M = 0.57) resulted in fewer misled responses than depressed (M = 1.05). The main effect of valence was not significant, $F(1,42) = 1.80$, MSe = 1.33, nor was the interaction between state and valence ($F < 1$). In the second comparison, focused- versus divided-attention, there was a main effect of state, $F(1,46) = 23.42$, MSe = 1.41, $p < .001$, a nonsignificant main effect of valence ($F < 1$), and a significant state by valence interaction, $F(1,46) = 3.53$, MSe = 0.89, $p < .04$.

Using a between subjects critical difference of 0.58 (one-tailed, $p < .05$), it was found that focused-attention resulted in fewer misled responses than divided-attention with negative ($M = 0.42$ and 1.96 for focused-attention and divided-attention, respectively) and neutral events ($M = 0.58$ and 1.38, respectively), but a similar difference for positive events ($M = 0.71$ and 1.25, respectively) was not significant. It is likely that the failure to find a significant difference between the groups for positive events is best interpreted in terms of low power (Type II error) rather than accept the null hypothesis that there is no difference between the means. In the third comparison, depressed versus divided-attention, the main effects of state, $F(1,42) = 3.05$, $MSe = 2.45$, and valence ($F < 1$) were not significant, but the interaction between state and valence was, $F(1,84) = 4.13$, $MSe = 0.92$, $p < .02$. Using a between subjects critical difference of 0.96 (two-tailed, $p < .05$), it was found that depressed participants made fewer misled responses than the divided-attention controls for negative events ($M = 0.80$ and 1.96 for depressed and divided-attention, respectively), but there were no significant differences between the two groups for positive ($M = 1.10$ and 1.25, respectively) or neutral events ($M = 1.25$ and 1.38, respectively). In summary, depressed and divided-attention states generally resulted in more misled responses than the focused-attention state. Although depressed and divided-attention states led to similar increases in misled responses for positive and neutral events, the depressed state resulted in fewer misled responses for negative events than did the divided-attention state.

Correct responses for consistent events. Table 4 presents the means and standard errors for the number of correct responses for consistent events as a function of mental

state (i.e., focused-attention, divided-attention, or depressed) and valence (i.e., positive, neutral, and negative).

A 3 (state) x 3 (valence) mixed ANOVA was conducted to again test the hypotheses that: (1) the divided-attention group would have lower memory performance than the focused-attention group; and (2) the depressed group would show similar memory performance to the divided-attention group, relative to the focused-attention controls. The analysis revealed a significant main effect of state, $F(2,65) = 25.11$, $MSe = 2.58$, $p < .001$. A Fisher's LSD was conducted, and the between subjects critical difference was computed to be 0.81 (one-tailed, $p < .05$) and 0.97 (two-tailed, $p < .05$). Using the value derived from the one-tailed test, it was found that both divided-attention ($M = 2.64$) and depressed ($M = 3.17$) states produced significantly fewer correct responses for consistent events compared to those in the focused-attention state ($M = 4.49$). Using the value derived from the two-tailed test, there was no significant difference between the depressed ($M = 3.17$) and divided-attention ($M = 2.64$) groups; thus, the two groups displayed similar memory performance. There was a significant main effect of valence, $F(2,130) = 27.93$, $MSe = 0.72$, $p < .001$. A Fisher's LSD was calculated to have a within subjects critical difference of 0.51 (two-tailed, $p < .05$). Using this value, it was found that negative ($M = 3.83$) and positive ($M = 3.66$) events led to better memory performance than neutral events ($M = 2.81$). No significant state by valence interaction was found, $F(4,130) = 1.22$, $MSe = 0.72$.

Discussion

The primary purpose of the present study was to explore whether depression increases susceptibility to misleading postevent information. Before addressing this issue, it is important to first discuss the overall effects that the misinformation had on memory. According to Goldstein (1992), memory can become contaminated by what an individual hears, reads, or sees following a witnessed event. Participants in the present study were exposed to misleading information after listening to a series of narrative events. Did this postevent information contaminate their memories? To an extent, yes. However, the misinformation effect was not demonstrated across all measures.

To determine the effects of misleading postevent information on memory, two aspects of the misinformation effect were considered: (1) the impairment of memory for the original narrative events (i.e., retroactive interference); and (2) the false recall of the misleading postevent information (i.e., misinformation acceptance). The first aspect of the misinformation effect was measured by comparing the overall accuracy (i.e., the number of correct responses) for events which were not misled (i.e., control events) to events which were misled (i.e., misled events). The results of this comparison revealed that participants were not more accurate for control events than misled events. This finding argues against the impairment of memory as a result of misleading postevent information.

A failure to find retroactive interference was also reported by McCloskey and Zaragoza (1985). They tested the claim that misleading postevent information impairs memory for an original event by using a modified recognition test. Typical experiments

on the misinformation effect utilize a forced-choice recognition test in which participants are required to choose between the original item (e.g., hammer) and the misled postevent item (e.g., screwdriver). Using this standard test, it has been consistently found that participants are significantly more accurate for control items compared to misled items (e.g., Loftus et al., 1978; Loftus et al., 1989). Such findings have frequently been interpreted as providing support for the memory impairment hypothesis (e.g., Loftus & Loftus, 1980). However, McCloskey and Zaragoza (1985) argued that the nature of the standard retrieval test is not suitable for measuring the effects of misinformation on memory. They believed that such tests cause participants in the misled condition to perform more poorly than controls, even if the misinformation had no effect on the individual's ability to access their original memories. Thus, they devised a test in which participants had to choose between the original item (e.g., hammer) and a new item (e.g., wrench); the misled postevent item (e.g., screwdriver) was not included as an option on the test. The results of their study indicated that with the modified test, there were no significant differences between performance in the misled condition and that in the control condition. The authors concluded that memory for an original event is not impaired by misleading postevent information.

Loftus et al. (1989) also made use of the modified test in which the misinformation item could not be selected. The results of this experiment are consistent with the findings of the present study and those of McCloskey and Zaragoza (1985); participants were not significantly more accurate on control items compared to misled items. However, an additional finding of the experiment was that participants who were misled responded

more slowly than control participants. Thus, according to Loftus et al., the misleading information did result in some form of interference that was not detected by simply looking at the modified test of accuracy.

Belli (1989) also found evidence of some form of retroactive interference. Belli made a distinction between "misinformation acceptance" and "misinformation interference." Misinformation acceptance referred to the phenomenon in which individuals come to accept and believe that the misleading information appeared in the event, even in the absence of memory impairment. Misinformation interference, on the other hand, referred to phenomenon in which misinformation influences a prior memory. Belli conducted two experiments using a retrieval test that was sensitive to both misinformation acceptance and interference (i.e., a yes/no retrieval test). The results of both experiments provided support for the existence of misinformation acceptance; one of the experiments also demonstrated that misinformation interferes with an individual's memory of a witnessed event.

Why did the present study provide no support for misinformation interference? It is possible that the cued recall test of accuracy was not sensitive enough to detect some form of interference. Although, as McCloskey and Zaragoza (1985) state, retroactive interference has been consistently demonstrated with recall tests (as opposed to recognition), the cues provided in the present experiment were quite specific and may have diminished the likelihood of obtaining an interference effect. Another possibility is that the forewarning led to an increased scrutiny of the misled events, thereby increasing resistance to the misinformation. In a study conducted by Greene et al. (1982),

participants were warned that they would be exposed to potentially inaccurate information. It was found that the warning, when given immediately prior to the presentation of the misleading information, resulted in greater scrutiny and resistance to that misinformation. Participants took longer to read the misinformation and were more accurate on target items. Although participants in the present study had no control over reading speed, the forewarning may have caused them to listen more carefully and critically to the postevent narrative. In doing so, participants may have been more likely to notice discrepancies between the original narrative events and the misleading postevent information.

Regardless of the underlying cause, however, a failure to demonstrate misinformation interference does not necessarily provide evidence against a misinformation effect. As Belli (1989) demonstrated, it is possible for individuals to be influenced by misleading information even in the absence of memory impairment (i.e., misinformation acceptance). According to Loftus and Hoffman (1989), misinformation acceptance plays a major role in most misinformation experiments. The phenomenon, however, has not received the recognition it deserves. Loftus and Hoffman further argued that researchers in the area of misinformation and memory should be more concerned with misinformation acceptance; although the phenomenon does not provide any information about the impairment of memories, it does provide valuable information about the creation of false memories. Thus, for the purposes of the present experiment, it is perhaps more important to consider whether the misleading postevent information led to misinformation acceptance rather than interference.

The present study tested for misinformation acceptance, the second aspect of the misinformation effect, by recording the number of misled responses (i.e., responses that were consistent with the misleading postevent information) made on the cued recall memory test. On average, participants included over 20% of the misled postevent information in their responses. Thus, despite the fact that participants displayed no memory impairment, the significant production of misled responses suggests that they were influenced by the misleading information. This finding, in itself, is particularly important because it demonstrates the robustness of the misinformation effect. The present study was different from other studies of the misinformation effect in several ways. Typical studies present participants with a sequence of slides; this study involved the use of an audiotaped narrative. A cued recall test was used to measure memory for the original events, as opposed to a recognition test. Also, most studies include only 1 to 4 misleading suggestions that may be considered neutral in content; the present study used 5 positive, 5 negative, and 5 neutral misled events. Despite these and other differences, however, the results support the findings of numerous other studies demonstrating misinformation acceptance using the standard procedure (e.g., Loftus et al., 1978).

Exposure to misinformation does not have a uniform effect on all participants (Bekerian & Bowers, 1983; Tousignant et al., 1986; Weinberg, Wadsworth, & Baron, 1983). Certain individuals seem to be more vulnerable to the effects of misleading information than others, yet very little is known about the specific characteristics that can increase one's susceptibility. Depression and divided-attention, for example, are two

factors that may interact with the misinformation effect. The effects of these two mental states will now be discussed in terms of accuracy of memory and misinformation acceptance.

Accuracy of Memory

Depressed participants. As expected, participants in the depressed group had lower memory performance than those in the focused-attention control group. This was true across all levels of valence (i.e., positive, neutral, and negative) and all types of manipulation (i.e., control, misled, and consistent events). This finding supports previous research indicating that depression is associated with deficits in memory. Breslow et al. (1980), for example, found that depressed patients exhibited widespread deficits on the Wechsler Memory Scale. Depressed participants have also demonstrated memory deficits on list-learning tasks (e.g., Coughlan and Hollows, 1984) and under conditions of free recall (Watts & Sharrock, 1987; Williams et al., 1987).

A study conducted by Breslow et al. (1981) made use of a story paradigm, as in the present study, to measure the effects of depression on memory. A 350-word story was developed that consisted of 10 positive, 10 negative, and 6 neutral themes. Participants were required to read the story aloud twice. Following a 10-minute filler activity, participants were asked to complete a free recall test of memory. The results demonstrated that depressed participants were substantially and significantly lower than the control group in their recall of positive themes. In contrast, recall of neutral and negative material was roughly comparable to that of control participants.

These findings conflict with those of the present study in which depressed participants performed significantly lower than the controls across all three types of themes. What could account for this substantial difference in findings? Initially, one might be tempted to suggest that differences between depressed participants and controls decline with repetition of the to-be-learned material. This would be consistent with the fact that Breslow et al. (1981) required participants to read the narrative twice; in contrast, participants in the present study listened to an audiotaped version of the narrative only once. The problem with such reasoning is that participants in the current study were presented with 15 pieces of information in the postevent narrative that were consistent with the original story, and performance on these items was still significantly lower than that for controls. Thus, repetition does not seem to be a factor in reducing the differences in memory performance between depressed and control participants. It could be possible, however, that depressed participants in the present study had difficulty attending to the audiotaped narrative. It is well known that depressed individuals tend to focus their attention on task-irrelevant thoughts (cited in Hertel & Rude, 1991; see Ingram, 1990) or stimulus-independent thoughts (Teasdale et al., 1995). By having depressed participants read the story aloud, Breslow et al. may have increased the likelihood that they were attending to the material to be learned. Consequently, this may have led to an increase in memory performance. This rationale is consistent with the reported finding that memory deficits disappear when the focus of attention among depressed individuals is constrained (Hertel & Rude, 1991). Why then, did the depressed participants in the Breslow et al. study show deficits for recall of positive material? It is

quite possible that the retrieval test (i.e., free recall) was not necessarily demonstrating a memory deficit for positive themes, but simply a bias for reporting negative and neutral themes (i.e., MCM). The cued recall test used in the present study did not allow for the selective reporting of themes and, thus, indicated memory deficits in depression for all types of valence. Perhaps the opposite result (i.e., no memory deficits for all types of valence) would have occurred if a cued recall test had been used in the Breslow et al. study. Further research needs to be conducted to test this hypothesis.

It has been demonstrated that the degree of memory impairment in depression is dependent on the complexity or effortfulness of the task (Wright & Salmon, 1990). For example, several studies have found evidence of memory deficits in depression under conditions of free recall but not under conditions of cued recall or recognition (e.g., Hart et al., 1987; Williams et al., 1987). Free recall is typically thought to be more sensitive to the effects of depression than either cued recall or recognition because it requires more effort. However, the results of the present study found evidence of memory impairment on a cued recall test. Similar findings were reported by Watts and Sharrock (1987). They found that depressed participants scored significantly lower than controls on a cued recall retrieval test. In addition, they discovered that performance on cued recall was no better than that on free recall. Taken together with the present results, it appears that depression can certainly lead to impaired performance on a cued recall memory test.

Divided-attention participants. It was found that participants in the divided-attention group were significantly less accurate than those in the focused-attention group

across all levels of valence (i.e., positive, neutral, and negative) and all types of manipulation (i.e., control, misled, and consistent events). This finding was in accordance with the hypothesis and is certainly not surprising. Individuals can attend to only a finite amount of information at any given time (Hartlage et al., 1993). Thus, it is not surprising that when individuals are required to focus their attention on two tasks simultaneously, their memory performance will be impaired. Early studies in this area demonstrated that when individuals were tested for deliberate recognition or recall of events to which they were exposed while preoccupied with other affairs, most individuals appeared extremely amnesic (cited in Eich, 1984). According to Eich, it can be confidently concluded that when events are denied conscious attention, they are ordinarily not accessible to conscious retrieval.

Depression versus divided-attention. Examination of accuracy for control and misled events indicated that depressed participants were significantly more accurate than divided-attention participants for negative events, but there were no significant differences between the two groups for positive or neutral events. Examination of accuracy for consistent events revealed no significant differences between the depressed group and the divided-attention controls. These findings are in accordance with the hypothesis that, because depressed participants have difficulty focusing their attention on external task demands and are thus in a state of divided-attention, the depressed and divided-attention groups would show similar memory performance. As might be expected, the extent of memory impairment relative to the focused-attention participants

was not identical between the depressed and divided-attention groups. However, the pattern of memory impairment demonstrated by depressed participants can be predicted by two simple assumptions: (1) depression invokes endogenously a state of divided-attention; and (2) attention to external cues is more easily focused on negative events compared to positive or neutral events.

It has been proposed that memory deficits in depression may be caused by attentional disturbances (e.g., Lemelin et al., 1996) and that the attention of depressed individuals is restricted to a limited subset of cognitive tasks, although their total cognitive capacity remains intact (Hartlage et al., 1993). This is supported by studies demonstrating that memory deficits in depression disappear when participants are encouraged to focus their attention on the memory task at hand (e.g., Hertel & Rude, 1991). The results of the present study also support the importance of examining attention in mood-memory research. The depressed and divided-attention groups displayed similar memory performance, relative to the focused-attention controls. Thus, it could be argued that the depressed participants had difficulty allocating their attention and that this led to decreased memory performance, but not to the extent of those in the divided-attention group. It would be of interest to conduct further research in which the divided-attention task was altered. It is possible that the divided-attention task used in this study was too demanding and not representative of the "divided state of attention" experienced by individuals with depression.

Interaction between mental state and valence of material. The results for the control and misled events indicated that mental state interacted with the valence of material. For individuals in the depressed state, it was found that negative events were significantly more accurate than neutral and positive events. This finding supports the phenomenon of MCM that has been extensively documented. Breslow et al. (1981), for example, found that depressed patients recalled significantly fewer positive story themes than negative themes. Similarly, Denny and Hunt (1992) demonstrated that depressed individuals had significantly greater recall of negatively valenced words compared to positively valenced ones. The opposite pattern was observed for the nondepressed control participants. Numerous other studies have made use of list-learning tasks and have demonstrated a tendency of depressed individuals to have better recall for words that are congruent with their mood (i.e., negative or unpleasant words), as opposed to those that are not (i.e., positive or pleasant words; e.g., McDowall, 1984; Teasdale & Russell, 1983). All of the aforementioned studies made use of a free recall test of participants' memory for valenced material. Typically, this type of test is more likely to demonstrate biases in recall because participants have to create their own cues (i.e., internal cues) for memory retrieval. For depressed individuals, such cues are likely to be consistent with their negative world view or self-schema, thus biasing them toward the recall of negative information. Rather than using a test of free recall, the present study made use of cued recall test of memory. Interestingly, despite the fact that participants were provided with detailed retrieval cues (i.e., external cues), depressed individuals still demonstrated MCM.

The two control groups demonstrated a different pattern of results than the depressed group. Unlike the depressed participants, the divided-attention participants recalled significantly more positive events than negative ones. This finding is consistent with numerous other studies demonstrating the biased recall of positive material among nondepressed control participants (e.g., Breslow et al., 1981; McDowell, 1984). In contrast to such findings, however, the focused-attention group recalled significantly more positive and negative events than neutral ones. Why was the biased recall of positive material not replicated among the focused-attention controls? It is possible the nature of the retrieval test may have decreased the likelihood of demonstrating biased recall among this group. Unlike the depressed and divided-attention groups, the focused-attention group was better able to attend to the narratives. Thus, when given external memory cues, they were able to recall a high number of both positive and negative events. The divided-attention group, having to concentrate on two tasks simultaneously, seemed to focus more of their attention on positive material. In contrast, the depressed group, likely being preoccupied with negative thoughts, seemed to focus more of their attention on negative material. In summary, it appears that when one's attention is limited to a portion of the target material, the individual will show preferential recall of material that is consistent with one's mood.

Misinformation Acceptance

Depressed participants. The findings provide support for the hypothesis that the depressed participants would show greater misinformation effects than the focused-

attention controls. The depressed group demonstrated greater misinformation acceptance across all levels of valence. Although there are no known studies that have examined the relationship between depression and misinformation acceptance, this finding is consistent with the notion that susceptibility to misinformation is greater when the original memory trace is weak. To test this notion, typical studies have manipulated the passage of time. Loftus et al. (1978), for example, presented participants with misinformation either immediately after viewing an event or just prior to testing. The results demonstrated typical memory decay: as time progressed after the witnessed event, memory performance declined. More interesting was the finding that misleading information had a greater impact when it was given just prior to the recognition test rather than immediately after the original event. Furthermore, when the misinformation was delayed, it had a greater impact as the delay increased. "Presumably, the weaker the original trace, the easier it is to alter" (Loftus et al., 1978, p. 25). Such findings were supported by Belli (1989) who found that when participants had no memory of items presented in the original event, they tended to accept the misleading postevent items as being true. The present study demonstrated that depressed individuals had poorer memory for the original events than the focused-attention participants; subsequently, these individuals were more likely to accept the misleading postevent information.

Divided-attention participants. As hypothesized, it was found that the divided-attention group was generally more susceptible to the misleading postevent information than the focused-attention group. The divided-attention group demonstrated greater

misinformation acceptance than the focused-attention group for negative and neutral events. Again, this finding is consistent with research demonstrating that individuals tend to be more susceptible to misleading information when the original memory trace is weak (i.e., Belli, 1989; Gilbert, 1996; Loftus et al., 1978). Unlike the aforementioned studies, however, the present study manipulated mental state (i.e., focused-attention and divided-attention) rather than the passage of time. Interestingly, combined with the results of previous studies, the results suggest that both the passage of time and the dividing of attention decrease memory performance and thereby increase susceptibility to misinformation.

Depression versus divided-attention. The results demonstrated that the participants in the depressed group were significantly less susceptible to negative misinformation than those in the divided-attention group; there were no significant differences between the two groups for positive or neutral events. Thus, it appears that the divided-attention group provides a good predictor of the memory performance of depressed participants for positive and neutral misinformation but not for negative material. This finding is consistent with the fact that depressed participants were significantly more accurate for negative events than those in the divided-attention group. With a better overall memory for negative events, depressed participants were better able to resist the negative misinformation. Furthermore, this finding would be expected if the divided state of attention experienced by depressed participants was due to a preoccupation with negative thoughts. Unlike the divided-attention group, who had to focus their attention on two

unrelated tasks, the depressed participants' negative thoughts seemed to make it less difficult for them to discern between negative memories from different sources. It should be emphasized, however, that despite the fact that the depressed participants demonstrated less misinformation acceptance for negative events than the divided-attention group, their susceptibility to misinformation was greater than the focused-attention group across all levels of valence.

Limitations and Future Directions

There are certain limitations of the present study that should be mentioned. This study did not control for age or years of education between the control groups and the depressed group. The differences in memory performance between the groups, therefore, may have been partially due to differences in age or education. However, the interaction of valence and depression, with negative events resulting in better performance than positive or neutral events, argues against a simple main effect of age on memory performance. Also, there were many participants in the depressed group who were taking medication (e.g., antidepressants) at the time of testing. Little research has been conducted to study the effects of antidepressants on memory in depressed individuals. Of those that have been conducted, mixed results have been obtained (Wright & Salmon, 1990). Thus, it is unknown whether medication had any effect on the memory performance of the depressed participants in the present study.

The results of this study have implications for eyewitness testimony and for therapy with clients suffering from depression. First, people who witness a crime and are later

interrogated by the police, may be in a state of divided-attention (e.g., due to anxiety, excitement, and/or depression). Given that divided-attention increases vulnerability to misinformation, such individuals would be at a greater risk for making false testimonies. Thus, perhaps it would be beneficial to take precautions to constrain the focus of attention of eyewitnesses during police interrogations. Second, given that depression increases susceptibility to misleading information, depressed clients seeking therapy are likely to be vulnerable to suggestions implicit in the questions asked by their therapists. Moreover, there are certain types of therapy that may be potentially harmful to depressed individuals. The use of hypnosis, for example, is known to increase the risk of creating false memories (Dywan & Bowers, 1983; Erdelyi, 1994; Lynn, Myers, & Malinoski, 1998), and among depressed individuals, this risk may be magnified. Further research is necessary to understand the interaction, if any, between the increased risk of false memories from hypnosis and from depression.

Conclusion

Memory for an event may be distorted by exposure to misleading postevent information. Do the results of the present study indicate that there are specific factors that can increase an individual's vulnerability to the misinformation effect? Apparently, yes. Both depression and divided-attention cause a deterioration in memory performance and a subsequent increase in susceptibility to misleading information. Depressed individuals, however, tend to display less impairment and misinformation acceptance than divided-attention individuals for material with negative valence. In conclusion,

memory is not infallible; however, the more knowledge we gain about the specific factors that can increase or decrease the possibility of memory contamination, the more able we are to reduce the risk of creating false memories.

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Table 1

Participant Characteristics

	Group								
	Focused-Attention			Divided-Attention			Depressed		
	M	SE	Range	M	SE	Range	M	SE	Range
n	24			24			20		
Sex Ratio (F/M)	14/10	0.10		16/8	0.10		10/10	0.11	
Age	20.71	0.93	18-40	19.92	0.31	19-25	35.90	2.14	19-62
Education (Yrs)	13.92	0.16	13-16	14.29	0.19	13-17	12.53	0.57	8-17
BDI-II Score	6.08	0.84	0-15	6.58	0.79	0-15	32.50	1.50	23-48

Note. M = mean; SE = standard error.

Table 2

Mean Number of Correct Responses as a Function of State, Valence, and Type of Manipulation

	State					
	Focused-Attention		Divided-Attention		Depressed	
Valence	M	SE	M	SE	M	SE
Positive						
Misled Events	4.04	0.24	2.25	0.32	2.75	0.38
Control Events	4.17	0.20	2.08	0.28	2.90	0.31
Neutral						
Misled Events	3.75	0.16	1.67	0.21	2.30	0.30
Control Events	3.25	0.18	1.92	0.25	2.55	0.30
Negative						
Misled Events	4.17	0.20	1.25	0.23	3.30	0.33
Control Events	4.42	0.15	1.83	0.25	3.35	0.22

Note. M = mean; SE = standard error. The total number of correct responses possible for each condition is 5.

Table 3

Mean Number of Misled Responses as a Function of State and Valence

	State					
	Focused-Attention		Divided-Attention		Depressed	
Valence	M	SE	M	SE	M	SE
Positive	0.71	0.23	1.25	0.24	1.10	0.28
Neutral	0.58	0.15	1.38	0.24	1.25	0.27
Negative	0.42	0.13	1.96	0.25	0.80	0.25

Note. M = mean; SE = standard error. The total number of misled responses possible for each condition is 5.

Table 4

Mean Number of Correct Responses for Consistent Events as a Function of State and Valence

	State					
	Focused-Attention		Divided-Attention		Depressed	
Valence	M	SE	M	SE	M	SE
Positive	4.75	0.09	2.88	0.25	3.35	0.31
Neutral	4.04	0.29	1.83	0.18	2.55	0.32
Negative	4.67	0.12	3.21	0.26	3.60	0.32

Note. M = mean; SE = standard error. The total number of correct responses possible for each condition is 5.

Figure Caption

Figure 1. Mean number of correct responses for focused-attention (n = 24), divided-attention (n = 24), and depressed (n = 20) groups in positive, neutral, and negative valence conditions. Error bars are standard errors.

Figure 1.

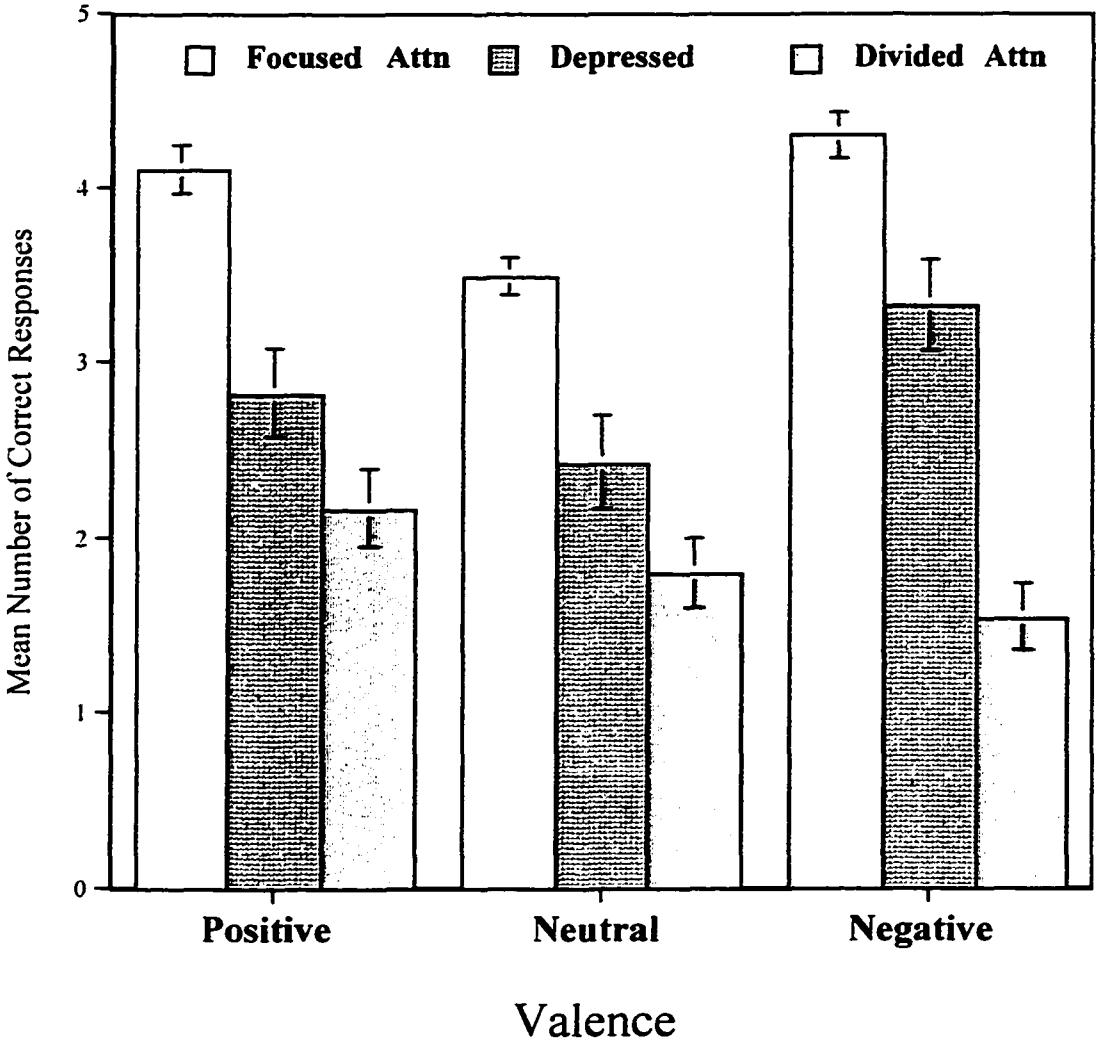
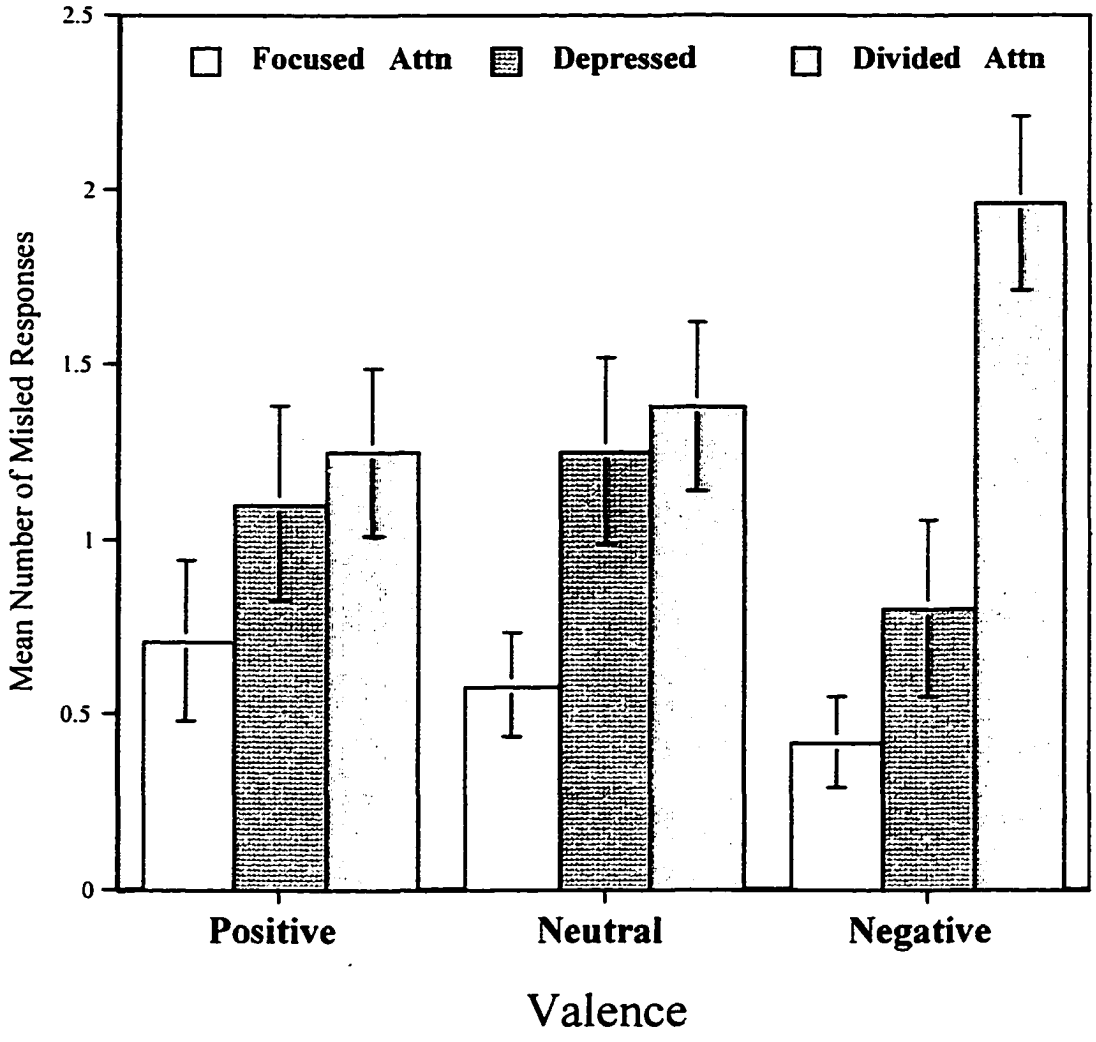


Figure Caption

Figure 2. Mean number of misled responses for focused-attention (n = 24), divided-attention (n = 24), and depressed (n = 20) groups in positive, neutral, and negative valence conditions. Error bars are standard errors.

Figure 2.



Appendix A

Narrative 1

Kelly woke up in the morning, checked the time, and went to take a shower. Before rinsing the shampoo out of her hair, the water turned cold. Feeling annoyed, Kelly went downstairs to make breakfast. She opened all of the curtains in the living room and noticed that it was a beautiful, sunny, summer day. When she walked into the kitchen, she was delighted to see that her roommate had washed all of the dishes from the night before. Unfortunately, there was a new mess - books all over the table. Kelly cleared off the table, made herself a cup of coffee, and sat down to read the business section of the newspaper. Just then, the phone rang and Kelly answered it on the second ring. It was good news! The person calling told her that she had been one of the few selected for a job interview for an administrative position. She was very excited.

Kelly was starting to feel hungry and decided to make some pancakes. After mixing all of the dry ingredients, she realized that she was out of eggs. That meant that she had to go to the grocery store. She ran upstairs, put on a pair of jeans, a gray tee-shirt, and a pair of sandals. She grabbed her purse and keys and left the house. Since it was such a nice day, she decided to walk to the store. As she was walking along side a ditch, she found a twenty-dollar bill. What luck! She was so happy about finding the money that she wasn't paying attention to where she was walking. She stumbled over a crack in the sidewalk and almost fell!

As Kelly continued her walk to the grocery store, she enjoyed the warmth of the sunshine. However, the heat was starting to make her thirsty. So Kelly decided to use some of the money that she found to buy herself a bottle of water at the corner store.

At the grocery store, there was a huge sale on many of the items. Kelly decided to take advantage of the sale and buy several things that she needed. As she walked through the crowded aisles, a large man crashed into her. She dropped the items she was holding, breaking a bottle of ketchup all over the floor. Feeling embarrassed, Kelly quickly cleaned up the mess and finished the rest of her shopping. As Kelly approached the checkout counter, she looked for the shortest line to stand in. While in line, Kelly saw one of her friends and called him over. He was carrying a bouquet of flowers and he took out a single rose and gave it to Kelly. Kelly thanked him for the flower and then realized that she had lost her place in line. Now she had to go all the way to the back. Her head was starting to ache and she did not have the patience to wait in line.

As the line slowly grew smaller, a man in front of her with a much larger order of groceries allowed Kelly to go before him. She was very grateful. She switched him places and then noticed a horrible odor coming from someone nearby. She could hardly stand the smell! Fortunately, there was only one person left ahead of her, so she didn't have much longer to wait. The cashier totaled up her order and Kelly reached for her wallet. To her dismay, her wallet was not in her purse! She must have forgotten it at home. All she had was the money that she had found earlier. Feeling embarrassed, she told the cashier that she would just take the milk, bananas, and eggs.

Outside the grocery store, Kelly met up with a good friend whom she hadn't seen in seven months. They hugged one another and talked for a while. The friend announced that she was getting married and wanted Kelly to be one of her Bride's maids. Kelly happily accepted, considering it to be a great honor. Feeling more cheerful, Kelly began to walk home. After walking only a short distance, the sky clouded over and it began to rain. To make matters worse, a speeding car drove by and splashed mud all over Kelly's jeans! Then, Kelly spotted a friend's car. It was a blue Tempo that was stopped at a red light. She ran to the car and asked her friend for a ride home. The friend, whose name was Joe, was happy to do the favor. As they drove, Kelly's favorite song came on the radio and raised her spirits. Joe mentioned that he had to make a few stops along the way to Kelly's house. He stopped at a convenience store to use the bank machine and then drove to the nearest full service gas station. The gas attendant was very rude and Kelly asked to speak to the manager. As Kelly stepped out of the car, she stepped in a puddle of mud. Now she had wet shoes and jeans! The manager then came outside and sincerely apologized for the poor service. To compensate, he gave both Kelly and Joe a voucher for ten dollars worth of gasoline.

Once back at Kelly's house, Kelly invited Joe in for some pancakes. As Kelly finished mixing the ingredients, Joe set the table. After pouring the batter into the pan, Kelly sat down to pour herself a glass of orange juice. Unfortunately, the jug slipped out of her hand and orange juice spilled all over the table. Kelly was so busy trying to clean up the mess that she forgot about the pancakes that were now burning on the stove. At that point, Kelly and Joe decided to skip breakfast and play cards instead. Part way through a game, the telephone rang. It was Kelly's boss; he was calling to tell her that she could have the day off work on Tuesday. Kelly then returned to the card game and to her surprise, she won every game!

Appendix B

Narrative 2

Kelly woke up in the morning, checked the temperature, and went to take a shower. Before rinsing the shampoo out of her hair, the water turned hot. Feeling annoyed, Kelly went downstairs to make breakfast. She opened all of the curtains in the kitchen and noticed that it was a beautiful, sunny, spring day. She was also delighted to see that her roommate had taken out all of the garbage. Unfortunately, there was a new mess - food all over the table. Kelly cleared off the table, made herself a cup of coffee, and sat down to read the classified ads of the newspaper. Just then, the phone rang and Kelly answered it on the second ring. It was good news! The person calling told her that she had been one of the few selected for a job interview for a secretarial position. She was very excited.

Kelly was starting to feel hungry and decided to make some homemade waffles. After mixing all of the dry ingredients, she realized that she was out of milk. That meant that she had to go to the grocery store. She ran upstairs, put on a pair of jeans, a gray tee-shirt, and a pair of running shoes. She grabbed her purse and keys and left the house. Since it was such a nice day, she decided to walk to the store. As she was walking along side a ditch, she found a ten-dollar bill. What luck! She was so happy about finding the money that she wasn't paying attention to where she was walking. She stumbled over a rock on the sidewalk and almost fell!

As Kelly continued her walk to the grocery store, she enjoyed the warmth of the sunshine. However, the heat was starting to make her thirsty. So Kelly decided to use some of the money that she found to buy herself a can of pop at the corner store.

At the grocery store, Kelly decided to take advantage of some free samples of cookies. She then began to walk through the crowded aisles when, suddenly, a large man crashed into her. She dropped the items she was holding, breaking a jar of jam all over the floor. Feeling embarrassed, Kelly quickly cleaned up the mess and finished the rest of her shopping. As Kelly approached the checkout counter, she looked for the shortest line to stand in. While in line, Kelly saw one of her friends and called him over. He was carrying a bouquet of flowers and he took out a single rose and gave it to Kelly. Kelly thanked him for the flower and then realized that she had lost her place in line. Now she had to go all the way to the back. Her feet were starting to ache and she did not have the patience to wait in line.

As the line slowly grew smaller, a woman in front of her with a much larger order of groceries allowed Kelly to go before her. She was very grateful. Kelly switched her places and then noticed a horrible odor coming from someone nearby. She could hardly stand the smell! Fortunately, there was only one person left ahead of her, so she didn't have much longer to wait. The cashier totaled up her order and Kelly reached for her credit card. To her dismay, her credit card was not in her purse! She must have forgotten it at home. All she had was the money that she had found earlier. Feeling embarrassed, she told the cashier that she would just take the milk, bananas, and eggs.

Outside the grocery store, Kelly met up with a good friend whom she hadn't seen in seven months. They hugged one another and talked for a while. The friend announced that she was organizing a bridal shower and she wanted Kelly to attend. Kelly happily accepted the offer. Feeling more cheerful, Kelly began to walk home. After walking only a short distance, the sky clouded over and it began to rain. To make matters worse, a speeding car drove by and splashed mud all over Kelly's jeans! Then, Kelly spotted a friend's car. It was a blue Tempo that was stopped at a stop sign. She ran to the car and asked her friend for a ride to the post office. She had to pick up a parcel from her mother and she did not want to walk in the rain. The friend, whose name was Joe, was happy to do the favor. As they drove, Kelly's favorite song came on the radio and raised her spirits. Joe mentioned that he had to make a few stops along the way to Kelly's house. He stopped at a convenience store to check his lottery ticket and then drove to the nearest self service gas station. Unfortunately, the gas pump was not working, so Kelly asked to speak to the manager. As Kelly stepped out of the car, she stepped in a puddle of mud. Now she had wet shoes and wet jeans! The manager then came outside and sincerely apologized for the inconvenience. To compensate, he gave both Kelly and Joe a voucher for a free car wash.

Once back at Kelly's house, Kelly invited Joe in for some waffles. As Kelly finished mixing the ingredients, Joe set the table. After pouring the batter into the pan, Kelly sat down to pour herself a glass of orange juice. Unfortunately, she knocked over a flower vase and spilled water all over the table. She then turned off the stove and began cleaning up the mess. By the time she was finished cleaning, breakfast was cold! At that point, Kelly and Joe decided to skip breakfast and play a checkers instead. Part way through a game, the telephone rang. It was Kelly's boss; he was calling to tell her that she could have the day off work on Tuesday. Kelly then returned to the card game and to her surprise, she won three out of four games!

Appendix C

Rating Form for Narrative 1

Please circle: Male or Female **Program:**_____

Please circle the year of the program you are currently in: 1 2 3 4 5

Below is a list of events. Please rate the events on a scale from 1 to 15 according to the degree to which the event is positive, neutral, or negative. The scale is as follows:

1 2 3 4 5	6 7 8 9 10	11 12 13 14 15
Very Moderately Mildly	N E U T R A L	Mildly Moderately Very
N E G A T I V E		P O S I T I V E

RATINGS

1. ___ It was a beautiful, sunny, summer day
2. ___ Kelly found $20
3. ___ Kelly opened the curtains in the living room
4. ___ Kelly stopped to pet a dog
5. ___ Kelly was told that she was one of the few people selected for a job interview for an administrative position
6. ___ There was a mess in the kitchen - books all over the table
7. ___ Kelly's coffee was too strong
8. ___ Kelly read the business section of the newspaper
9. ___ Kelly mixed all of the dry ingredients to make breakfast, then realized that she was out of eggs
10. ___ A man with a larger order of groceries allowed Kelly to go before him in line
11. ___ The manager of a gas station gave both Kelly and Joe a voucher for ten dollars worth of gasoline
12. ___ Kelly stumbled over a crack in the sidewalk and almost fell
13. ___ Kelly put on a pair of jeans, a tee-shirt, and a pair of sandals
14. ___ Kelly listened to the radio as she cleaned the kitchen
15. ___ There was a blue Tempo that was stopped at a red light
16. ___ Kelly's head was starting to ache
17. ___ A large man crashed into Kelly, making her drop her groceries and break a bottle of ketchup on the floor
18. ___ Joe stopped at a convenience store to use the bank machine
19. ___ Kelly broke a glass
20. ___ Kelly was delighted to see that her roommate had done all of the dishes from the night before
21. ___ There was a huge sale at the grocery store and Kelly decided to take advantage of it
22. ___ Kelly's friend asked her to be a bride's maid in her wedding

23. ___ Kelly woke up in the morning, checked the time, and went to take a shower
24. ___ The water in the shower turned cold
25. ___ The dog chewed a hole in Kelly's sock
26. ___ Kelly decided to make some pancakes for breakfast
27. ___ Kelly decided to buy herself a bottle of water at the corner store
28. ___ Kelly went to pay for her groceries and realized that she forgot her wallet
29. ___ Kelly's friend gave her a ride home so that she didn't have to walk in the rain
30. ___ The gas attendant was very rude to Kelly and Joe
31. ___ Kelly spilled orange juice all over the table
32. ___ Joe drove to the nearest full service gas station
33. ___ Kelly received a call from her father
34. ___ Kelly picked up a penny for good luck
35. ___ Kelly bought a chocolate donut
36. ___ Kelly burnt breakfast
37. ___ Kelly and Joe decided to skip breakfast and play cards instead
38. ___ Kelly won every game of cards
39. ___ Kelly could hear the birds chirping when she went outside
40. ___ Kelly bought a pack of bubble gum
41. ___ Kelly enjoyed the warmth of the sunshine as she walked to the grocery store
42. ___ Kelly made herself a cup of coffee
43. ___ Kelly answered the phone on the second ring
44. ___ Kelly received a single rose from a friend
45. ___ Kelly lost her place in line and had to go all the way to the back
46. ___ Kelly stubbed her toe on the corner of the bed
47. ___ As Kelly stood in line, there was a horrible odor coming from someone nearby
48. ___ Kelly found a coupon that she could use toward her grocery order
49. ___ Kelly met up with a good friend whom she hadn't seen in seven months
50. ___ Kelly dropped her purse on the ground
51. ___ Before leaving the house, Kelly grabbed her purse and keys
52. ___ As Kelly walked home, the sky clouded over and it began to rain
53. ___ Kelly's favorite song came on the radio and lifted her spirits
54. ___ Kelly put on a pair of sunglasses
55. ___ Joe set the table
56. ___ Kelly sat down to pour herself a glass of orange juice
57. ___ Kelly did some window shopping
58. ___ A speeding car drove by and splashed mud all over Kelly's jeans
59. ___ Kelly stepped in a puddle of mud
60. ___ Kelly's boss called to tell her that she could have the day off work on Tuesday

Appendix D

Rating Form for Narrative 2

Please circle: Male or Female **Program:**_____

Please circle the year of the program you are currently in: 1 2 3 4 5

Below is a list of events. Please rate the events on a scale from 1 to 15 according to the degree to which the event is positive, neutral, or negative. The scale is as follows:

1 2 3 4 5	6 7 8 9 10	11 12 13 14 15
Very Moderately Mildly	N E U T R A L	Mildly Moderately Very
N E G A T I V E		P O S I T I V E

RATINGS

1. ___ It was a beautiful, sunny, spring day
2. ___ Kelly found $10
3. ___ Kelly opened the curtains in the kitchen
4. ___ Kelly stopped to pet a cat
5. ___ Kelly was told that she was one of the few people selected for a job interview for a secretarial position
6. ___ There was a mess in the kitchen - food all over the table
7. ___ Kelly's coffee was too weak
8. ___ Kelly read the classified ads of the newspaper
9. ___ Kelly mixed all of the dry ingredients to make breakfast, then realized that she was out of milk
10. ___ A woman with a larger order of groceries allowed Kelly to go before her in line
11. ___ The manager of a gas station gave both Kelly and Joe a voucher for a free car wash
12. ___ Kelly stumbled over a rock on the sidewalk and almost fell
13. ___ Kelly put on a pair of jeans, a tee-shirt, and a pair of running shoes
14. ___ Kelly listened to the television as she cleaned the kitchen
15. ___ There was a blue Tempo that was stopped at a stop sign
16. ___ Kelly's feet were starting to ache
17. ___ A large man crashed into Kelly, making her drop her groceries and break a jar of jam on the floor
18. ___ Joe stopped at a convenience store to check his lottery ticket
19. ___ Kelly broke a plate
20. ___ Kelly was delighted to see that her roommate had taken out all of the garbage
21. ___ There were free samples of cookies at the grocery store and Kelly decided to take advantage of them

22. ___ Kelly's friend invited her to attend a bridal shower
23. ___ Kelly woke up in the morning, checked the temperature, and went to take a shower
24. ___ The water in the shower turned very hot
25. ___ The dog chewed a hole in Kelly's shoe
26. ___ Kelly decided to make some homemade waffles for breakfast
27. ___ Kelly decided to buy herself a can of pop at the corner store
28. ___ Kelly went to pay for her groceries and realized that she forgot her credit card
29. ___ Kelly's friend gave her a ride to the post office so that she didn't have to walk in the rain
30. ___ The gas pump was not working so Joe could not fill up his gas tank
31. ___ Kelly knocked over a vase and spilled water all over the table
32. ___ Joe drove to the nearest self service gas station
33. ___ Kelly received a call from her uncle
34. ___ Kelly picked up a nickel for good luck
35. ___ Kelly bought a maple donut
36. ___ By the time Kelly finished cleaning, she realized that breakfast was cold
37. ___ Kelly and Joe decided to skip breakfast and play checkers instead
38. ___ Kelly won three out of four games of checkers
39. ___ Kelly could smell fresh flowers when she went outside
40. ___ Kelly bought a pack of peppermint gum
41. ___ Kelly enjoyed the warmth of the sunshine as she walked to the grocery store
42. ___ Kelly made herself a cup of coffee
43. ___ Kelly answered the phone on the second ring
44. ___ Kelly received a single rose from a friend
45. ___ Kelly lost her place in line and had to go all the way to the back
46. ___ Kelly stubbed her toe on the corner of the bed
47. ___ As Kelly stood in line, there was a horrible odor coming from someone nearby
48. ___ Kelly found a coupon that she could use toward her grocery order
49. ___ Kelly met up with a good friend whom she hadn't seen in seven months
50. ___ Kelly dropped her purse on the ground
51. ___ Before leaving the house, Kelly grabbed her purse and keys
52. ___ As Kelly walked home, the sky clouded over and it began to rain
53. ___ Kelly's favorite song came on the radio and lifted her spirits
54. ___ Kelly put on a pair of sunglasses
55. ___ Joe set the table
56. ___ Kelly sat down to pour herself a glass of orange juice
57. ___ Kelly did some window shopping
58. ___ A speeding car drove by and splashed mud all over Kelly's jeans
59. ___ Kelly stepped in a puddle of mud
60. ___ Kelly's boss called to tell her that she could have the day off work on Tuesday

Appendix E

Summary of Events

Sets of Related Events (#1-15)

Positive Events (Set #1)	Positive Events (Set #2)
1.1) It was a beautiful, sunny, summer day	2.1) It was a beautiful, sunny, spring day
1.2) Kelly was told that she was one of the few people selected for a job interview for an administrative position	2.2) Kelly was told that she was one of the few people selected for a job interview for a secretarial position
1.3) Kelly found $20	2.3) Kelly found $10
1.4) A man with a larger order of groceries allowed Kelly to go before him in line	2.4) A woman with a larger order of groceries allowed Kelly to go before her in line
1.5) The manager gave both Kelly and Joe a voucher for ten dollars worth of gasoline	2.5) The manager gave both Kelly and Joe a voucher for a free car wash
Negative Events (Set #1)	**Negative Events (Set #2)**
1.6) There was a mess in the kitchen - books all over the table	2.6) There was a mess in the kitchen - food all over the table
1.7) Kelly mixed all of the dry ingredients to make breakfast, then realized that she was out of eggs	2.7) Kelly mixed all of the dry ingredients to make breakfast, then realized that she was out of milk
1.8) Kelly stumbled over a crack in the sidewalk and almost fell	2.8) Kelly stumbled over a rock on the sidewalk and almost fell
1.9) A large man crashed into Kelly, making her drop her groceries and break a bottle of ketchup on the floor	2.9) A large man crashed into Kelly, making her drop her groceries and break a jar of jam on the floor
1.10) Kelly's head was starting to ache	2.10) Kelly's feet were starting to ache
Neutral Events (Set #1)	**Neutral Events (Set #2)**
1.11) Kelly opened the curtains in the living room	2.11) Kelly opened the curtains in the kitchen
1.12) Kelly read the business section of the newspaper	2.12) Kelly read the classified ads of the newspaper
1.13) Kelly put on a pair of jeans, a tee-shirt, and a pair of sandals	2.13) Kelly put on a pair of jeans, a tee-shirt, and a pair of running shoes
1.14) There was a blue Tempo that was stopped at a red light	2.14) There was a blue Tempo that was stopped at a red stop sign
1.15) Joe stopped at a convenience store to use the bank machine	2.15) Joe stopped at a convenience store to check his lottery ticket

Sets of Related Events (#16-30)

Positive Events (Set #1)	Positive Events (Set #2)
1.16) Kelly was delighted to see that her roommate had done all of the dishes from the night before	2.16) Kelly was delighted to see that her roommate had taken out all of the garbage
1.17) There was a huge sale at the grocery store and Kelly decided to take advantage of it	2.17) There were free samples of cookies at the grocery store and Kelly decided to take advantage of them
1.18) Kelly's friend asked her to be a bride's maid in her wedding	2.18) Kelly's friend invited her to attend a bridal shower
1.19) Kelly's friend gave her a ride home so that she didn't have to walk in the rain	2.19) Kelly's friend gave her a ride to the post office so that she didn't have to walk in the rain
1.20) Kelly won every game of cards	2.20) Kelly won 3 out of 4 games of checkers
Negative Events (Set #1)	**Negative Events (Set #2)**
1.21) The water in the shower turned cold	2.21) The water in the shower turned very hot
1.22) Kelly went to pay for her groceries and realized that she forgot her wallet	2.22) Kelly went to pay for her groceries and realized that she forgot her credit card
1.23) The gas attendant was very rude to Kelly and Joe	2.23) The gas pump was not working so Joe could not fill up his gas tank
1.24) Kelly spilled orange juice all over the table	2.24) Kelly knocked over a vase and spilled water all over the table
1.25) Kelly burnt breakfast	2.25) By the time Kelly finished cleaning, she realized that her breakfast was now cold
Neutral Events (Set #1)	**Neutral Events (Set #2)**
1.26) Kelly woke up in the morning, checked the time, and went to take a shower	2.26) Kelly woke up in the morning, checked the temperature, and went to take a shower
1.27) Kelly decided to make some pancakes for breakfast	2.27) Kelly decided to make some homemade waffles for breakfast
1.28) Kelly decided to buy herself a bottle of water at the corner store	2.28) Kelly decided to buy herself a can of pop at the corner store
1.29) Joe drove to the nearest full service gas station	2.29) Joe drove to the nearest self service gas station
1.30) Kelly and Joe decided to skip breakfast and play cards instead	2.30) Kelly and Joe decided to skip breakfast and play checkers instead

Independent Events

Positive Events
31) Kelly enjoyed the warmth of the sunshine as she walked to the grocery store
32) Kelly received a single rose from a friend
33) Kelly met up with a good friend whom she hadn't seen in seven months
34) Kelly's favorite song came on the radio and lifted her spirits
35) Kelly's boss called to tell her that she could have the day off work on Tuesday
Negative Events
36) Kelly lost her place in line and had to go all the way to the back
37) As Kelly stood in line, there was a horrible odor coming from someone nearby
38) As Kelly walked home, the sky clouded over and it began to rain
39) A speeding car drove by and splashed mud all over Kelly's jeans
40) Kelly stepped in a puddle of mud
Neutral Events
41) Kelly made herself a cup of coffee
42) Kelly answered the phone on the second ring
43) Before leaving the house, Kelly grabbed her purse and keys
44) Joe set the table
45) Kelly sat down to pour herself a glass of orange juice

Corresponding Events for Each Narrative

Narrative 1 (Original Narrative) - consists of all set #1 events (i.e., 1.1-1.30) and the repeated events (i.e., 31-45)

Version 1A (Postevent Narrative) - consists of a set of 15 repeated consistent events (i.e., repeated events 31-45) and a set of 15 misled events (i.e., 2.1-2.15)

Version 1B (Postevent Narrative) - consists of a set of 15 repeated consistent events (i.e., repeated events 31-45) and a set of 15 misled events (i.e., 2.16-2.30)

Narrative 2 (Version 2 of the Original Narrative) - consists of all set #2 events (i.e., 2.1-2.30) and the repeated events (i.e., 31-45)

Version 2A (Postevent Narrative) - consists of a set of 15 repeated consistent events (i.e., repeated events 31-45) and a set of 15 misled events (i.e., 1.1-1.15)

Version 2B (Postevent Narrative) - consists of a set of 15 repeated consistent events (i.e., repeated events 31-45) and a set of 15 misled events (i.e., 1.16-1.30)

Appendix F

Postevent Information: Version 1A

When Kelly went downstairs, she opened the curtains in the kitchen and noticed that it was a beautiful spring day. She was discouraged, however, to see a mess of food all over the kitchen table. Kelly cleaned up the mess and made herself a cup of coffee. While reading the classified ads of the newspaper, the telephone rang and Kelly answered it on the second ring. The person calling told her that she had been selected for a job interview for a secretarial position. Kelly then decided to make breakfast but realized that she was out of milk. She put on a pair of jeans and running shoes, grabbed her purse and keys, and went to the grocery store. On the way, she found a ten dollar bill. She was so excited that she almost tripped over a rock on the sidewalk. As Kelly continued walking, she enjoyed the warmth of the sunshine on her face.

At the grocery store, a man crashed into Kelly causing her to break a jar of jam on the floor. While waiting to pay for her groceries, Kelly received a flower from a friend. She then lost her place in line and had to go all the way to the back. By this time, Kelly's feet were starting to ache. However, a kind woman allowed Kelly to go before her. As Kelly switched her places, she noticed an awful odor!

Outside the grocery store, Kelly spoke to a friend whom she hadn't seen in seven months. Upon leaving her friend, it began to rain and a speeding car splashed mud on Kelly's jeans. Then, Kelly spotted her friend's car stopped at a stop sign. When Kelly got in the car, her favorite song came on the radio and made her feel more cheerful. During the drive, Joe stopped at a convenience store to check his lottery ticket and then went to a gas station. Kelly got out of the car to speak to the manager and stepped in a puddle of mud. The manager of the gas station offered both Kelly and Joe a voucher for a free car wash.

Back at Kelly's, Joe set the table and Kelly sat down to have a glass of orange juice. The phone then rang; Kelly's boss called to tell her that she could have the day off work on Tuesday. Kelly was quite pleased!

Appendix G

Postevent Information: Version 1B

Kelly woke up in the morning, checked the temperature, and went to take a shower. Before rinsing the shampoo out of her hair, the water turned very hot. Feeling annoyed, Kelly went downstairs and was delighted to see that her roommate had taken out all of the garbage. Kelly made herself a cup of coffee and sat down at the table. Then, the telephone rang and Kelly answered it on the second ring. After hanging up the phone, Kelly decided to make some waffles for breakfast - but first she had to go to the grocery store. She grabbed her purse and keys and left the house.

Along the way to the grocery store, Kelly enjoyed the warmth of the sunshine on her face. She stopped at a corner store to buy a can of pop and then continued walking. Once at the grocery store, Kelly decided to take advantage of some free samples of cookies. While waiting in line to pay for her groceries, Kelly received a flower from a friend. She then lost her place in line and had to go all the way to the back. As the line grew smaller, Kelly switched places with someone and noticed an awful odor. When Kelly went to pay for her groceries, she realized that she forgot her credit card at home; as a result, she could only take a few of the items.

Outside the grocery store, Kelly spoke to a friend whom she hadn't seen in seven months. The friend asked Kelly to attend a bridal shower that she was organizing. Upon leaving her friend, it began to rain and a speeding car splashed mud on Kelly's jeans. Fortunately, however, Joe was willing to drive Kelly to the post office so that she didn't have to walk in the rain. When Kelly got into the car, her favorite song came on the radio and made her feel more cheerful. Along the way, Joe stopped at a self service gas station. Unfortunately, the gas pump was not working so Kelly asked to speak to the manager. As she got out of the car to approach him, she stepped in a puddle of mud.

Back at Kelly's, Kelly finished making breakfast while Joe set the table. Kelly then sat down to pour herself a glass of orange juice. As she reached to get the jug, she knocked over a vase and spilled water all over the table. By the time she was finished cleaning up the mess, breakfast was cold! At that point, Kelly and Joe decided to skip breakfast and play a few games of checkers instead. During a game, Kelly's boss called to tell her that she could have the day off work on Tuesday. Kelly then returned to the game and to her surprise, she won 3 out of 4 games!

Appendix H

Postevent Information: Version 2A

When Kelly went downstairs, she opened the curtains in the living room and noticed that it was a beautiful summer day. She was discouraged, however, to see a mess of books all over the kitchen table. Kelly cleaned up the mess and made herself a cup of coffee. While reading the business section of the newspaper, the telephone rang and Kelly answered it on the second ring. The person calling told her that she had been selected for a job interview for an administrative position. Kelly then decided to make breakfast but realized that she was out of eggs. She put on a pair of jeans and sandals, grabbed her purse and keys, and went to the grocery store. On the way, she found a twenty dollar bill. She was so excited that she almost tripped over a crack in the sidewalk. As Kelly continued walking, she enjoyed the warmth of the sunshine on her face.

At the grocery store, a man crashed into Kelly causing her to break a bottle of ketchup on the floor. While waiting to pay for her groceries, Kelly received a flower from a friend. She then lost her place in line and had to go all the way to the back. By this time, Kelly's head was starting to ache. However, a kind man allowed Kelly to go before him. As Kelly switched him places, she noticed an awful odor!

Outside the grocery store, Kelly spoke to a friend whom she hadn't seen in seven months. Upon leaving her friend, it began to rain and a speeding car splashed mud on Kelly's jeans. Then, Kelly spotted her friend's car stopped at a red light. When Kelly got in the car, her favorite song came on the radio and made her feel more cheerful. During the drive, Joe stopped at a convenience store to use the bank machine and then went to a gas station. Kelly got out of the car to speak to the manager and stepped in a puddle of mud. The manager of the gas station offered both Kelly and Joe a voucher for ten dollars worth of gasoline.

Back at Kelly's, Joe set the table and Kelly sat down to have a glass of orange juice. The phone then rang; Kelly's boss called to tell her that she could have the day off work on Tuesday. Kelly was quite pleased!

Appendix I

Postevent Information: Version 2B

Kelly woke up in the morning, checked the time, and went to take a shower. Before rinsing the shampoo out of her hair, the water turned very cold. Feeling annoyed, Kelly went downstairs and was delighted to see that her roommate had done all of the dishes from the night before. Kelly made herself a cup of coffee and sat down at the table. Then, the telephone rang and Kelly answered it on the second ring. After hanging up the phone, Kelly decided to make some pancakes for breakfast - but first she had to go to the grocery store. She grabbed her purse and keys and left the house.

Along the way to the grocery store, Kelly enjoyed the warmth of the sunshine on her face. She stopped at a corner store to buy a bottle of water and then continued walking. Once at the grocery store, Kelly decided to take advantage of the huge sale. While waiting in line to pay for her groceries, Kelly received a flower from a friend. She then lost her place in line and had to go all the way to the back. As the line grew smaller, Kelly switched places with someone and noticed an awful odor. When Kelly went to pay for her groceries, she realized that she forgot her wallet at home; as a result, she could only take a few of the items. Outside the grocery store, Kelly spoke to a friend whom she hadn't seen in seven months. The friend asked Kelly to be a bride's maid in her wedding. Upon leaving her friend, it began to rain and a speeding car splashed mud on Kelly's jeans. Fortunately, however, Joe was willing to drive Kelly home so that she didn't have to walk in the rain. When Kelly got into the car, her favorite song came on the radio and made her feel more cheerful. Along the way, Joe stopped at a full service gas station. Unfortunately, the gas attendant was very rude so Kelly asked to speak to the manager. As she got out of the car to approach him, she stepped in a puddle of mud.

Back at Kelly's, Kelly finished making breakfast while Joe set the table. Kelly then sat down to pour herself a glass of orange juice. As she reached to get the jug, she accidentally knocked it over and spilled orange juice all over the table. By the time she was finished cleaning up the mess, breakfast was burning on the stove! At that point, Kelly and Joe decided to skip breakfast and play a few games of cards instead. During a game, Kelly's boss called to tell her that she could have the day off work on Tuesday. Kelly then returned to the game and to her surprise, she won every game!

Appendix J

Memory Test

TO BE FILLED OUT BY THE EXPERIMENTER

Reference Number: _____ Group: d/v1a, d/v1b, d/v2a, d/v2b
da/v1a, da/v1b, da/v2a, da/v2b
fa/v1a, fa/v1b, fa/v2a, fa/v2b

Scores:

Answer the following questions according to what you remember hearing in the original story. Answer EVERY question. If you are unsure of an answer, it is okay to guess. Some questions require only one word answers, others require several words. Whenever possible, try to give your answers in the exact wording you remember hearing in the original story. Take your time and try your best!

1. When Kelly woke up in the morning, she _____, and went to take a shower.
   Answer: _____

2. What happened when Kelly took a shower?
   Answer: _____

3. Kelly went downstairs and opened the curtains in the _____.
   Answer: _____

4. What season of the year did the story take place?
   Answer: _____

5. When Kelly went downstairs, she was delighted to see that her roommate _____.
   Answer: _____

6. There was a mess in the kitchen, _____ all over the table.
   Answer: _____

7. What did Kelly drink as she read the newspaper?
   Answer: _____

8. What part of the newspaper did Kelly read?
   Answer: _____

9. When the phone rang regarding the interview, how many times did it ring before Kelly picked it up?
   Answer: _____

10. Kelly was selected for a job interview for what type of position?
    Answer: _____

11. What did Kelly decide to make for breakfast?
    Answer: _____

12. When Kelly started mixing the ingredients to make breakfast, she realized that she was out of _____.
    Answer: _____

13. What type of shoes did Kelly put on with her jeans and tee-shirt?
    Answer: _____

14. Before leaving the house, Kelly grabbed her purse and _____.
    Answer: _____

15. How much money did Kelly find?
    Answer: _____

16. As Kelly walked to the grocery store, she stumbled over a _____ and almost fell.
    Answer: _____

17. As Kelly continued her walk to the grocery store, she enjoyed _____.
    Answer: _____

18. What did Kelly stop at the corner store to buy?
    Answer: _____

19. What did Kelly decide to take advantage of at the grocery store?
    Answer: _____

20. When a large man crashed into Kelly, what did she break on the floor?
    Answer: _____

21. While waiting in line, what did Kelly receive from a friend?
    Answer: _____

22. Kelly thanked her friend and then realized that _____.
    Answer: _____

23. Kelly did not have the patience to wait in line because her _____ started to ache.
    Answer: _____

24. Who allowed Kelly to go ahead of them in line?
    Answer: _____

25. When Kelly switched places in line, she noticed _____ coming from someone nearby.
    Answer: _____

26. When Kelly went to pay for her groceries, she realized that _____.
    Answer: _____

27. Outside the grocery store, Kelly met up with a good friend whom she hadn't seen in _____ months.
    Answer: _____

28. Kelly's good friend wanted her to _____.
    Answer: _____

29. Kelly had only walked a short distance toward home when _____.
    Answer: _____

30. A speeding car drove by and _____.
    Answer: _____

31. The blue Tempo was stopped at a _____.
    Answer: _____

32. Kelly ran to the car and asked her friend for a ride _____.
    Answer: _____

33. What raised Kelly's spirits as they drove home?
    Answer: _____

34. Joe stopped at a convenience store to _____.
    Answer: _____

35. After stopping at a convenience store, Joe drove to the nearest _____ gas station.
    Answer: _____

36. Why did Kelly ask to speak to the manager of the gas station?
    Answer: _____

37. As Kelly stepped out of the car to speak to the manager, she _____.
    Answer: _____

38. The manager gave both Kelly and Joe a voucher for _____.
    Answer: _____

39. Back at Kelly's house, what did Joe do as Kelly finished mixing the ingredients?
    Answer: _____

40. After pouring the batter in the pan, why did Kelly sit down?
    Answer: _____

41. What spilled all over the table?
    Answer: _____

42. What happened to breakfast?
    Answer: _____

43. Kelly and Joe decided to skip breakfast and _____ instead.
    Answer: _____

44. Kelly's boss called to tell her that she could have the day off work on _____.
    Answer: _____

45. Kelly won _____.
    Answer: _____

Appendix K

Scoring Key for Version 1A

Summary of Scoring Key

1 point for a response that is a paraphrase or rewording of a 2 point answer
2 points for a response that is identical in wording to the original narrative
3 points for a response that is a paraphrase or rewording of a 4 point answer
4 points for a response that is identical in wording to the postevent information
5 points for a chance response that is consistent with misleading information from another version
6 points for other responses (e.g., no response or wrong response)

Note: When a 2 point response is the same as a 4 point response, the response is scored as a 1 or 2 point response (not as a 3 or 4 point response).

Scoring Key

#	Pt	Answer	#	Pt	Answer	#	Pt	Answer
1	2 4 5	checked the time NA checked the temp.	16	2 4 5	crack in the side-walk rock on the side-walk NA	31	2 4 5	a red light a stop sign NA
2	2 4 5	the water turned cold NA the water turned hot	17	2 4 5	the warmth of the sunshine the warmth of the sunshine NA	32	2 4 5	home NA to the post office
3	2 4 5	living room kitchen NA	18	2 4 5	a bottle of water NA a can of pop	33	2 4 5	Kelly's favorite song came on the radio her favorite song came on the radio NA
4	2 4 5	summer spring NA	19	2 4 5	the sale NA free samples of cookies	34	2 4 5	use the bank machine check his lottery ticket NA

5	2 4 5	had washed all of the dishes from the night before NA had taken out all of the garbage	20	2 4 5	a bottle of ketchup a jar of jam NA	35	2 4 5	full service NA self service
6	2 4 5	books food NA	21	2 4 5	a single rose a flower NA	36	2 4 5	because the gas attendant was very rude NA because the gas pump didn't work
7	2 4 5	cup of coffee cup of coffee NA	22	2 4 5	she had lost her place in line she had lost her place in line NA	37	2 4 5	stepped in a puddle of mud stepped in a puddle of mud NA
8	2 4 5	business section classified ads NA	23	2 4 5	head feet NA	38	2 4 5	ten dollars worth of gasoline a free car wash NA
9	2 4 5	twice (2 times or 2) twice (2 times or 2) NA	24	2 4 5	a man in front of her with a much larger order of groceries a kind woman NA	39	2 4 5	Joe set the table Joe set the table NA
10	2 4 5	administrative position secretarial position NA	25	2 4 5	a horrible odor an awful odor NA	40	2 4 5	to pour herself a glass of orange juice to have a glass of orange juice NA
11	2 4 5	pancakes NA waffles	26	2 4 5	her wallet was not in her purse (she must have forgotten it at home) NA she forgot her credit card	41	2 4 5	orange juice NA water from a flower vase
12	2 4 5	eggs milk NA	27	2 4 5	seven seven NA	42	2 4 5	the pancakes burnt on the stove NA the pancakes went cold

13	2 4 5	pair of sandals pair of running shoes NA	28	2 4 5	to be one of her Bride's maids NA come to a wedding shower	43	2 4 5	play cards NA play checkers
14	2 4 5	keys keys NA	29	2 4 5	the sky clouded over & it began to rain it began to rain NA	44	2 4 5	Tuesday Tuesday NA
15	2 4 5	a twenty dollar bill a ten dollar bill NA	30	2 4 5	Splashed mud all over Kelly's jeans splashed mud on Kelly's jeans NA	45	2 4 5	every game NA 3 out of 4 games

Appendix L

Scoring Key for Version 1B

#	Pt	Answer	#	Pt	Answer	#	Pt	Answer
1	2 4 5	checked the time checked the temp. NA	16	2 4 5	crack in the side-walk NA rock on the side-walk	31	2 4 5	a red light NA a stop sign
2	2 4 5	the water turned cold the water turned very hot NA	17	2 4 5	the warmth of the sunshine the warmth of the sunshine NA	32	2 4 5	home to the post office NA
3	2 4 5	living room NA kitchen	18	2 4 5	a bottle of water a can of pop NA	33	2 4 5	Kelly's favorite song came on the radio her favorite song came on the radio NA
4	2 4 5	summer NA spring	19	2 4 5	the sale some free samples of cookies NA	34	2 4 5	use the bank machine NA check his lottery ticket
5	2 4 5	had washed all of the dishes from the night before had taken out all of the garbage NA	20	2 4 5	a bottle of ketchup NA a jar of jam	35	2 4 5	full service self service NA
6	2 4 5	books NA food	21	2 4 5	a single rose a flower NA	36	2 4 5	because the gas attendant was very rude the gas pump was not working NA
7	2 4 5	cup of coffee cup of coffee NA	22	2 4 5	she had lost her place in line she had lost her place in line NA	37	2 4 5	stepped in a puddle of mud stepped in a puddle of mud NA
8	2 4 5	business section NA classified ads	23	2 4 5	head NA feet	38	2 4 5	ten dollars worth of gasoline NA a free car wash

9	2 4 5	twice (2 times or 2) twice (2 times or 2) NA	24	2 4 5	a man in front of her with a much larger order of groceries NA a woman	39	2 4 5	Joe set the table Joe set the table NA
10	2 4 5	administrative position NA secretarial position	25	2 4 5	a horrible odor an awful odor NA	40	2 4 5	to pour herself a glass of orange juice to pour herself a glass of orange juice NA
11	2 4 5	pancakes waffles NA	26	2 4 5	her wallet was not in her purse (she must have forgotten it at home) she forgot her credit card at home NA	41	2 4 5	orange juice water from a flower vase NA
12	2 4 5	eggs NA milk	27	2 4 5	seven seven NA	42	2 4 5	the pancakes burnt on the stove breakfast was cold NA
13	2 4 5	pair of sandals NA pair of running shoes	28	2 4 5	to be one of her Bride's maids to attend a bridal shower that she was organizing NA	43	2 4 5	play cards play checkers NA
14	2 4 5	keys keys NA	29	2 4 5	the sky clouded over & it began to rain it began to rain NA	44	2 4 5	Tuesday Tuesday NA
15	2 4 5	a twenty dollar bill NA a ten dollar bill	30	2 4 5	splashed mud all over Kelly's jeans splashed mud on Kelly's jeans NA	45	2 4 5	every game 3 out of 4 games NA

Appendix M

Scoring Key for Version 2A

#	Pt	Answer	#	Pt	Answer	#	Pt	Answer
1	2 4 5	checked the temp. NA checked the time	16	2 4 5	rock on the side-walk crack in the side-walk NA	31	2 4 5	a stop sign a red light NA
2	2 4 5	the water turned hot NA the water turned cold	17	2 4 5	the warmth of the sunshine the warmth of the sunshine NA	32	2 4 5	post office NA home
3	2 4 5	kitchen living room NA	18	2 4 5	a can of pop NA a bottle of water	33	2 4 5	Kelly's favorite song came on the radio her favorite song came on the radio NA
4	2 4 5	spring summer NA	19	2 4 5	some free samples of cookies NA the sale	34	2 4 5	check his lottery ticket use the bank machine NA
5	2 4 5	had taken out all of the garbage NA had washed all of the dishes	20	2 4 5	a jar of jam a bottle of ketchup NA	35	2 4 5	self service NA full service
6	2 4 5	food books NA	21	2 4 5	a single rose a flower NA	36	2 4 5	because the gas pump was not working NA the gas attendant was rude
7	2 4 5	cup of coffee cup of coffee NA	22	2 4 5	she had lost her place in line she had lost her place in line NA	37	2 4 5	stepped in a puddle of mud stepped in a puddle of mud NA
8	2 4 5	classified ads business section NA	23	2 4 5	feet head NA	38	2 4 5	a free car wash ten dollars worth of gasoline NA

9	2 4 5	twice (2 times or 2) twice (2 times or 2) NA	24	2 4 5	a woman in front of her with a much larger order of groceries a kind man NA	39	2 4 5	Joe set the table Joe set the table NA
10	2 4 5	secretarial position administrative position NA	25	2 4 5	a horrible odor an awful odor NA	40	2 4 5	to pour herself a glass of orange juice to have a glass of orange juice NA
11	2 4 5	homemade waffles NA pancakes	26	2 4 5	her credit card was not in her purse (she must have forgotten it at home) NA she forgot her wallet	41	2 4 5	water from a flower vase NA orange juice
12	2 4 5	milk eggs NA	27	2 4 5	seven seven NA	42	2 4 5	breakfast was cold NA breakfast burnt on the stove
13	2 4 5	pair of running shoes pair of sandals NA	28	2 4 5	to attend a bridal shower that she was organizing NA to be one of her Bride's maids	43	2 4 5	play checkers NA play cards
14	2 4 5	keys keys NA	29	2 4 5	the sky clouded over & it began to rain it began to rain NA	44	2 4 5	Tuesday Tuesday NA
15	2 4 5	a ten dollar bill a twenty dollar bill NA	30	2 4 5	splashed mud all over Kelly's jeans splashed mud on Kelly's jeans NA	45	2 4 5	3 out of 4 games NA every game

Appendix N

Scoring Key for Version 2B

#	Pt	Answer	#	Pt	Answer	#	Pt	Answer
1	2 4 5	checked the temp. checked the time NA	16	2 4 5	rock on the side-walk NA crack in the side-walk	31	2 4 5	a stop sign NA a red light
2	2 4 5	the water turned hot the water turned very cold NA	17	2 4 5	the warmth of the sunshine the warmth of the sunshine NA	32	2 4 5	post office home NA
3	2 4 5	kitchen NA living room	18	2 4 5	a can of pop a bottle of water NA	33	2 4 5	Kelly's favorite song came on the radio her favorite song came on the radio NA
4	2 4 5	spring NA summer	19	2 4 5	some free samples of cookies the huge sale NA	34	2 4 5	check his lottery ticket NA use the bank machine
5	2 4 5	had taken out all of the garbage had done all the dishes from the night before NA	20	2 4 5	a jar of jam NA a bottle of ketchup	35	2 4 5	self service full service NA
6	2 4 5	food NA books	21	2 4 5	a single rose a flower NA	36	2 4 5	because the gas pump was not working the gas attendant was very rude NA
7	2 4 5	cup of coffee cup of coffee NA	22	2 4 5	she had lost her place in line she had lost her place in line NA	37	2 4 5	stepped in a puddle of mud stepped in a puddle of mud NA
8	2 4 5	classified ads NA business section	23	2 4 5	feet NA head	38	2 4 5	a free car wash NA ten dollars worth of gasoline

9	2 4 5	twice (2 times or 2) twice (2 times or 2) NA	24	2 4 5	a woman in front of her with a much larger order of groceries NA a man	39	2 4 5	Joe set the table Joe set the table NA
10	2 4 5	secretarial position NA administrative position	25	2 4 5	a horrible odor an awful odor NA	40	2 4 5	to pour herself a glass of orange juice to pour herself a glass of orange juice NA
11	2 4 5	homemade waffles pancakes NA	26	2 4 5	her credit card was not in her purse (she must have forgotten it at home) she forgot her wallet at home NA	41	2 4 5	water from a flower vase orange juice NA
12	2 4 5	milk NA eggs	27	2 4 5	seven seven NA	42	2 4 5	breakfast was cold breakfast burnt on the stove NA
13	2 4 5	pair of running shoes NA pair of sandals	28	2 4 5	to attend a bridal shower that she was organizing to be a Bride's maid in her wedding NA	43	2 4 5	play checkers play a few games of cards NA
14	2 4 5	keys keys NA	29	2 4 5	the sky clouded over & it began to rain it began to rain NA	44	2 4 5	Tuesday Tuesday NA
15	2 4 5	a ten dollar bill NA a twenty dollar bill	30	2 4 5	splashed mud all over Kelly's jeans splashed mud on Kelly's jeans NA	45	2 4 5	3 out of 4 games every game NA

Appendix O

CONSENT FORM

The general purpose of this study is to determine the effects of mood and attention on memory. As a volunteer, you will be asked to engage in five main tasks: (1) listen to a short story; (2) attempt to solve some puzzles; (3) listen to a summary of the story; (4) answer some questions about the story; and (5) answer some brief questionnaires.

My signature on this sheet indicates that I agree to participate in this study conducted by Tracy Gilbert, M.A. Clinical Psychology candidate. It also indicates that I understand the following:

1. I am a volunteer and can withdraw from the study at any time without explanation or penalty.

2. There are no known risks of physical or psychological harm.

3. One of the benefits of this study include aiding in the understanding of the effects of mood on memory. Further benefits and implications will be provided following the completion of the study.

4. The data I provide will be confidential.

5. The data obtained in this research will be stored at Lakehead University by Dr. Hayman for a period of seven years, as per standard university procedures.

6. I will receive a summary of the project, upon request, following the completion of the project. This information can be sent to me directly, or obtained from Tracy Gilbert or Dr. Hayman through Lakehead University Psychology Department.

I have received explanations about the nature of the study, its purposes, and procedures.

_____

Signature of Participant Date

Appendix P

General Information Questionnaire

Please answer all of the following questions as honestly as possible. All answers will be strictly confidential.

1. Age: _____ Sex: _____ Marital Status: _____

2. Number of years of education (i.e., years from grade 1 to 13 + college + university): _____

3. Are you currently taking any medication? _____

   If yes, please list the type and name (as best you can remember) of all the medications that you are currently taking and the number of months that you have been taking them.

Medication	Number of Months of Use
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

4. In your opinion, are you currently experiencing any side effects as a result of medication? _____ If yes, please describe them.

   _____

   _____

5. Circle any disorder that you have been treated for, hospitalized for, or diagnosed with:

   Depression
   Eating Disorders
   Anxiety Disorder
   Panic Attacks
   Bipolar Disorder (Manic Depression)
   Schizophrenia
   Other: Specify _____

6. Do you feel or think that you may have some type of problem with mood, anxiety, or something else that you have never been diagnosed with? _____ If yes, please briefly describe what you believe the problem to be and why you believe this.

_____

_____

_____

7. Check the box of any disorder that a family member has been treated for, hospitalized for, or diagnosed with. Include the relationship of that family member to you on the line next to the disorder (e.g., father, uncle, sister, grandmother):

Depression: _____
Panic Attacks: _____
Eating Disorder: _____
Bipolar Disorder (Manic Depression):_____
Anxiety Disorder: _____
Schizophrenia: _____
Other: Specify disorder and relation _____

8. Do you think that a family member may have some type of problem with mood, anxiety, or something else that they have never been diagnosed with? _____ If yes, indicate the relationship of that family member to you and briefly describe what you believe the problem to be.

_____

_____

_____

9. Do you have any problems with vision, hearing, or reading that might hinder your performance on a test? _____ If yes, please describe:

_____

_____

Appendix Q

DEBRIEFING FORM

Thank-you for your participation in this study, your assistance has been greatly appreciated. If the study has created any distress or you simply need to speak to someone, here is a list of phone numbers you can contact:

Canadian Mental Health Association: 343-5564

Lakehead University Psychology Clinic: 343-8441

Lakehead University Health Centre: 343-8361

Lakehead University Student Career & Counselling Centre: 343-8018

Peer Support Line: 343-8255

Thunder Bay Depressive Manic Depressive Support Group: 622-9727

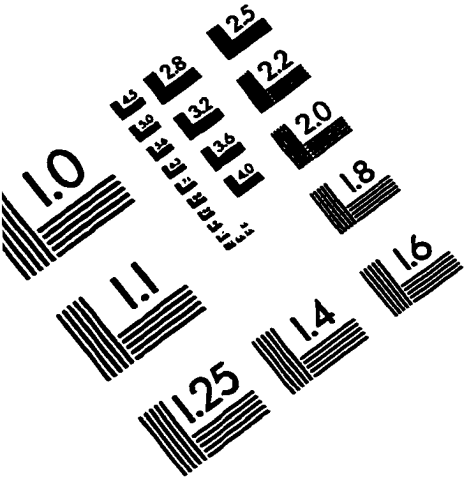
People Advocating for Change Through Empowerment: 343-4760

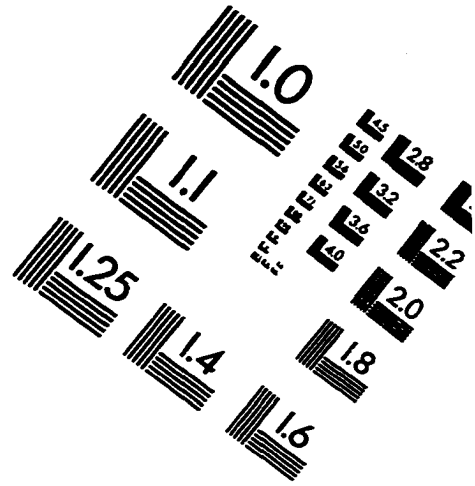
Thunder Bay Regional McKellar: 343-7123

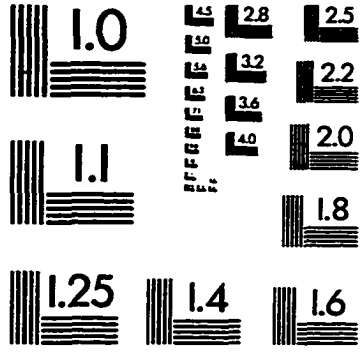
Lakehead Psychiatric Hospital: 343-4300

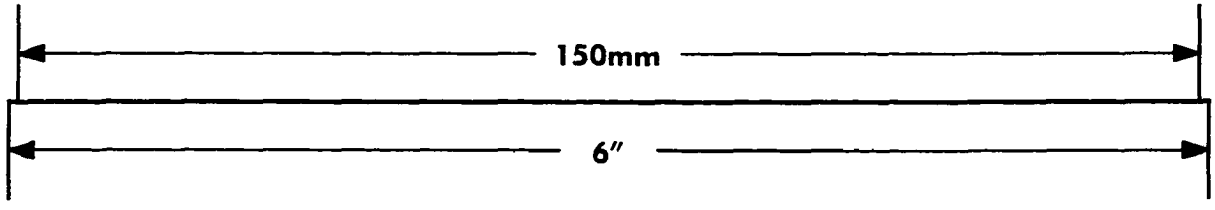
If you are interested in a summary of this study, it will be available by August 1998. You may choose to have the summary mailed to you directly, or you may obtain a copy from Tracy Gilbert or Dr. Hayman through the Lakehead University Psychology Department. The summary will include the purposes of the study, the benefits and implications, and the overall findings. For more information on this study, contact Tracy Gilbert at 343-8476 or Dr. Hayman at 343-8480.

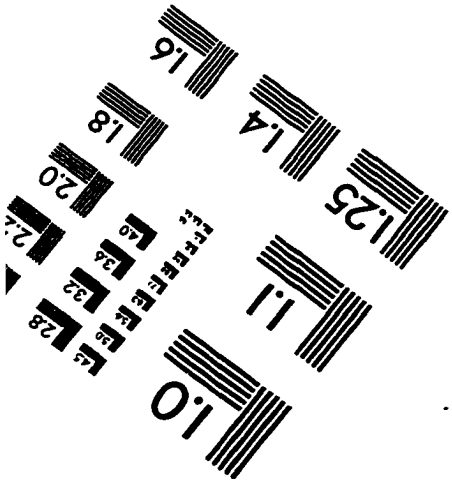
IMAGE EVALUATION
TEST TARGET (QA-3)

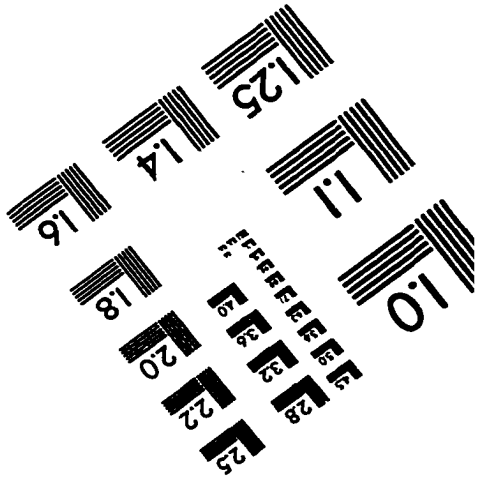












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