Effects of imagery and valence of information on improving memory in dysphoric college students

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The Effects of Imagery and Valence of Information on Improving Memory in Dysphoric College Students

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Abstract
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Director: Janet P. Wollersheim, Ph.D.

Much of the current literature regarding the effects of depressed mood on memory has revealed that depressed subjects evidence poorer recall on a variety of measures when compared with non-depressed subjects, and that the greatest amount of memory difficulty is for items of positive hedonic tone. Little research, however, has sought to identify methods of improving memory in this population as one aspect of treating depression. This study sought to compare a group receiving an imagery instruction set, a group receiving a cognitive instruction set, and a no-instruction control group as a means of improving memory in dysphoric college students for passages varying in item valence. The hypotheses of this study were that all groups would improve in memory due to a practice effect, that subjects in the imagery condition would recall more information than the other groups, and that the greatest amount of memory improvement from pre- to post-test would be for items of positive valence.

Ninety college students, identified as dysphoric on the Beck Depression Inventory, were randomly assigned to the three groups. Each subject was read a 640 word narrative passage about a person's day, and, after an interference phase of ten minutes, were asked to write down as much of the story as they could recall. Subjects in the imagery and cognitive conditions were then given training in using their respective memory techniques while the control group performed an unrelated task. All subjects were then read a second passage, and after a ten minute interference phase were again asked to write all that they could remember.

The data did not support the hypotheses of this study. A significant effect of material valence was found, however, such that all subjects tended to recall a greater number of negative items, followed by neutral items, and lastly by positive items. This finding was explained in terms of mood dependant memory. The results of this study, however, were confounded by a weak manipulation.

Points of discussion include methodological limitations of this project, possible explanations for the current findings, and suggestions for future research in the area of depression and memory.
Acknowledgements

As this project comes to a close, I look back over its course and progress with a sigh of relief, and would like to acknowledge the contributions of the many people involved in its completion.

First, and foremost, I would like to thank Janet P. Wollersheim, Ph.D. for serving as the chair of my committee. Dr. Wollersheim's patience and guidance from beginning to end of this project has taught me lessons beyond those of research -- how to be a competent professional.

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Fredric E. Rose
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Introduction

The condition known as depression has been written about for nearly 2000 years, although in the earlier times it was known as melancholia (Beck 1967). Even then the symptoms of the condition were fairly similar to depression as it is known today. The past few decades, however, have added a substantial amount of data to the empirical literature concerning the disorder. In particular, Beck (1967) published his book asserting that depression is not a disease of affect, but of cognition. In other words, people's incorrect thoughts are what influence the onset and maintenance of depression, rather than one's emotions. The defining symptoms of depression are as follows: (a) a specific alteration in mood, including sadness, loneliness, and apathy (b) a negative self-concept associated with self-reproaches and self blame, (c) regressive and self-punitive wishes (d) vegetative changes including loss of libido, anorexia, and insomnia and (e) change in activity level, either a retardation or agitation (Beck, 1967, p 6). The most important of the symptoms is what Beck refers to as the cognitive triad. The cognitive triad consists of negative thoughts about one's self, one's experience, and one's future. Beck contends that it is these negative thoughts which cause and perpetuate the condition known as depression. The cognitive theory of depression has helped to advance the empirical study of depression.
While there are many differing views concerning the causes and treatment of depression, Beck's theory has gained much appeal and a vast amount of the current research on depression has been geared towards investigating its validity. In a review of the more prominent theories of depression Blaney (1977) notes that while Beck's theory has many unique features, there is also a considerable amount of overlap with both Seligman's (1974, 1975) Learned Helplessness theory and Lewinsohn's (1974a, 1974b) Behavioral theory. In particular, some of the negative cognitions to which Beck refers appear to be the very ones which would be expected of someone in a state of learned helplessness. Indeed, cognitions such as the sense of hopelessness that things will never change or get better are very similar to the hypothesized feelings one has in the state of helplessness proposed by Seligman. In addition, both theories consider individual perceptions of events to be very important.

Lewinsohn's behavioral theory maintains that it is a lack of response-contingent positive reinforcement that causes clinical depression. A person becomes depressed, according to Lewinsohn, because the environment contains few positively reinforcing events for the subject, and/or because the depressed individual, perhaps because of a lack of skill, infrequently makes those responses that would be positively reinforced. The main difference between the cognitive and behavioral theories is fundamental. Lewinsohn asserts that
the cognitive aspects of depression are "secondary elaborations of the feeling of dysphoria, which in turn is presumed to be the consequence of a low rate of [response-contingent positive reinforcement]" (Lewinsohn, 1974a, p. 169). In other words, Beck maintains that cognitions cause depression, while Lewinsohn claims that the cognitions are a result of the depression. However, Lewinsohn's theory states that "depressed individuals are more sensitive to aversive stimuli...than non-depressed subjects" (1974a, p. 165). This characteristic, however, may simply be a behavioral manifestation of the negative view of one's world to which Beck refers.

Beck's most important and unique contribution to the various theories of depression is his emphasis on particular cognitions that are not addressed by the others (Blaney, 1977). According to Beck, the cognitive triad is the root of a series of other cognitive symptoms that lead to depression. This list includes a low self-evaluation, negative expectations, self-blame and self-criticism, indecisiveness, and distortion of body image (Beck, 1967). Because the literature dealing with the validation of the theory is quite extensive, it will not be discussed here. Suffice it to note that Beck's cognitive theory of depression has generated a considerable amount of research and there exists considerable empirical support for many of his contentions (Blaney, 1977).
Memory Problems in Depression

In recent years difficulties in memory have also been noted among depressed individuals (Beck, Rush, Shaw, & Emery, 1979), and much of the current literature dealing with depression has been devoted to investigating these difficulties. There appear to be two main areas where memory deficits have been noted: (a) Memory in general, and (b) memory for events (personal or otherwise) when the hedonic tone of the event is considered. With respect to the hedonic tone, it is unclear as to whether there is a heightened sensitivity to negative information, or a decreased sensitivity to positive information. This issue will be addressed in more detail later.

The degree of memory loss appears to be related to severity of depression (Johnson & Magaro, 1987; Fogarty & Hemsley, 1983; Clark and Teasdale, 1982). The more severe the depression, the greater the tendency to recall negative experiences, while recall of positive experiences significantly decreases. In a review of the literature, Johnson et al. (1987) concluded that the self-schemata of mildly depressed individuals do not share the same pervasive negativity as that of more severe, clinically depressed patients. As Johnson et al. (1987) state, severity affects memory in depression "(a) by disrupting trace processing and storage by its disorganizational nature, and/or (b) by producing low levels of effort in encoding and storage."
Fogarty and Hemsley (1983) presented depressed patients and non-depressed controls with a list of words on two separate occasions and asked them to recall a personal memory for each word on the list, and then to rate it for pleasantness. Because memories were taken on two separate occasions it was possible to study the effects of variations in mood on memory. Depressed subjects recalled significantly more unhappy experiences on the first assessment and significantly more happy experiences on the second assessment if an improvement in mood had also taken place.

Results of this study were also consistent with earlier research which demonstrated that depressed individuals recalled a significantly greater number of negative experiences than non-depressed controls. Fogarty and Hemsley concluded that "depression is most closely related to measures of unhappy memories while for the control group mild depression is related to measures of the accessibility of happy memories." In other words, mild mood fluctuation found in a normal population may result in decreased accessibility of positive memories, but larger variations in mood, like those noticed in the depressed patients by Fogarty and Hemsley, result in increased accessibility of negative memories. It has been hypothesized that at the onset of depression positive memories appear to be suppressed, but negative ones are not yet affected. However, because positive memories are suppressed, access to negative thoughts becomes easier. Easier access to negative memories assists
in perpetuating the depression, making negative memories more and more prominent, finally resulting in heightened access to negative cognitions and further suppression of positive ones, resulting in a vicious spiral into depression.

Fogarty and Hemsley have also ruled out the possibility that the effects of mood are on the categorization of memories, rather than on their accessibility. Independent judges rated the memories of both patients and controls for hedonic tone, and although the judges rated more moderately, in general they were in agreement with the subjects. It appears unlikely, therefore, that mood effects on categorization of memories can explain the effects noted in these studies.

Finally, Clark et al. (1982) presented depressed patients experiencing diurnal variations in mood with a list of words and asked them to recall a past real-life experience associated with each word. During the time of day when depression was worst, patients were more likely to recall negative personal memories than during the less depressed time of day. These authors also reported that the current hedonic ratings of the memory were more likely to be rated by the subjects as less positive (or more negative) than the original hedonic tone the more depressed a person was at the time they made the rating. Clark and Teasdale concluded that mood affects both the selection of emotional memories for entry into consciousness as well as how pleasing or upsetting those memories will be once they have entered consciousness.
Other research has found that in addition to lower recall due to the effects of severity of depression, memory access, as assessed by speed of recall, is also affected (Lloyd & Lishman, 1975; Fitzgerald, Slade, & Lawrence, 1988). The Lloyd and Lishman (1975) study involved presenting depressed and non-depressed patients with a stimulus word and asking subjects to think of a personal memory associated with each word. The latency between the time of stimulus presentation and the time of memory retrieval was the dependant measure. Subjects who later showed an improvement in their depression were re-tested. Results showed that the ratio between speed of recall of unpleasant and pleasant memories decreased with increasing depression. These results appear to be a function of the degree of depression, as pleasant memories were recalled faster than unpleasant memories in less severely depressed patients, while the opposite was true for more severely depressed patients.

Fitzgerald, et al. (1988) had dysphoric and non-dysphoric college students estimate the frequency with which they experienced 20 (10 positive and 10 negative) affects. Subjects were shown cards containing these affects and asked to judge the frequency with which they felt they experienced them on a scale of 1 (never) to 9 (several times a day). They were then presented with a card naming one of the affects and asked to think of a personal memory. Results indicated that dysphoric college students tend to estimate that they experience negative affect more frequently than
positive affect, while the reverse was true for non-dysphoric subjects. These investigators also found that dysphoric subjects recalled negative experiences faster than non-dysphoric subjects when presented with a negative stimulus cue. Conversely, the non-dysphoric subjects recalled positive experiences faster than dysphoric subjects after a positive stimulus cue. The authors concluded that if memories are associated with a particular affect, and those memories are highly available, then the judged frequency of the subjective experience of that affect will increase.

A potential drawback of this study is that it is entirely possible that the dysphoric subjects actually do experience more negative affect than non-dysphoric, and that these results are not simply a subjective interpretation based on memory availability. However, if the findings are based on memory availability the study lends support to a common finding in research on memory and depression: better memory for negative information (and/or poorer memory for positive information) will tend to increase depression, strengthening the memory for negative information, resulting in the depressive cycle mentioned above. It is suggested that if negative memories are more easily accessed, than the judged frequency of the affect of dysphoria will increase, making the individual more depressed, or at least lowering hope of experiencing positive affect, resulting in more depression.
Negative mood such as that found in depression does not appear to affect recall for negative information alone. In a review of the literature Ingram and Reed (1986) concluded that only pleasant and not unpleasant information appeared to be affected by mood. Several studies (Breslow, Kocsis, and Belkin, 1981; DeMonbreun and Craighead, 1977; Finkel, Glass, and Merluzzi, 1982; Isen, Shalker, Clark, and Karp, 1978; and Nasby and Yando, 1982) have all found a deficit in the recall of positively valenced material, relative to negatively valenced material. Breslow, et. al. (1981) used a story recall paradigm with hospitalized depressed patients. Patients were read a story containing a mixture of positive, negative, and neutral elements and asked to write down as much of the story as they could remember after a 10 minute interval. Results revealed an overall deficit in recall for depressed subjects relative to controls, most of which was attributed to poorer recall of the positive themes in the story.

DeMonbreun et al. (1977) and Finkel et al. (1982) found that only when the stimulus is balanced towards positive information was there a distortion by depressed individuals in their perception of feedback. DeMonbreun et al. used a discrimination task that provided non-verbal feedback (different shades of black on a slide to indicate degree of acceptability of the response) to depressed patients. Subjects were accurate in their perception of feedback immediately following presentation, but later underestimated
the amount of positive feedback received. In other words, it appears that the depressed patients, non-depressed psychiatric and non-psychiatric controls do not differ in their immediate perception of positive, negative, and neutral feedback. However, depressed patients, relative to the controls do tend to underestimate (distort) the amount of positive information actually received. This phenomenon only occurred when the subject had received a high rate of positive reinforcement. The distortion did not occur when the subjects received a low rate accompanied by a high rate of negative feedback. Similarly, Finkel et al. presented dysphoric and non-dysphoric college students with positive and negative self-statements. When the statement were primarily negative, no group differences in recall of amount of exposure were found. However, when the statements were primarily positive, the dysphoric group recalled being exposed to significantly fewer positive statements than controls. Isen et al. (1978, Study 2) and Nasby and Yando (1982, Study 1) found that induced depression resulted in a deficit in recall of pleasant words only. Teasdale and Fogarty (1979) on separate occasions induced depression and happiness in college students. They were then presented with a list of neutral words and were asked to recall either a real-life experience to be specified as either positive or negative, and to signal when they had thought of it. The amount of time taken to recall the experience was measured. The ratio of latency of recall for retrieval of unpleasant
experiences to the latency of retrieval of pleasant experiences was significantly lower in the depressed condition than in the happy condition. This effect was largely due to an effect of mood on the retrieval of pleasant memories. Teasdale, Taylor, and Fogarty (1980) found that mood inductions resulted in differences that were significant for positive memories only.

Finally, Natale & Hantas (1982) got mixed results regarding the issue of better memory for negative information and lower memory for positive information. Those authors hypnotized subjects and induced a happy, sad, or neutral mood-state and provided them bogus personality descriptions. Later the subjects were presented with a list of personality descriptors and were asked to pick out the descriptors from the "personalized" list provided earlier. Results were consistent with the literature in that induced depression lowered memory for positive self-relevant information and showed an increased tendency toward false-alarm identification of negative descriptors. This study provides support for the notion that temporary mood states are associated with biased memory processes about the self. However, the study is not without problems. First of all, only female subjects were used solely because they have been found to be more susceptible than males to mood induction procedures. This selection procedure may have resulted in a biased sample. In addition, the mood induction procedure itself may have confounded the results. The use of different
types of mood induction procedures, such as the Velten procedure vs. hypnosis, may produce differences in the quality of the induced mood, making comparison's difficult.

There is the question of the validity of studies where moods themselves are induced. Blaney (1986), in a review of the literature on memory and depression, concluded that a major problem with mood induction studies using memory elicitation, hypnosis, music, and the Velten (1968) procedures is that these inductions contain the explicit instructions for the subject to try to feel the specified mood (the Velten procedure involves asking the subject to read a series of self-statements of increasing positive or negative hedonic tone, which guides the subject into the desired mood). As Blaney notes, subjects in an induced mood may be behaving because of the mood, or possibly because they were told to adopt and maintain that mood. It is natural for "normal" subjects to try and counter any negative feelings they begin to experience. However, because of the experimental instructions to feel a given mood, subjects may be actively trying to maintain the negative feelings any way possible, in this case by paying attention to fewer positive or more negative information. Mood induction procedures have their advantages, though, most notably because they allow direct experimental manipulation. The question the researcher must answer is whether or not something else might be going on because of the procedure used.
Another common complaint in the current research on memory and depression is the lack of psychiatric controls to distinguish the effects of depression from the global effects of psychopathology. There have been a few studies, however, that have attempted to do this. Research by Gotlib (1981) investigated differences between depressed and non-depressed psychiatric inpatients and normal controls with respect to their administration and recall of self-reinforcement and self-punishment. Gotlib reported that in-patients did not differ in their administration of either punishment or reinforcement, although they did differ in their recall of amount and type of feedback. Both groups of in-patients administered significantly more self-punishments and fewer self-reinforcements than normal controls, but the depressed patients recalled giving significantly fewer reinforcements and more punishment than was actually the case. Gotlib concluded that while "a low-rate of self-reinforcement may be a characteristic of global psychopathology, deficits in the recall of self-reinforcement and self-punishment appear to be specific to depression" (emphasis added).

The results of the Gotlib (1981) study differ somewhat from a similar one by Nelson and Craighead (1977). Nelson et al. found that while depressed students recalled receiving more negative feedback than non-depressed students, they were more accurate in their recall than the non-depressed students, who tended to recall less negative feedback than was actually the case. The difference in these two studies
appears to be in the type of feedback given. Gotlib investigated self-administered praise and punishment, whereas Nelson and Craighead used feedback from an external source, the experimenter. It is therefore possible that depressed individuals tend to exhibit greater distortion on the recall of material that is more clearly self-referent; they subject their own thoughts to more cognitive processes than information from external sources, thus increasing the probability of distortion or faulty processing.

Roth and Rehm (1980) also used a non-depressed psychiatric control group in an investigation of self-monitoring processes, memory, and depression. Subjects were asked to rate each word of a list containing 40 positive and negative adjectives as to how well each word characterized him or her. Next, subjects were asked to circle the ten positive and negative adjectives from the list that they felt best described them. Later subjects were asked to write down the 20 circled adjectives, and then were given a recognition test for those same 20 items. In contrast to the above study, these investigators found no differences between groups in their recall and recognition of personally relevant adjectives, although the recall scores were in the predicted direction of poorer performance by depressed subjects.

As a second task, the investigators presented subjects with 30 words, one at a time, and asked them to guess at a common associate of each word. The list of words was actually a list with ambiguous associates, and there were in
fact no correct or incorrect answers. Subjects received no immediate feedback concerning their responses, but when finished they were informed that they were "correct" on exactly half of their answers. They were then told that they could review some of their guesses, either correct ones or incorrect ones. The depressed patients tended to select the incorrect choices more than the non-depressed patients. Finally, the subjects were asked to rate a video of themselves on two dimensions, a positive one and a negative one. When ratings were compared to ratings of objective judges, both groups appeared to be poorer at self-monitoring, although depressed patients rated themselves as displaying significantly fewer positive behaviors and more negative behaviors than the non-depressed patients. Again, there appears to be some non-specific effect of psychopathology, although it cannot account for all of the effects shown in the literature.

Past research (Williams and Broadbent, 1986) suggests that the depressed individual's difficulties in accessing specific positive memories may be due to inefficient retrieval strategies, resulting in very general memories of time periods or repeated events, such as "My husband often fixes my car for me", or "We never had pets when I was a child." The research by Moore, Watts, and Williams (1988) provides further support to this claim. These authors asked depressed patients and non-depressed, non-psychiatric controls to recall a specific memory from stimulus sentences
varying in valence. If a subject's initial response was too
general the experimenter would prompt the subject to give a
more specific response. Results show that depressed
patients' initial responses to all of the sentences were
significantly more general than the controls' initial
responses. In addition, there was a significant group x
valence interaction, in that depressed subjects gave
significantly more general responses to positive stimuli that
could not be followed by a specific memory than controls.
There was no difference between groups for the negative
stimuli. Depressed individuals, therefore appear to be able
to generate specific memories for negative events, but have
difficulty when the event is of a more positive hedonic tone.

Watts, MacLeod, and Morris (1988a) attempted to describe
associations between phenomenal and objective aspects of
concentration problems in depression. These authors
differentiated concentration problems into "blank" lapses and
"mind wandering" lapses, although they state that there are
other types as well. The researchers were looking for a
behavioral correlate associated with these two types of
concentration lapses, as measured by a questionnaire and
self-report during the various tasks (i.e.- subjects were to
say "Lost it" whenever they found that they had lost
concentration, and then "Yes" or "No" to indicate whether or
not they had started to think about something else). They
used two tasks, the 'Tower of London' task and memory for a
prose passage. The Tower of London planning task involves
three different colored beads arranged on sticks of unequal length. The task is to move the beads to a target position in the minimum number of moves. There were 12 problems in all, requiring between two and fives moves each. The memory for prose task involved answering 10 questions about a 750 word passage about a department store, which had just been read. Results indicate that blanking appears to be associated with longer planning times in the 'Tower of London' task, while mind wandering is more closely associated with poor memory for prose.

Watts et al. (1988a) offer the hypothesis that the amount of regulation of thought necessary to complete a particular task determines which type of lapses can occur. Problem solving requires that a series of stages be carried out sequentially, and generally utilizes the assistance of the Supervisory Attention System (SAS), a cognitive system that gives supervisory assistance to action systems that require it (Norman and Shallice, 1986). The SAS constructs a hierarchy of thoughts and assists in maintaining attention to the stages needing current attention. Watts et al. (1988a) suggest that when a depressed individual engages in problem solving the SAS is inhibited, causing lapses in concentration of the blanking type (for a complete discussion of this phenomenon see Norman & Shallice, 1986). However, on memory for prose, switching from one stage to another is not required, making one susceptible to intrusions of other thoughts, or mind wandering.
A simpler alternative hypothesis is simply the amount of cognitive effort required by the task. Problem solving presumably requires more processing effort than memory for prose, necessitating full attention to the task at hand (shutting down other thoughts). With the absence of other thoughts, lapses in concentration would take the form of blanking. In contrast, less effortful tasks like memory for prose fail to receive full attention by depressed subjects, resulting in mind wandering.

The cognitive model of depression (Beck, 1967) maintains that a depressed individual views the self, the environment, and the future in negative terms. It follows that if a depressed person has access only to negative events in memory, the negative views would tend to get worse, perpetuating the negative cognitions, resulting in a downward spiral further into depression. Better access to more positive life-events might therefore serve to disrupt this pattern.

The Use of Imagery in Memory Improvement

Since access to more positive memories may aid in decreasing depression, cognitive therapy might be enhanced by incorporating techniques which assist depressed patients in accessing more positive memories. As Teasdale and Fennell (1983) state, "The general evaluation of cognitive therapy needs to be supplemented by more detailed investigations of specific component techniques." Watts, MacLeod, and Morris (1988b) have noticed that while techniques such as the
structured assignments suggested by Beck et al. (1979) are commonly used, so far little research has paid attention to the improvement of memory in the cognitive therapy of depression. Watts et al (1988b) tested the use of a visual imagery processing strategy as a means of improving memory problems in depressed patients. Imagery was chosen because of the wide range of situations in which it can be used by patients, such as job instructions at work.

Watts, et al. (1988b) assigned depressed patients to one of two experimental conditions, imagery and relaxation, and a no-treatment control group. Subjects in the imagery condition were given training and practice in the use of imagery, while the relaxation subjects were given brief relaxation training. This latter group was used as a control for non-specific effects, while the no-treatment group was used to control for practice effects. All subjects were then read a 750-word passage aloud twice by the experimenter, who had given them the instructions to use the technique each had just learned to help remember it. The no-treatment group was simply told to "concentrate on it as well as you can."

Subjects were then immediately asked 10 questions testing their knowledge of the passage. Results of the study indicate that subjects instructed to use imagery recalled significantly more of the passage than those subjects given relaxation training as well as those given no instruction at all. These latter two groups did not differ from each other in amount of recall. Subjects with less state anxiety and
those of less endogenous depression benefitted most from the technique, although anxiety was no longer a factor when endogeneity was partialed out. There was also a zero correlation between ability to visualize, as measured by the Verbalizer-Visualizer questionnaire. Thus, less endogenous depressed patients, irrespective of their tendency to think in words or pictures, appear to be able to benefit from imagery instructions to help improve memory.

There is a limitation to the Watts et al. (1988b) study however. The story used by these authors was purposely constructed to be neutral in content and of little interest (different sections of a department store). Their reasoning was to ensure that the story would fail to be encoded unless processing effort was made. While this is a valid concern, much of the current literature on depression and memory has noted that the difficulties in memory with this population tend to lie in either a heightened attention to negatively toned material, or a lower attention to positively toned material. Memory deficits, while still present, are least visible on material that is neutral in hedonic content. The imagery technique employed, therefore, may help memory in general, but it is unclear if it can improve memory for information containing positive and negative elements.

In addition, this study only controlled for non-specific techniques. The authors did not compare the imagery technique to other forms of memory improvement such as
cognitive instructions. The current study is designed to investigate these questions.

There is a large amount of literature on the effects of imagery instructions on memory (see Alesandrini, 1982 for a more complete review). In one study, children remembered a passage better when they received imagery instructions (Kulhavy & Swenson, 1975). This effect was even more pronounced when practice was given prior to the instructions. Pressley (1976) used third-graders in an experiment by giving them training and practice in either making up mental images along with examples of good pictures or in recalling story facts. A story was then read to each group. Children who had been given imagery practice were also given instructions to form mental images after reading each passage of the prose. Imagery practice and instruction proved to be better in facilitating memory for the story than the control students who received neither training or practice. Because both training and instructions were used together, it cannot be ascertained as to which was more effective, instructions, training, or a combination of the two. It does show, however, that imagery in general is superior to rehearsal in improving children's memory for prose.

Using expository text, however, DeRose (1976) failed to find the same effect. In this study fifth-graders were told to mentally imagine concepts presented in a social studies passage. These students remembered less than students who were shown actual pictures, and performed no better than a
control group who received no instructions. This study only used the instructions to form images, without the aid of practice, suggesting that instructions alone may not be enough to facilitate memory, at least in children.

It has been suggested that a problem with trying to get learners to use mental imagery to improve reading retention is that reading tends to interfere with imagery because both use some sort of visual processing (Alesandrini, 1982). As a result, the use of imagery during reading may require more time if it is to be effective. Lesgold, Curtis, DeGood, Golinkoff, McCormick, and Shimron (1974) asked subjects to read a passage within a limited time period and were given instructions to use mental imagery. The authors found that while there were no overall benefits from the imagery instructions, adults who received the instructions tended to remember more from the first half of a passage than controls who received no instructions. These results suggest that imagery may be beneficial for learning, but requires more time. Other studies (Levin & Divine-Hawkins, 1974; Brooks, 1967) have found that both children and adults can benefit from the use of imagery during listening, rather than reading.

Attempts to use imagery strategies to improve memory performance of neurological patients (Powell, 1981, p. 124), blind subjects (Jonides, Kahn, & Rozin, 1975), and schizophrenics (Traupmann & Anderson, 1981) have met with some success. Until the Watts et al. (1988b) study, however,
there appears to have been no attempt to use imagery to improve memory in depressed subjects.

In a review of the imagery literature, Alesandrini (1982) concluded that the use of imagery instructions can facilitate memory for a variety of people, although she states that pictorial strategies (strategies utilizing actual photographs or drawn pictures) and the use of concrete language (words readily visualized) are slightly more beneficial. One advantage of imagery instructions, however, is that the images used may be "idiosyncratic or bizarre", a condition considered by some memory experts to facilitate memory (Lorayne & Lucas, 1974).

There is growing evidence that imagery does have a clinical use in the treatment of depression, or moods in general (Means, Wilson, & Dlugokinski, 1987; Hart & Means, 1985; Schultz, 1978). Schultz (1978) has noted that Freud and Abraham have used imaginal techniques to treat depression, although those techniques were of a psychoanalytic nature and involved long-term treatment. Means et al. (1987) induced anger and sadness in two groups of subjects and compared the relative effectiveness of imagery and cognitive treatments to improve mood. Subjects were asked to remember a particular event in their life that made them feel either sad or angry. This memory was then used as a starting point for an Experimentally Induced Mood (EMI) procedure designed to produce the target mood. The EMI consisted of both imaginal and cognitive components for the
subject to re-experience the mood from the memory. Subjects were then told to use first either a cognitive or an imaginal set of instructions (depending on experimental group) to change their mood within a 15-second time period. The EMI was re-administered and the other set of instructions was given. Results of the study showed that overall both methods were effective in mood reduction. However, when subjects used imagery prior to cognitive statements both methods were equally effective, but when statements were used prior to imagery, imagery proved to be more effective. The investigators concluded that "images are more effective in producing emotional change because affect and images are precognitively connected."

A potential drawback to this research is that it is unclear if the authors controlled for type of mood. Subjects were merely asked to "recall a situation in the past when they felt particularly sad or angry", but did not appear to specify or control for which type of mood was thought of. It is therefore difficult to conclude whether the investigated techniques improved the unpleasant moods in general, or either sadness or anger alone. In addition, the arguments against the use of mood inductions in general apply to this study. A no-treatment control group was not used, so it cannot be concluded that either treatment worked at all. There is no indication that the EMI procedure used provided the researchers with any lasting mood. The re-experienced feelings may have simply dissipated in the short time
following induction. A control group could have alleviated this problem.

Hart et al. (1985) compared imaginal and cognitive techniques to improve mood in relation to the specific etiology of the dysphoria. Dysphoria was induced in subjects in a hypnotic state by asking them to recall a sad or depressing event, followed by either cognitive or imaginal instructions to re-experience that event. Subjects were then given either an imaginal or a cognitive treatment involving a set of instructions to raise their mood. After 15 seconds subjects rated their mood. Results show that the cognitive treatment was only effective when the dysphoria was cognitively induced. Imaginal treatment was effective irrespective of type of induction. These results indicate that the use of imagery can have a positive effect on depressed individuals. Hart and Means caution the acceptance of the conclusion that imagery treatments are more effective than cognitive ones because of the 15 second time allowance. They note that it is possible that the cognitive treatment may require more processing time than the study allotted. There is an alternate hypothesis to their results, however. In the imaginal treatment condition instructions were given to "Sense how your body needs to feel and what it needs to do. Allow the things to happen to you that need to happen." In the cognitive condition subjects were instructed to "Think through and integrate your knowledge in ways that are best for you in your situation. Keep thinking about what happened
and why you are sad." As one may notice, there is a difference in the types of instructions given (the two excerpts are only a sample, but they are representative). The imaginal instructions appear to emphasize a moving forward and getting through the sad event, as if telling the subjects to settle the sad feelings to end the sadness. Conversely, the cognitive instructions tend to emphasize the sad situation, telling the subject to deliberate about it and why they feel that way they do. There is only minimal emphasis on working through or getting past the feelings. It is possible that the difference in the instructions rendered the cognitive method ineffective.

Other research has noted that depressed patients do not benefit from imagery, although there are methodological problems with them. Hart, Kwentus, Hamer, and Taylor (1986) compared the performance of elderly Alzheimer's patients, elderly depressed patients, and elderly controls on a verbal learning task. The list of words consisted of 6 words of high imagery value and 6 words of low-imagery value. Depressed patients performed worse than the elderly controls, although better than the Alzheimer's patients. There was no difference for the memory of low imagery value words between depressed and normal groups, but depressed patients tended to recall significantly fewer high-imagery-value words than normal. The authors' conclusion that depressed patients may be unable to use imagery to facilitate memory may be unfounded, however, because the study did not instruct
subjects to use imagery. Depressed individuals’ motivation
to perform certain tasks is often low, and getting them to
carry out these tasks may require explicit instructions to do
so. The lack of benefit from imagery may be due to the fact
that it did not occur to the depressed patients to use it or
that it required too much cognitive effort to do so, rather
than an inability to use imagery.

It appears then, that memory can be facilitated by the
use of imagery. There is also some evidence that imagery
does have some effect on negative affect, particularly
dysphoria. The current study is an attempt to clarify the
ability of imaginal techniques to improve the memory for
positive stimuli in depressed subjects. The imagery
instruction technique will be compared with a more cognitive
technique involving cognitive instructions.

There are three hypotheses in this study. The first is
that subjects in all groups will improve in the amount of
recall due to a practice effect. The second hypothesis is
that subjects in the imagery condition will recall more
information overall than the other groups because of the
imagery technique’s presumed superiority as a memory aid.
Finally, it is believed that the greatest reason for lower
overall memory deficits in dysphoric subjects is due to a
decreased ability to recall positive elements. Furthermore,
it is also believed that there should be little evidence of a
deficit in the ability to recall negative elements.
Therefore, the area with the greatest room for recall
improvement will be for positive elements of the stories. The third hypothesis, therefore, is that the greatest amount of memory improvement for all groups from pre- to post-test will be for items of positive valence.

The method for this study will be similar to the Watts et al. (1988b) study, with the exception that stories containing positive, neutral, and negative events will be used instead of the more neutral ones. Some of the variables in the Watts et al. study proved to be of no consequence. As a result, these variables (e.g., subject classification based on state vs. trait anxiety and verbalizers vs. visualizers), will not be studied.
Method

Overview

Ninety college students were screened for depression using the Beck Depression Inventory (BDI). Those scoring at or above a 12 on this instrument were asked to participate in the experiment. Only those subjects who also met this cutoff score during a second administration of the BDI at the time of the experimental manipulation were allowed to continue in the experiment. All subjects participated in the experiment on an individual basis.

The experimenter informed the subjects that the study was investigating memory, and asked them to pay attention to a story that was about to be read. After the experimenter read the passage, subjects solved simple arithmetic problems for ten minutes. These problems served as an interference task to prevent any rehearsal of the story. Subjects were then asked to write down as much of the story as they could remember. This served as the pre-test.

Next, one group of subjects was instructed to use imagery in recalling a story, while another group was instructed to use a more cognitive strategy as a memory aid. In order to give subjects practice in using the techniques, both groups were read a short passage and asked to repeat it verbally from memory. A third group, the control group, received no such instruction. They worked on a task unrelated to memory during this phase of the experiment.
The experimenter then read all subjects a second story similar in content to the one used for the pre-test, instructing them to use the learned technique to assist in recall (subjects in the control group did not get these instructions). After a ten minute interference phase involving more arithmetic problems, subjects were again asked to write down all they remembered of the second story. This served as the post-test. All subjects were then administered a manipulation check, debriefed, and given class credit for their participation in the experiment.

Subjects

Ninety introductory psychology students at the University of Montana (22 male, 68 female; mean age: 21) served as subjects. All subjects received class credit for their participation. The Watts et al. (1988b) study reported that the imagery technique employed in that study was most effective for patients diagnosed with reactive, rather than endogenous depression. This experiment used dysphoric college students because this population would be most analogous to patients with reactive depression, allowing greater generalization. Subjects were treated in accordance with the "Ethical Principles of Psychologists" (American Psychological Association, 1981).

Subjects were initially screened by administering the Beck Depression Inventory (BDI) (Beck, Ward, Mendelson, & Erbaugh, 1961), and those subjects who scored at 12 or above, indicating at least a mildly dysphoric mood, were asked to
participate in the study. The BDI is a widely used and popular method of identifying depressed individuals, and has sufficient reliability and validity for this purpose. The BDI is a 21-item self-report instrument that provides a measure of an individual's current level of depression. It has been shown to correlate highly with other measures of depression (Davies, Burrows, & Poynton, 1975; Gotlib, 1984) and with psychiatrists' ratings (Bumberry, Oliver, & McClure, 1978). Because the time between the screening and the experimental manipulation usually lasted a few days, subjects completed the BDI a second time just prior to beginning the experiment. This was to assess each subject's level of dysphoria at the time of the manipulations. Only those subjects who still scored above the cutoff participated in the experiment. The mean BDI score for this second administration was 18.2 (range = 12-39), a level indicating moderate dysphoria. The mean BDI scores for the imagery, cognitive, and control groups were $M = 18.17$, 17.57, and 18.83, respectively. There were no differences between groups regarding level of depression, as assessed by a one-way analysis of variance using experimental group as the independent variable and BDI scores as the dependent measure, $F(2,87) = 0.326$, $p > .05$. Separate one-way analyses of variance were also conducted to assess any differences between groups with respect to sex and age of subjects. In the imagery, cognitive, and control groups the mean number of women was 20, 25, and 23, respectively, $F(2,87) = 1.13$, $p >
The mean age for the imagery, cognitive, and control groups was 23, 20, and 21 years, respectively, $F(2,87) = 1.67, p > .05$. These procedures for selecting dysphoric subjects are in accordance with the recommendations put forth by Kendall, Hollon, Beck, Hammen, & Ingram (1987).

**Materials**

Two passages, each with approximately 640 words served as stimuli. One of the passages was adapted from Breslow, et al. (1981). Each passage was a narrative containing a mixture of 15 positive, 15 neutral, and 15 negative elements regarding a person's day. Each passage was constructed sentence by sentence with either a positive, negative, or neutral theme in mind. Thus, each sentence, or in some instances a part of a sentence, involved a natural unit of analysis for scoring. As in the Breslow, et al. (1981) study, in constructing themes every attempt was made to state them in simple, declarative statements with comparable amounts of detail and grammatical usage.

The passages were constructed to be equal in positive, negative, and neutral content so that one story was not more negative or positive than the other. The negative themes of the stories were based on the categories of masochistic dream material described by Beck (1967). Such material typically portrays the subject as being less fortunate or less attractive than he or she is in reality, or as being subjected to an unpleasant experience. The specific categories described by Beck that were used in story
construction for the present study include physical discomfort and injury; thwarting; deprivation; physical attack; non-physical attack; being excluded, superseded, or abandoned; and being lost.

The positive themes of the two passages used in this study were derived from Dahl's classification of the positive emotions (Dahl, 1977). In essence, these themes are the antithesis of Beck's masochistic categories, and include goal achievement, success, reward, relief, satisfaction, and the reception of altruistic assistance. Neutral elements of the stories were mainly filler items used to continue the flow of each passage. The different elements occurred randomly throughout the stories in order to avoid patterns of valence (see Appendices A and B for the stories).

Procedure

The author and advanced undergraduate students in psychology involved in a course designed to help them learn methods of research administered the experimental manipulations to subjects individually. Each assistant received training prior to beginning the study and had specific instructions to be read to subjects.

Those subjects who had scored above the cutoff during the screening were contacted and asked to return. Upon entering the testing room each student again completed the BDI, as well as the Marlowe-Crowne Social Desirability Scale (Crowne & Marlowe, 1960). The latter scale served primarily as a control to avoid demand characteristics that may arise
from a second administration of the BDI. Subjects who no longer scored above the cutoff on the BDI were excused, while subjects still scoring at a 12 or above continued in the experiment.

Subjects were randomly assigned to one of three conditions: imagery memory technique, cognitive memory technique, or a no treatment control condition. Thirty subjects served in each group. The experimenter told subjects, "This is a memory experiment. I am going to read you a story, and I want you to pay close attention because you will be asked to reproduce this story from memory as best as you can later on." The experimenter read one of the stories aloud at a medium, steady pace. The order of story presentation was balanced to avoid order effects. Following the reading, subjects performed an unrelated interference task (solving simple math problems) for approximately ten minutes in order to prevent rehearsal of the stories. After the interference period subjects were asked to write down as much of the story as they could remember. Instructions to subjects were as follows: "Now I would like you to write down as much of the story as you can remember. Even though you may not be able to remember the exact words of a sentence, try to write down the meaning of it as close as possible to the original story." Scores from this recall served as the pre-test.

**Imagery Instructions.** Subjects in the imagery memory technique group then received the memory instructions
pertaining to their condition, followed by training and
guided practice in using the instructed technique. A
potential problem for the study was the lack of motivation
often observed in depressed individuals (Beck, 1967). As
with the Watts et al. (1988b) study, it was anticipated that
instructions alone would not be sufficient, justifying the
use of this guided practice.

This practice phase involved the reading of a short
passage, neutral in content to avoid any effects on mood (see
Appendix C for the passage). In the imagery condition
subjects received instructions similar to those in the Watts
et al. (1988b) study. They were as follows:

I would like to see just how well you can
concentrate on a passage if you really try to
picture what you hear. Try to form a mental image
of each scene as I describe it. Put yourself in
the scene and see what is going on. Experience
what is happening. Make pictures in your head
about what is happening. Imagine that you are part
of the story.

The experimenter then read the short passage. At select
points during the practice passage the experimenter stopped
and gave "imagine that" instructions. Following the passage
subjects were asked to describe the scene as vividly as
possible. If the subject had difficulty in recalling parts
of the practice story the examiner gave cues until the
subject recalled the part, and suggested a possible image
that might be used to recall that section of the passage.
For instance, if the name of a store couldn't be recalled,
the examiner might have suggested picturing the sign above
the door. Subjects were read the practice story only once, and were asked to recall it only once. The total time for this phase of the experiment was approximately ten minutes.

**Cognitive Instructions.** The procedures for the subjects in the cognitive condition were identical to the procedures in the imagery condition, except for the memory instructions and type of assistance during the practice phase.

Instructions for the cognitive group were as follows:

I would like to see just how well you can concentrate on a passage if you really try to think about the words and ideas that you hear. Try to think about what is read. Say the words over again in your head, thinking about the ideas expressed in the story. Think about what is happening. Think about the ideas that are being expressed.

At the same select points in the story as the imaginal group, the experimenter stopped and gave "think about that" instructions. Subjects were then asked to repeat the story as clearly as possible. When subjects in this group had difficulty in recalling parts of the passage, the experimenter again offered cues, and suggested a theme or idea for that part of the practice story. For instance, if the name of a store couldn’t be recalled, the experimenter might have suggested the relationship between the name of the store and the store’s purpose (e.g., the "Fast-fax" copy store makes copies and faxes, and also wants to advertise its speed).

Following the practice the experimenter instructed subjects to use the memory technique that they had just learned to aid recall of the post-test story, which was then
read aloud once. That is, subjects in the imagery condition were reminded to "picture everything you hear, just like you did on the other story. Create a mental picture", and in the cognitive condition subjects were told to "concentrate on the thoughts and ideas just like you did on the other story. Say them over again in your mind." No other instructions were given once the reading of the post-test passage had begun. Simple arithmetic problems again served as an interference, lasting ten minutes. After this interference phase subjects were again asked to write down as much of this post-test story as possible, using the same instructions as in the pre-test phase.

Control Group. Procedures for the pre-test phase of the experiment were the same for subjects in the control group. However, during the training and practice phase of the imagery and cognitive conditions, the control group performed an unrelated task - Raven's Progressive Matrices. This task is fairly easy to complete in the beginning, so as not to cause any frustration or anxiety, affecting concentration. Subjects worked on this measure for the same amount of time it took the experimental groups to complete their training and practice, approximately ten minutes. Before reading the post-test passage the experimenter told subjects in the control group to simply "concentrate on the story as well as you can."
**Manipulation Check**

After the post-test all subjects were asked to identify the method they felt they relied upon the most in recalling the post-test story. They also rated how effective they felt that method was and indicated if they felt they would try to use that technique in the future (see Appendix D for the manipulation check). In order to avoid demand characteristics, the question was asked as follows: "We have found that about one-third of the people think of words to memorize, about one-third use pictures, and about one-third use no particular method. Can you tell me which method you feel you actually relied upon the most in remembering the second story?" This ended the experiment. Subjects were then debriefed in full (see Appendix E for the debriefing statement).

**Scoring of Responses**

Two undergraduate psychology majors, blind to the conditions of the experiment, performed the content analysis for all subjects' stories. Guidelines for scoring were constructed and given to the two raters, who received training in their use prior to scoring the experimental data. Positive, negative, and neutral elements were scored as either present or absent. In order for an element to be considered present, the statement written by the subjects must have contained both the general subject matter of the original element and the original theme of that statement. For example, if one of the positive elements in a story
involved the character's good mood, any statement in the reproduction that indicated the character's good mood was scored as present. Appendices F and G contain the scoring guidelines for both stories. The order in which subjects wrote the various elements was not considered important, nor was the exact wording of phrases. Final scores were the total points in each valence category. Thus, subjects could have received 15 points for each of the positive, neutral, and negative categories, for a possible total of 45 points per story. This scoring method was consistent with that used in Breslow et al. (1981).
Results

**Stimulus Equality**

The valence equality of the two stimulus passages was verified by having 20 college students read both stories and rate each element on a 5-point Likert-type scale. The stories were presented in their entirety. Each element, however, was identified by a number. This number indicated to the students that they were to rate that element on the Likert scale, with 1 being very negative and 5 being very positive.

To be considered equal in valence the ratings of the two stories should be highly correlated, such that high ratings on one story (indicating positive valence) would correspond to high ratings on the other story. Additionally, statistical differences should be found between the valence ratings of the non-corresponding elements within the same story and between ratings of non-corresponding elements of the other story (non-corresponding elements means elements intended to be of a different valence, such as positive vs. negative). Such differences would indicate that there were indeed three distinct valence categories in the stories. No significant differences should be found in the ratings of corresponding elements of the two stories (e.g., the positive elements of “Bill’s Day” and the positive elements of “Susan’s Day”), ensuring that the elements of one story were
not more extreme in valence than the corresponding elements of the other.

In order to assess the degree of correlation between the two stories, a Pearson product-moment correlation statistic was calculated using the entire range of valence ratings of each story. That is, the two sets of 45 ratings (one set per story) for all 20 student raters were grouped according to the intended valence category. Items intended to be positive were paired, those intended to be neutral were paired, and those intended to be negative were paired. These two lists of 900 ratings were then correlated. This statistic revealed that the two stories were highly positively correlated, \( r = .699 \).

Separate Bonferroni adjusted t-tests comparing the student ratings of the positive, neutral, and negative elements of each story were computed. In other words, ratings of the positive elements of one story were compared with ratings of the negative and neutral elements of the same story, and also with the ratings of the positive, negative, and neutral elements of the other story. The ratings of all corresponding elements did not differ significantly from each other, \( p > .05 \). Ratings of all non-corresponding elements both within and between stories did indeed differ significantly, \( p < .001 \). Tables 1, 2, and 3 contain the means and t-values for these analyses. The means for these analyses are also presented in Figure 1. Altogether, these
Table 1
Means and t-values for Rated Elements of Stimulus Passages

<table>
<thead>
<tr>
<th></th>
<th>Bill's Story</th>
<th>Susan's Story</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Positive</td>
<td>Neutral</td>
</tr>
<tr>
<td>Positive</td>
<td>M = 4.26</td>
<td>M = 3.23</td>
</tr>
<tr>
<td>M = 4.26</td>
<td>-0.02</td>
<td>-19.25*</td>
</tr>
<tr>
<td>Neutral</td>
<td>20.02*</td>
<td>-1.41</td>
</tr>
<tr>
<td>M = 3.30</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Negative</td>
<td>47.16*</td>
<td>26.72*</td>
</tr>
<tr>
<td>M = 1.80</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note. t-values at cell intersections are for each comparison between the valence categories of the two stories.

*p < .001
Table 2
Means and T-values for Comparisons of Valence Elements Within the "Bill's Day" Story

<table>
<thead>
<tr>
<th></th>
<th>Positive</th>
<th>Neutral</th>
<th>Negative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive</td>
<td>M = 4.26</td>
<td>-</td>
<td>18.83*</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>40.66*</td>
</tr>
<tr>
<td>Neutral</td>
<td>M = 3.23</td>
<td>-</td>
<td>-26.55*</td>
</tr>
<tr>
<td>Negative</td>
<td>M = 1.79</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Note. t-values at cell intersections are for each comparison between the elements within "Bill's Day".

*P < .001
Table 3
Means and T-values for Comparisons of Valence Elements Within the "Susan's Day" Story

<table>
<thead>
<tr>
<th></th>
<th>Positive</th>
<th>Neutral</th>
<th>Negative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive</td>
<td>M = 4.26</td>
<td>M = 3.30</td>
<td>M = 1.80</td>
</tr>
<tr>
<td>Neutral</td>
<td>--</td>
<td>17.84*</td>
<td>41.47*</td>
</tr>
<tr>
<td>Negative</td>
<td>--</td>
<td>--</td>
<td>31.50*</td>
</tr>
</tbody>
</table>

Note. t-values at cell intersections are for each comparison between the valence categories within "Susan's Day".

*p < .001
Figure 1

Mean valence ratings for story elements.
Higher ratings indicate more positive valence.
results indicate that the stories were equal in content and did contain three groups of elements differing in valence.

**Inter-rater Reliability**

The two raters, blind to the purpose of the study, were given specific guidelines and training in conducting the content analysis for the two stories. Pilot testing with non-depressed subjects was conducted in order to give experimenters practice the procedures of the study. This resulted in the collection of 20 sets of data (two stories per set), which served as the training data for the two raters. The raters were each given ten data sets, consisting of ten written protocols of "Bill's Day" and ten written protocols of "Susan's Day", and were asked to score them according to the presented guidelines. The author then compared the two raters' scores for the first ten data sets and identified common errors or misconceptions in scoring. This feedback was provided and the second set of data were given to the raters for scoring. At the end of the training procedure a Cohen's kappa of .82 for "Bill's Day" and of .86 for "Susan's Day" had been achieved. This was considered an acceptable level of reliability, and no further training was given once the actual scoring had begun.

**Scoring**

After all experimental data had been scored by the two raters individually, the author compared all scores and again identified disagreements, but provided no feedback as to how
to settle them. The two raters then settled all disagreements by discussion without assistance. The final tally of responses for each subject, as agreed upon by the two raters, served as the recall scores. Thus, there were six scores per subject, one for each valence category in both stories.

The Effect of Depression on Recall

Much of the current literature in the area of depression and memory has shown that the ability to recall stimuli decreases as level of depression increases. Based on this finding, it was believed that the present study would also show such effects prior to any experimental manipulation. To assess the effect the level of dysphoria was having on recall, four Pearson product moment correlation coefficients were calculated between subjects' BDI scores at the time of manipulation and the pre-test positive, pre-test neutral, pre-test negative, and pre-test total (the sum of the three valence categories) scores. These coefficients, $r = 0.016$, $r = 0.017$, $r = 0.037$, and $r = 0.016$, respectively, were all non-significant, suggesting that level of depression did not have a significant effect on recall in general, nor on the recall for items of specific valence. Because of the truncated range of BDI scores (the modal score was 13), however, the correlation statistic may not be an appropriate test for the effect of depression on recall scores. There is other evidence that suggests depression was indeed having an
effect on recall, which will be discussed in more detail later.

Memory Improvement

The experimental data were analyzed in a single 3 (memory condition) X 2 (pre- post-test) X 3 (valence) analysis of variance with repeated measures on the second and third variables. The dependent measures for this analysis were the total recall scores for each of the three valence categories, for a total of six scores (three pre-test and three post-test) per subject. Table 4 summarizes the anova results, and Table 5 displays the means and standard deviations for all groups. On the whole, only a single main effect reached significance, and there were no significant interactions.

The first hypothesis of this study, that subjects in all conditions would improve in the number of items recalled from pre- to post-test, was tested in the analysis of variance by the main effect of Pre- Post-test. This analysis failed to reach significance, $F(1,87) = 0.636, p > .05$. Thus, it appears that subjects in all groups did not show an improvement in the amount of story items recalled when averaged across valence category.

The second hypothesis was that the greatest improvement in story recall from pre- to post-test would be found in the imagery group because of this method's hypothesized superior assistance to memory. For this hypothesis to be supported, the Condition X Pre- Post-test interaction should be
Table 4
Summary Table for Three-Way Anova

<table>
<thead>
<tr>
<th>Source of Variance</th>
<th>df</th>
<th>Sum of Squares</th>
<th>Mean Square</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Condition (A)</td>
<td>2</td>
<td>133.137</td>
<td>66.569</td>
<td>2.328</td>
</tr>
<tr>
<td>Error</td>
<td>87</td>
<td>2488.122</td>
<td>28.599</td>
<td></td>
</tr>
<tr>
<td>Pre- Post-test (B)</td>
<td>1</td>
<td>4.267</td>
<td>4.267</td>
<td>0.350</td>
</tr>
<tr>
<td>A X B</td>
<td>2</td>
<td>15.478</td>
<td>7.739</td>
<td>0.636</td>
</tr>
<tr>
<td>Error</td>
<td>87</td>
<td>1059.256</td>
<td>12.175</td>
<td></td>
</tr>
<tr>
<td>Valence (C)</td>
<td>2</td>
<td>489.404</td>
<td>244.702</td>
<td>88.500*</td>
</tr>
<tr>
<td>A X C</td>
<td>4</td>
<td>4.485</td>
<td>1.121</td>
<td>0.406</td>
</tr>
<tr>
<td>Error</td>
<td>174</td>
<td>481.111</td>
<td>2.765</td>
<td></td>
</tr>
<tr>
<td>B X C</td>
<td>2</td>
<td>0.033</td>
<td>0.017</td>
<td>0.006</td>
</tr>
<tr>
<td>A X B X C</td>
<td>4</td>
<td>13.989</td>
<td>3.497</td>
<td>1.244</td>
</tr>
<tr>
<td>Error</td>
<td>174</td>
<td>488.978</td>
<td>2.810</td>
<td></td>
</tr>
</tbody>
</table>

*p < .0001
Table 5

Means and Standard Deviations for Each Experimental Group

<table>
<thead>
<tr>
<th>Condition</th>
<th>Pre-Test</th>
<th></th>
<th></th>
<th>Post-Test</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Positive</td>
<td>Neutral</td>
<td>Negative</td>
<td>Positive</td>
<td>Neutral</td>
<td>Negative</td>
</tr>
<tr>
<td>Imagery</td>
<td>6.97</td>
<td>7.63</td>
<td>9.33</td>
<td>6.97</td>
<td>7.83</td>
<td>9.37</td>
</tr>
<tr>
<td>M</td>
<td>2.54</td>
<td>2.76</td>
<td>2.97</td>
<td>3.18</td>
<td>2.90</td>
<td>3.71</td>
</tr>
<tr>
<td>Cognitive</td>
<td>8.30</td>
<td>8.53</td>
<td>9.83</td>
<td>8.50</td>
<td>9.17</td>
<td>10.90</td>
</tr>
<tr>
<td>M</td>
<td>2.85</td>
<td>3.01</td>
<td>3.16</td>
<td>2.40</td>
<td>2.70</td>
<td>3.12</td>
</tr>
<tr>
<td>Control</td>
<td>7.20</td>
<td>8.13</td>
<td>10.10</td>
<td>7.60</td>
<td>7.80</td>
<td>9.50</td>
</tr>
<tr>
<td>M</td>
<td>2.39</td>
<td>2.71</td>
<td>2.92</td>
<td>2.81</td>
<td>3.16</td>
<td>3.32</td>
</tr>
<tr>
<td>Total</td>
<td>7.49</td>
<td>8.10</td>
<td>9.76</td>
<td>7.69</td>
<td>8.27</td>
<td>9.92</td>
</tr>
<tr>
<td>M</td>
<td>2.64</td>
<td>2.82</td>
<td>3.00</td>
<td>2.85</td>
<td>2.96</td>
<td>3.43</td>
</tr>
</tbody>
</table>
significant. This interaction, however, did not reach significance, $F(2, 87) = 0.636$, $p > .05$. These results indicate that the three experimental groups did not differentially improve in the number of story items recalled when averaged across valence category.

The third hypothesis of this study, that the greatest improvement in story recall for all groups would be found in the positive elements of the stories, was tested in this analysis by the Valence X Pre-Post-test interaction. This statistic also failed to reach significance, $F(2, 174) = 0.406$, $p > .05$. The lack of a significant Valence X Pre-Post-test interaction indicates that subjects in this study did not differentially improve in their recall of items varying in valence.

If all three of the hypotheses of this study had been supported, one might also expect to find a significant three-way interaction between experimental condition, pre-post-test, and valence of information. A significant interaction of this sort would reflect that subjects in the three conditions all differentially improved in their recall of story items from pre- to post-test. That is, one group would show more improvement in number of items recalled than subjects in another condition. In addition, items varying in valence would be recalled differentially, such that greater improvement in recall would be found in items of a particular valence category relative to another. This three-way interaction, however, also failed to reach significance,
$\chi(4,174) = 1.244, p > .05$. Thus, the three hypotheses of this study were not supported. Some possible reasons for these results are discussed below.

The analysis of variance, however, did reveal a significant main effect of valence, $F(2,174) = 88.50, p < .0001$. This finding indicates that subjects differentially recalled items in each valence category when averaged across pre- and post-tests. This particular effect was not hypothesized in the present study because the primary interests of this investigation lie in the improvement of recall scores, and not in the overall differences in the recall of items within each valence category across pre- and post-tests.

However, due to the significant main effect of information valence, a Newman-Keuls' multiple range test was performed in order to assess differences between the mean number of recalled elements in each valence category. The means and standard deviations used in this analysis are presented in Table 6. The results of this test were in the direction that would be predicted for dysphoric subjects, namely that these subjects tended to recall a greater number of negative elements overall. Subjects in all conditions of the experiment recalled a greater number of negative items than would be expected by chance, followed by recall of neutral items. Positive items in the stories showed the least amount of recall in all groups in both pre- and post-tests, $p < .01$. Refer to Figure 2 for an illustration of these differences.
Table 6

**Means and Standard Deviations for Recall Scores Across Pre- and Post-Tests**

<table>
<thead>
<tr>
<th></th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive</td>
<td>7.59*</td>
<td>2.42</td>
</tr>
<tr>
<td>Neutral</td>
<td>8.18*</td>
<td>2.35</td>
</tr>
<tr>
<td>Negative</td>
<td>9.84*</td>
<td>2.46</td>
</tr>
</tbody>
</table>

*Means differ significantly from each other at p < .01.*
Figure 2

Mean recall of elements in each valence category.
Subjects' responses were also scored for various errors in recall such as interference and transformations. An item was labeled as an interference if it was written down during the post-test recall phase, but was a part of either the pre-test story, the practice story, or not part of any story. This error never occurred. Transformations involve a discrepancy between the subject’s written recall of a particular item’s valence and the intended valence. An extreme example of a transformation would be if a story mentioned the character’s good mood but the subject wrote down that the character was in a bad mood. There were six possible transformations: positive to neutral, positive to negative, neutral to positive, neutral to negative, negative to positive, and negative to neutral. The above example, therefore, would be marked as a positive to negative transformation. When a transformation occurred in a subject’s protocol it was not counted as an accurate recollection, and so was not included in the final scores. Transformations did occasionally occur, the most common of which were positive to neutral and negative to neutral, usually a result of omitting the key words that gave the item its particular valence rating (such as "...which upset him" or "...and was pleased to find..."). These occurrences, however, were rare, and showed no consistent pattern, such as only occurring during post-test, or only found in a particular condition, and therefore were difficult to
interpret. They were most likely due to short-cuts in writing, a point that will be discussed later.

**Manipulation Check**

Three separate chi-square tests, one for each experimental group, were computed in order to analyze the frequency data generated by the first question of the manipulation check. This question asked subjects to indicate which method they felt they relied upon the most during the post-test (see Appendix D). The chi-square test for subjects in the imagery condition reached significance, $X^2(2, N = 30) = 21.80, p < .001$. A greater number of subjects instructed to use imagery indicated that they in fact used this method more than would be expected by chance. The chi-square test for subjects in the cognitive condition failed to reach significance, $X^2(2, N = 30) = 5.40, p > .05$. The distribution of responses for subjects instructed to use the cognitive technique did not differ from chance. Subjects instructed to use the cognitive method were just as likely to use imagery as they were the cognitive technique. The chi-square test for subjects in the control condition reached significance, $X^2(2, N = 30) = 6.20, p < .05$. Subjects given no specific instructions to assist recall tended to use imagery more than a cognitive technique or none at all. Table 7 summarizes the data used in these analyses. In general, these data suggest that the manipulation for subjects in the imagery condition was successful, such that subjects given instruction to use this technique did in fact
Table 7

Incidence Table for the Chi-Square Statistics Evaluating the Effectiveness of the Manipulation

<table>
<thead>
<tr>
<th>Condition</th>
<th>Imagery</th>
<th>Cognitive</th>
<th>No-Particular</th>
</tr>
</thead>
<tbody>
<tr>
<td>Imagery**</td>
<td>22 / 10</td>
<td>3 / 10</td>
<td>5 / 10</td>
</tr>
<tr>
<td>Cognitive</td>
<td>13 / 10</td>
<td>13 / 10</td>
<td>4 / 10</td>
</tr>
<tr>
<td>Control*</td>
<td>16 / 10</td>
<td>9 / 10</td>
<td>5 / 10</td>
</tr>
</tbody>
</table>

Note. Technique used as reported by subjects / Expected in each cell

*Chi-square statistic significant, \( p < .05 \).

**Chi-square statistic significant, \( p < .001 \).
use it during the post-test. However, the cognitive manipulation was not as strong as intended since subjects in this condition were just as likely to report relying on imagery as they were the cognitive technique. Subjects in the control condition, who had received no specific instructions for post-test recall, tended to report relying on imagery to assist in memory more than would be expected by chance. Thus, the use of imagery was over-represented in the sample, indicating a weak overall manipulation of memory technique.

Since it was hypothesized that subjects in the imagery condition would produce better recall scores than other subjects during the post-test, it was believed that those subjects who actually used imagery (as indicated in the manipulation check) would recognize the improvement in recall more readily than subjects in the other conditions. They would therefore be more likely to report that they would try to use this technique again in the future. Subjects in the cognitive and control conditions, who would not find as great an improvement in memory, would not show such a preference.

As a post-hoc analysis to test this question, a chi-square statistic was calculated to analyze the frequency with which subjects indicated that they would use the technique reported in question one of the manipulation check again. The expected frequencies for this analysis were based on conditional probability estimates. The frequencies were calculated by multiplying the probability of being in any
single experimental condition (p = .33) by the probability of responding "Yes" "No", or "Unsure". These later probabilities differ because inclusion in these groups were based on subjects' self-assignment when answering question 3 of the manipulation check, resulting in an unequal distribution of subjects in each category. Also, because of the large number of low expected frequencies in the cells for subjects answering "No" or "Unsure", the observed frequencies for these cells within each group were combined. The chi-square statistic was significant, \( \chi^2(2, N = 90) = 28.51, p < .001 \). Table 8 presents the contingency table for this analysis. Subjects who used images during the post-test stated that they would use that technique again more than would be expected by chance. Subjects who used no particular memory technique during the post-test stated that they would not, or were unsure if they would, use that approach in the future. While a majority of subjects using the cognitive method said that they would use it again in the future, the distribution for this group did not differ from what would be expected by chance alone.

Assuming that a willingness to use a technique again in the future is an indication of satisfaction with performance, this analysis suggests that dysphoric subjects who use a specific memory technique are more satisfied with their performance than subjects who use no method in particular. This interpretation is limited, however, by the fact that subjects did not experience the relative effectiveness of all
Table 8

Chi-Square Contingency Table of Subject Reports of Willingness to Use the Technique Again

<table>
<thead>
<tr>
<th>Method Used</th>
<th>Would You Use it Again?</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>No or Unsure</td>
<td>Total Observed</td>
<td></td>
</tr>
<tr>
<td>Imagery</td>
<td>48 / 40.23</td>
<td>3 / 10.77</td>
<td>51</td>
<td></td>
</tr>
<tr>
<td>Cognitive</td>
<td>19 / 19.72</td>
<td>6 / 5.28</td>
<td>25</td>
<td></td>
</tr>
<tr>
<td>No Particular</td>
<td>4 / 11.04</td>
<td>10 / 2.96</td>
<td>14</td>
<td></td>
</tr>
<tr>
<td><strong>Total Observed</strong></td>
<td><strong>71</strong></td>
<td><strong>19</strong></td>
<td><strong>90</strong></td>
<td></td>
</tr>
</tbody>
</table>

*Note.* Observed reports / Expected
three choices, and so did not have any basis for comparison. It may be that without any knowledge of relative efficacy, subjects simply tended to state that they would use in the future whatever method they used in the experiment. Subjects who reported using no particular method may have also been in the awkward position of having to answer "yes" or "no" to using a method that they really couldn't identify. Answering "unsure", as the majority of subjects in this group did, provided a logical answer.

As part of the manipulation check, subjects rated how much they felt the method they used helped their recall. Because of the unequal Ns in group cells, a one-way, unweighted means analysis of variance was computed in order to assess any differences among groups on this variable. In this analysis the method subjects reported using served as the independent variable and the assistance ratings from the Likert-type scale served as the dependant variable. The groups in this analysis had unequal Ns for the independent variable because groups were self-assigned (i.e., subjects placed themselves in a group when they indicated which method they used, which resulted in an unequal distribution). The analysis of variance was significant, $F(2, 87) = 7.20, p < .01$. Thus, the three groups differentially rated the amount of help provided by their respective memory techniques. The summary table for this anova is presented in Table 9. Scheffe F-tests were used in order to assess the nature of the differences between the mean assistance ratings for each
Table 9  

Unweighted Means Analysis of Variance for Assistance Rating Scores

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>Sum of Squares</th>
<th>Mean Square</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technique Used</td>
<td>2</td>
<td>19.624</td>
<td>9.812</td>
<td>7.20*</td>
</tr>
<tr>
<td>Within Subjects</td>
<td>87</td>
<td>118.461</td>
<td>1.362</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>89</td>
<td>140.473</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Note. Cell Ns for the Imagery, Cognitive, and No Particular memory techniques were 51, 25, and 14, respectively.  
*p < .01
Table 10

Mean Assistance Ratings for Memory Technique Used by Subjects

<table>
<thead>
<tr>
<th>Method Used</th>
<th>M</th>
<th>SD</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Imagery</td>
<td>4.11*</td>
<td>1.01</td>
<td>51</td>
</tr>
<tr>
<td>Cognitive</td>
<td>3.41</td>
<td>1.44</td>
<td>25</td>
</tr>
<tr>
<td>No Particular</td>
<td>2.81*</td>
<td>1.16</td>
<td>14</td>
</tr>
</tbody>
</table>

Note. Scores were on a scale of 1 (indicating the technique interfered with recall) and 5 (indicating the technique greatly assisted in recall).

*Means differ significantly at p < .05.
group (see Table 10). These tests revealed that subjects who reported using imagery rated this method as being more helpful than the subjects who used no method in particular rated their approach, \( p < .05 \). The assistance ratings of subjects who used the cognitive technique did not differ from those subjects who used either imagery or no method in particular, \( p > .05 \). Essentially, subjects who used the cognitive technique reported that it neither helped nor hurt recall.
Discussion

The three principle hypotheses of this investigation predicted that all subjects would improve in the amount of story items recalled, that the greatest improvement in recall would be found in subjects who used the imagery technique, and that the greatest improvement for all groups would be found in items of positive valence. The results, however, failed to support these hypotheses. The current investigation did, however, reveal a significant effect of information valence, such that subjects in all conditions tended to recall more negative elements than neutral, and more neutral elements than positive. The following is a discussion of these results.

The significant main effect of information valence can perhaps best be explained in terms of mood dependent memory. Subjects were apparently mildly dysphoric during both story presentation and recall, and therefore tended to remember elements of the stories consistent with that mood. If this is the case then it can be stated with some confidence that this study was indeed using a dysphoric population. The non-significant correlations between depression level and amount of pre-test recall may be explained by the truncated distribution of BDI scores. The modal BDI score was 13 and the distribution was highly positively skewed because of a very few subjects who scored high on the BDI, meaning that there was not a large enough range of depression to get an
accurate correlation coefficient. While a non-dysphoric control group was not used in this investigation, given the large body of literature demonstrating the effects of mood on memory, it does not seem likely that a non-dysphoric group would produce recall scores similar to those found in the present study. This interpretation, however, is only a hypothesis, as the data from this study were not designed to be able to make such conclusions. The remainder of this discussion will focus on the unsupported hypotheses and offer suggestions as to why they weren't supported in the present study.

The first hypothesis of this study predicted that all groups would improve in recall from pre- to post-test. There are two reasons why one would expect to find such an improvement. One is simply a practice effect. During the pre-test phase subjects learn about the type of material to be presented, and perhaps learn to "fine tune" their encoding strategy. The second reason is that a great many of the subjects in all groups reported using imagery to encode the post-test story. Numerous studies have found that the use of imagery often results in improvement in recall, an effect that appears to hold for a variety of populations (c.f., Alesandrini, 1982; Powell, 1981; Jonides, Kahn, & Rozin, 1975; Traupmann & Anderson, 1981; Levin & Divine-Hawkins, 1974). The present study, however, failed to replicate such a finding.
A potential explanation for the lack of a practice effect lies in the nature of the procedures of the experiment. Subjects were asked twice to write down from memory a 640 word story after completing ten minutes worth of arithmetic problems. Writing such lengthy stories twice, in addition to doing simple arithmetic problems are quite tedious tasks, the monotony of which may have hampered motivation to write down as much as was actually remembered. Writing down two fairly long stories may have been too much to ask of subjects, so that by the post-test recall subjects simply left parts out or took "short cuts" such as just listing elements of the story. Such a tactic would have the effect of eliminating many of the neutral filler items, resulting in a net decrease in recall scores. It follows that if subjects did actually recall more of the stories during the post test, but wrote down less than they remembered due to writing fatigue, no improvement would be noted. Anecdotally, upon giving the instructions to write once again as much of the story as possible, one subject sighed and asked if he could just verbally describe what he remembered, an indication that this study may have been quite tiresome for at least some of the subjects.

It would seem that research investigating story recall should employ a means of data collection requiring less work for subjects. Watts and Sharrock (1987) found that the ability to answer correctly a series of questions about a passage is just as sensitive to memory disturbance as free-
recall. Watts and Sharrock's method would probably be less affected by writing fatigue than the free recall task of the present study. It is likely, then, that the nature of the stories used, the fact that subjects were not instructed to use only the learned technique, and the tediousness of the tasks all served to obfuscate differences in recall between the groups of this study.

One must also look at the populations used in the two studies. Watts et al. used clinically depressed subjects, while the present study used dysphoric college students as an analogous population. This latter group of subjects would probably not meet the criteria for a depressive syndrome, suggesting that the mild dysphoria found in these college students, as assessed by the BDI, may be insufficient to demonstrate significant effects of depression on memory. Ellis (1985) has criticized studies manipulating mood via subject classification on depression inventories because such methods are too weak to produce measurable effects. Ellis contends that the mood must be relatively strong in order to find memory deficits, and suggests that mood induction procedures are more preferable to subject classification on the basis of depression inventories in obtaining a more profound mood state. This explanation, however, is at least somewhat lacking in support because it does not address why other studies (e.g., Colby & Gotlib, 1988; Dobson & Shaw, 1981) have found memory deficits in depressed college students relative to non-depressed students when such
subjects were obtained via subject classification strategies. In addition, a mood induction procedure would not be practical for the present study because of the length of time necessary to run each subject (approximately 1 1/2 hours) and the relatively short duration of moods induced by such procedures.

Ellis (1985) has also criticized story recall tasks such as the methods used in the present study, stating that they may make insufficient encoding demands on subjects because of their highly meaningful and logical structure. Stories, he claims, are much easier to encode and subsequently recall than memory tasks utilizing such stimuli as word lists, thereby making it more difficult to demonstrate mood effects on memory. This criticism may have more merit than his first criticism of subject classification procedures via depression inventories. It has been proposed that the memory deficits found in depressed individuals will be greater when encoding demands are more difficult, demanding, or complex (Ellis & Lane, 1984; Ellis, in press, cited in Ellis, 1985). Watts et al. (1988b) attempted to circumvent the problem of logical sequence and meaningfulness by specifically constructing their stories to be less interesting in order to maximize encoding demands. The stories used in the present study, because of their more engaging nature, most likely did not overcome the difficulties suggested by Ellis, the result being that subjects may not have evidenced poorer pre-test scores if compared to normal controls. The purpose of this
study, however, was not to demonstrate memory deficits in dysphoric college students (a phenomenon already believed to exist) but rather to investigate methods of improving such deficits.

The combination of Ellis' two points, a relatively weak mood variable and the use of a meaningful, integrated story, make it difficult to rule out the possibility that there was actually little room for improvement during the post-test. In effect, this study may lend support to Ellis' argument that story recall paradigms are not good candidates for demonstrating mood-memory effects. Further research investigating the nature of memory deficits in depression is needed. Specifically, it appears to be important to ascertain whether or not such deficits can consistently be found in story recall tasks, and to delineate the limits of such findings.

The second hypothesis of this study was that each group, imagery instruction, cognitive instruction, and control, would differentially improve in recall of the passages, with the greatest improvement seen in the imagery group. As Table 4 indicates, this did not happen. Instead, none of the groups in this experiment showed improvement in story recall from pre- to post-test. One possible explanation for these results is that the Watts et al. (1988b) imagery technique may not be strong enough to stifle the depressive cognitions and improve access to positive memories. Imagery may be an effective memory aid, but the particular imagery technique
used in this experiment may not have been strong enough to produce results, especially in a non-clinical population. Recall that the manipulation check revealed that most of the dysphoric subjects who used imagery felt that the use of imagery is helpful in memory, and so its use in this capacity should be explored further.

Analysis of the manipulation check revealed that while the imagery manipulation was successful, the cognitive manipulation was not. Inspection of the data revealed that many subjects in all groups reported using pictures and images for recalling the post-test story, indicating that the independent variable of memory technique was not successfully manipulated. The high incidence of imagery use within each group may have blurred any differences that may actually exist between the different types of instruction. Because of this confounding, no conclusions can be drawn regarding the differential efficacy of the memory techniques employed in this study.

One possible explanation for the lack of differentiation between groups in terms of the memory technique actually used during post-test, is that inadequate practice was provided. More adequate practice may have assisted subjects in easily utilizing only the instructed technique. This study provided the same amount of practice as that used in the the Watts et al. (1988b) study, but dysphoric college students may need even more practice than the depressed patients used in the Watts et al. study, since the latter group was actively
seeking treatment and may have been more receptive to following the instructions of the experimenters. Also, the more severe effects of the depressive syndrome may have been limiting the cognitive abilities of subjects in the Watts et al. investigation, such that no other memory techniques occurred to them, whereas subjects in the present study were college students with presumably stronger study habits and memorization schemes.

Another reason for the failure of the manipulation may lie in the nature of the stories used. Recall that Watts et al. (1988b) specifically chose a fairly neutral description as the test story in an effort to maximize the encoding effort of subjects, while this study used stories with a richer valence content. The wider range of valence may have made the stories more engaging and therefore less likely to result in maximum encoding effort. The result, for this study, would be no difference in encoding effort from pre- to post-test, eliminating potential differences attributable to memory technique.

Further, the story in the Watts et al. study was designed to be maximally sensitive to the imagery instruction. The stories used in the present investigation may have also lent themselves to the use of imagery, more so than the thoughts and ideas expressed therein. This interpretation is supported by the tendency for the control group, which received no specific instructions at all, to report using pictures and images more than any other method.
The ability of these stories to elicit images, therefore, may be stronger than the influence of the cognitive instructions, thereby overriding the cognitive manipulation. There is, however, another explanation for the tendency for subjects to use imagery. It may be that people in general naturally use imagery with the type of information presented in these stimuli. This explanation does not seem likely, however, given that past research investigating the effectiveness of imagery instruction to aid in the recall of sentences and narratives was found to be superior to no instruction at all (Anderson, 1971; Anderson & Hidde, 1971; Rasco, Tennyson, & Boutwell, 1975). If people tend to naturally use imagery, these studies would not have found such differences.

Regardless, if there is a natural proclivity to use imagery, the absence of a strong enough manipulation to override it would likely produce the results found in this study. It would be important for future research to investigate the issue of a tendency for people to use imagery vs. stimulus pull for its use, since it may make a difference in the type of instructions given to subjects.

The instructions given to subjects during the post-test may also have affected the manipulation. Prior to reading the post-test story subjects were told to use the particular memory technique that they had just practiced in order to better remember the upcoming story. They were not, however, told not to use any other method. Subjects in the cognitive instruction group may have employed both methods and stated
that they relied upon imagery the most because it is a more salient characteristic of the stories.

The final hypothesis not supported was that there would be a greater improvement in the number of positive elements of the story recalled relative to the negative and neutral elements. This was hypothesized because of mood dependent memory. It was believed that because of the dysphoric mood found in the subjects there would be a greater recall of the negative elements due to mood congruence during the pre-test, a phenomenon which did occur in this study. The logic was that since negative items are readily recalled, there would be little room for improvement in the recall of these story elements during post-test. Positive items, on the other hand, are more difficult for dysphoric subjects to remember, and so during pre-test recall fewer story elements in this valence category would be recalled. If the memory technique(s) were effective, the greatest room for improvement would be for these items, meaning that there would be a greater improvement in recall of positive story elements relative to negative ones. The data, however, showed no improvement in any valence category from pre-test to post-test. Subjects in all conditions recalled a greater number of negative elements than neutral, and more neutral than positive.

The reason for the failure to find support for this hypothesis, again, may have been due to the demands of the task. It has been suggested that students may have been
writing down less of the story than was actually remembered because of the tediousness of writing down from memory such lengthy stories. It is also likely that because of the effects of dysphoria on memory, negative elements of the story would be more readily accessed in memory, while more effort would be needed to recall positive elements. If subjects were putting little effort into post-test writings by simply writing down whatever was easiest to recall, negative elements would be more prominent, and no improvement would be found.

Conclusion

This study sought to compare an imagery technique found to improve memory in depressed patients with a more cognitive technique, and to assess what effect information valence would have on recall. Overall, subjects recalled more negative elements of the stories in this study, suggesting the presence of mood-dependant memory. However, three principle hypotheses of this study were not supported.

The first hypothesis was that subjects in all groups would improve in recall from pre- to post-test due to a practice effect. The second hypothesis was that subjects given instruction and practice in the use of imagery would show a greater amount of improvement in story recall relative to subjects given instruction and practice in a more cognitive method and subjects given no instruction at all. The third hypothesis not supported was that the greatest amount of improvement in recall for all groups would be for
the positive elements of the stories. The effectiveness of imagery as an aid to increase the recall of positive themes cannot be determined from this study. The story-recall format of the present experiment, the failure of the memory technique manipulation, and the writing intensive task for subjects confounded the results.

Past research has suggested that the logic and structure of narratives makes it difficult to demonstrate memory deficits in dysphoric subjects. Without memory deficits, memory improvements are equally difficult to demonstrate. The fact that a majority of subjects in all conditions reported using imagery rather than the instructed technique may be due to a tendency for the stories to elicit images or to a pre-disposition for people to use imagery. Other possibilities for the weak manipulation include inadequate practice and the fact that subjects were not instructed to use only the memory technique taught to them. Finally, the large amount of writing involved may have caused subjects to take short cuts when writing down the stories, giving an inaccurate account of actual recall.

Because many of the subjects who used imagery in the present study found it to be more helpful than subjects who used no method in particular, further research in the area of memory improvement in depression is needed in order to better understand the role of imagery in improving memory for depressed patients. This future research should take the following into account: (a) use stimuli designed to maximize
encoding demands; (b) use a means of data collection that minimizes the physical effort required of subjects; (c) if subject classification via depression inventories is the method chosen for subject selection, set a high enough cut-off score to better ensure the presence of memory deficits; (d) instruct subjects to use only the desired memory technique; and (e) provide adequate practice to ensure subjects are able to effectively use the desired memory method.
References


Appendix A

Note. "+" after a statement denotes positive valence, "Ø" denotes neutral valence, and "-" denotes negative valence.

Bill's Day

Bill started his day in a bright, cheerful mood +. The sun was shining and he felt that today was going to be a great day +. After getting dressed he went downstairs to eat breakfast when the phone rang Ø. It was his neighbor calling to inform him that his dog had dug up a flower bed over night, and that it would cost $75.00 to replace it -. This made Bill angry -. "Oh, Well", he sighed, and left the house Ø. He walked to the corner candy store to check his lottery ticket number Ø and felt great when he learned that he had won two hundred dollars +. While he was receiving the storekeeper's congratulations +, he suddenly remembered he was late for work and rushed off afraid that he would lose his job -. At last Bill got to his office Ø, but when he tried to go in the door was locked -. Bill thought, "I really am stupid; I forgot that we changed offices today -." So he set off to find his new office Ø.

On the way he was fascinated to observe two old friends of his walking together, since he had not realized they knew each other Ø. He hailed them and told them of his good fortune in winning the lottery +, and they congratulated him and remarked how happy they were for him +. They then
began to talk about work 0. They told Bill that he was the only one from the office not invited to the party next week, which ruined Bill's good mood, and, in fact, he felt quite left out and sad 0. He couldn't help feeling that things just weren't going as well as he thought they would today 0.

Bill continued on and was soon quite absorbed in catching up to a woman from his office 0. He walked a little faster so that he could catch up to her 0. They said hello, and Bill felt better when she told him that he wasn't the only one to forget about the office change 0.

Before lunch, they reached the office, and Bill's boss remarked in front of everybody how foolish he was to have made such a mistake 0. Bill couldn't do much except to sit there and take it, but he felt very embarrassed 0. He then sat down at his desk and started to work 0. The other workers laughed and teased Bill 0, but then stopped, since they all admired his vigor and energy at work 0. They knew he was a good employee, and some of them apologized to him for laughing 0. Soon it was lunchtime and Bill sent out for a corned beef sandwich on rye 0. He was frustrated when the delivery man brought him Swiss cheese on white bread 0. "What terrible luck," thought Bill 0, but then he put it out of his mind and sat back in his desk chair to look over the office with a contented feeling of having done his job well 0. He really did like his job, and it made him
realize that some of the bad things that had happened weren't all that terrible. 

When it was time to leave work, Bill remembered that he had to stop and get some groceries. However, when he got there the store had just closed and Bill couldn't get in. Bill's luck changed, however, because the clerk saw him and let in to buy the couple of things that he needed. On the way home Bill walked down a long dark street, and a man came up to him and beat him over the head. Bill ran away as fast as he could in fear for his life. After a while he slowed down to catch his breath, and when he got home he felt much better. He was met at the door by his wife, whom he loved very much. When he saw her he broke into a smile, relieved to be home, and said, "I've got a lot to tell you, about what happened to me today," and began to tell his story.
Appendix B

Note. "+" after a statement denotes positive valence, "0" denotes neutral valence, and "−" denotes negative valence.

Susan's Day

Susan woke up very excited because today she was going on a picnic with some friends + . She went into the kitchen and began preparing a special dish to bring along to the picnic 0 . After putting it in the oven Susan got dressed in her new outfit, and was very pleased with the way it looked on her + . An hour later she realized that she was running late − , so she quickly got her things together and ran into the kitchen to get her casserole 0 . She then discovered that she had forgotten to turn the oven on + . "How stupid I am!" she thought, and was very mad at herself − . She called a delicatessen and ordered sandwiches instead 0 , but when she got there they had forgotten her order − . The delicatessen apologized, and ended up giving her the sandwiches for free ± . Susan got in her car and headed for the picnic 0 .

On the way Susan noticed how the sun was shining and thought, "This is a beautiful day," and smiled in anticipation + . Apparently many other people had the same idea because it took over 45 minutes to find a parking spot − . She soon found one and headed off to look for her friends 0 . She had a long way to walk, and ended up at the wrong end of the park − . She saw someone that she knew,
and was pleased to find out that he had made the same mistake as she did __, so the two of them headed off for the rest of the group ___+. On the way some boys playing football knocked her down __, causing her to scrape her knee rather badly___. She sat there for awhile quite upset and in a lot of pain___. After resting she got up and continued on her way ___. Her friend happened to have some bandages, so he patched her up and made her feel a whole lot better __+. Her frustration passed when she reached her friends because it felt great to see them all together __+. 

Susan noticed that people were playing softball and wanted to play ___. There were too many people, though, and Susan didn't get picked to be on a team, which made her feel kind of worthless __. She sat and watched for a while ___, until someone got tired and asked her to take his place, which made her happy __+. During the game she made some mistakes, and felt foolish ___. She also felt that some of her friends were cruel because they laughed at her for making these mistakes __, but after the game they all complimented her for being a good sport and trying her best __+. After the game everyone ate lunch ___. Susan got embarrassed when she had to tell people why she brought deli sandwiches __, but everybody said they were good, and thanked her for bringing them ___. 

At the end of the day Susan got excited when a man that she really liked walked her to her car __+. On the way he asked her out on a date which made her very happy __+. They
made plans to get together soon, and said goodbye ☐. On the way home she couldn't stop thinking about what a great day it was, and was very pleased with the way things went ☐. Her excitement was ruined, however, when a policeman pulled her over and gave her a speeding ticket ☐. Susan realized that she wasn't paying much attention to her driving, and got upset at herself for it ☐. She finally made it home, though, and sat down to relax ☐. Her cat let out a loud "Meow" and jumped up on Susan's lap ☐. Susan loved her cat, and felt really good when it began to purr in her arms ☐. As she began to pet her cat she realized that he felt wet, and started to look around ☐. "Oh, No! This is terrible!" she cried out when she saw that the cat had knocked over a $100.00 crystal vase that had flowers in it ☐. After cleaning it up she sat down and thought about what a strange day it had been ☐.
Appendix C

Note. "[HERE]" inserted in the passage marks the point at which subjects were told to "Imagine that" if in the imagery condition, and to "Think about that" if in the cognitive condition.

Practice Passage

Walking down the street one can see a variety of people and places, each one interesting unto itself. The streets are full of the lunch time traffic right now. [HERE] That's probably the biggest change we've had in this small town. There has been an awful lot of growth, some good, and some bad. The old is still around, though. There, on the left you can see George's Old Town Cafe. [HERE] That place, along with George, has been around for as long as I can remember. All the old-timers go there to have a cup of coffee and talk about the good-old-days. Next to the cafe is Mary's Bakery. [HERE] She makes the best apple cobbler in town. I've always said the two should combine their talents. What a money maker that would be. [HERE] Anyway, back to the changes. Across from the bakery is the Fast-Fax copy store. It seems out of place next to the older stores, but they're a sign of the times, one would guess. [HERE] A lot of folks don't like all the technological advances, but they have their place, I suppose. Like they say, "The more things change, the more they stay the same."
Appendix D
Rating Sheet

1. In order to help me remember the second story I primarily (mark the one method you feel you relied upon the most):
   ___ used pictures and images
   ___ thought about the words and ideas in the story
   ___ used no particular method

2. How much did the method used (as indicated in #1) help you remember the story? (Place a mark on the line that best describes your feeling)

   It made ____________________________  It helped
   things worse                     It neither            a lot
                                      helped nor hurt

3. Would you try to use this memory technique in the future?
   ___ Yes
   ___ No
   ___ Unsure
Appendix E

Debriefing Statement

Thank you for taking part in this experiment. This study was designed to test various methods of improving memory in dysphoric college students. You were chosen because the score you reached on questionnaires you filled out indicate that you may be feeling a little down right now.

Past research has shown that depressed people have trouble with their memory, particularly memory for positive events and statements. The stories you were read contained an equal number of positive, negative, and neutral statements, and we were looking at how many of each type you remembered on the second trial relative to the first trial. We were comparing three different methods of memory in order to find out which was most effective: Imagery (using pictures to remember), cognitive instruction (saying the words over in your head), and a group that received no particular instructions.

If you are interested in reading about this area of psychology you might want to look up the following articles in the library:


Appendix F

Scoring Criteria For Bill's Day

<table>
<thead>
<tr>
<th>Element</th>
<th>Needed</th>
<th>Examples</th>
<th>Not Acceptable</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Bill started his day in a bright, cheerful mood.</td>
<td>Anything indicating Bill was in a good mood. An indication that Bill anticipated a good day.</td>
<td>Bill was sad. Bill was in a bad mood.</td>
<td></td>
</tr>
<tr>
<td>2. The sun was shining and he felt that today was going to be a great day.</td>
<td>An indication that Bill anticipated a good day.</td>
<td>The sun shined (no &quot;feeling&quot;). It was just another day for Bill.</td>
<td></td>
</tr>
<tr>
<td>3. After getting dressed he went downstairs to eat breakfast when the phone rang.</td>
<td>Mention that Bill got a phone call in the morning.</td>
<td>Someone was at the door. He called a neighbor.</td>
<td></td>
</tr>
<tr>
<td>4. It was his neighbor calling to inform him that his dog had dug up a flower bed over night, and that it would cost $75.00 to replace it.</td>
<td>Mention that his dog ruined something, and that it would cost between $70 and $80 to repair it. His dog dug up a yard, costing $76.</td>
<td>His dog was in the pound and he had to go get it. Bills dog destroyed a flower bed, and would cost $70 to replace it. His dog ruined a yard, costing $200 to fix it up.</td>
<td></td>
</tr>
<tr>
<td>5. This made Bill angry.</td>
<td>Mention that Bill was angry.</td>
<td>Bill got mad at this. This upset Bill.</td>
<td>Bill laughed it off.</td>
</tr>
</tbody>
</table>
6. "Oh, Well", he sighed, and left the house. 

An indication that Bill got over it. 

He didn’t let it bother him for long. 

What could he do? 

Bill left for work. Bill left in a bad mood.

7. He walked to the corner candy store to check his lottery ticket. 

An indication that he checked his lottery ticket. He wanted to see if he won anything in the lottery. 

He went to the store and bought some candy. He bought a baseball ticket. 

(Candy store is not necessary.) 

8. ... and felt great when he learned that he had won two hundred dollars. 

Any indication that he had won money. 

He won two hundred dollars. He won money in the lottery. 

He lost in the lottery. He lost a bet. He didn’t win the lottery. 

9. While he was receiving the store keepers congratulations, 

Anything indicating Bill was congratulated. 

People congratulated him. 

Nobody said anything to him.

10. ... he suddenly remembered he was late for work and rushed off afraid he would lose his job. 

He was late for work, implying that he was worried about getting in trouble for being late. 

He was late for work and ran off, thinking he would be fired. Bill left in a hurry because he was late for work. 

He left for work. He was late for an appointment. He had to get to work. 

11. At last Bill got to his office, 

An indication that Bill made it to work. 

When he got to work... It was a long walk. He had a ways to go to get there.
12. but when he tried to go in the door was locked. The door to the office was locked. He was locked out of his office. He couldn't get into the office because it was locked up. Bill went into the office.

13. Bill thought, "I really am stupid; I forgot that we changed offices today." Calling himself stupid. I am really stupid. Bill thought about how stupid he was. Bill remembered they moved offices today (without calling self stupid).

14. So he set off to find his new office. He went to find the office. He left for the new office. Bill didn't go to work. Bill couldn't find his new office.

15. On the way, he was fascinated to observe two old friends walking together, since he had not realized they knew each other. Need Bill seeing two old friends walking together. Bill saw his friends walking down the street. He ran into some friends walking together. Bill stopped at some friends' houses along the way. Bill thought about some old friends on the way.

16. He hailed them and told them of his good fortune in winning the lottery. Bill told them he had won money. Bill mentioned his luck in the lottery while speaking to them. Bill spoke with his friends. Bill hailed them to catch up on old times.
17. and they congratulated him and remarked how happy they were for him. 

18. They then began to talk about work. 

19. They told Bill that he was the only one from the office not invited to the party next week, which succeeded in puncturing Bill's good spirits, and, in fact, he felt quite left out and sad. 

20. He couldn't help feeling that things just weren't going as well as he thought they would today.
21. Bill continued on and was soon quite absorbed in catching up to a woman from his office. He saw a lady he worked with and tried to catch up to her. Bill tried to run up to a person from the office. Bill saw another friend. Bill thought about a lady that he knew.

22. He walked a little faster so that he could catch up to her. Bill ran up to her. He scooted up along side her. He soon caught up to her. She slowed down for him.

23. They said hello, and Bill felt better when she told him that he wasn't the only one to forget about the office change. They found out that they both went to the wrong place must be present. He found out they both went to the old office this morning. They both forgot about the office change this morning. She went to the wrong office this morning too. He told her that he went to the wrong office this morning. She mentioned that she started to go to the wrong office, but remembered.

24. Before lunch, they reached the office, and Bill's boss remarked upon how foolish he was to have made such a mistake. Bill's boss must make a negative comment about making the mistake. Bill's boss called him stupid for being late. His boss laughed at bill for making such a dumb mistake. Bill's boss gave him a funny look for being late. His boss was mad at him.
25. Bill couldn't do much except to sit there and take it, but he felt very embarrassed.

Mention that Bill was embarrassed/felt bad.

Bill felt embarrassed. Bill felt foolish in front of everyone. Bill felt helpless as his boss yelled.

He thought his boss was a jerk. Bill just sat there (no implication that he felt bad).

26. He then sat down at his desk and started to work. Ø

An indication that Bill got on with his work.

So Bill started to work. Bill got to work.

Bill took a break. Bill didn't want to work anymore.

27. The other workers laughed and teased Bill, =

Anything indicating Bill was teased.

Some of the others laughed at Bill. People ridiculed him.

They laughed with Bill about his mistake.

28. ..but then stopped, since they all admired his vigor and energy at work. Ø+  

An indication that the other workers admired his work.

The other workers knew he was a good worker. They stopped teasing him because he does excellent work.

Bill wished the others knew how hard he works. The others stopped and went back to their work.

29. They knew he was a good employee, and some of them apologized to him for laughing. Ø+  

An indication that his co-workers admired him in some way, and were sorry for laughing.

They apologized to Bill for laughing. They new he worked hard, and felt bad for teasing him.

Bill just worked harder. The others soon stopped and got to work.
<table>
<thead>
<tr>
<th>30. Soon it was lunchtime and Bill sent out for a corned beef sandwich on rye.</th>
<th>The fact that Bill ordered a corned beef sandwich must be present.</th>
<th>Bill sent out for a corned beef sandwich for lunch.</th>
<th>Bill ate a sandwich for lunch. Bill ordered a ham and cheese sandwich for lunch.</th>
</tr>
</thead>
<tbody>
<tr>
<td>31. he was frustrated when the delivery man brought him Swiss cheese on white bread.</td>
<td>The fact that Bill receives a sandwich other than the one ordered must be present.</td>
<td>Bill got the wrong sandwich. They sent a baloney sandwich instead.</td>
<td>Bill got his sandwich. Bill's order came late. He didn't like his lunch.</td>
</tr>
<tr>
<td>33. ...but then he put it out of his mind and sat back in his desk chair to look over the office with a contented feeling of having done his job well.</td>
<td>An indication that Bill knew he had done a good job.</td>
<td>Bill sat back and thought about how good a job he had done. Bill was pleased with the work he had accomplished. Bill was proud of the work he had done.</td>
<td>Bill sat back and relaxed. He was excited that his day was almost over. Bill finished all the work that he had to do that day.</td>
</tr>
<tr>
<td>34. He really did like his job, and it made him realize that some of the bad things that had happened weren't all that terrible.</td>
<td>An indication that Bill realized that things weren't as bad as before.</td>
<td>The rest of his day went fine. He didn't think things were all that bad. Bill liked his job and forgot about the bad things that happened today.</td>
<td>Bill liked his job. Bill made it through the day.</td>
</tr>
</tbody>
</table>
35. When it was time to leave work, Bill remembered that he had to stop and get some groceries.

36. However, when he got there the store had just closed and Bill couldn't get in. But the store was closed. The store wasn't open when he got there. They were out of his items.

37. Bill's luck changed, however, because the clerk saw him and let in to buy the couple of things that he needed. The store owner unlocked the door for him. He was allowed in. Bill snuck in the store. He went to a different store.

38. On the way home Bill walked down a long dark street. Any indication that Bill was walking down a dark street. After work Bill walked down a dark street. The street Bill walked home on was long and dark. Bill walked down a long street. Bill walked home.

39. and man came up to him and beat him over the head. A man beat him up. Bill was hit over the head. Bill was attacked. Bill was robbed. He saw someone getting beat up on the way home.
40. Bill ran away as fast as he could in fear for his life. _

41. After a while he slowed down to catch his breath, _ Ø

42. and when he got home he felt much better. _ +

43. He was met at the door by his wife, whom he loved very much. _ +

44. When he saw her, he broke into a smile, relieved to be home, and said, "I've got a lot to tell you, about what happened to me today," _ +

45. ..and began to tell his story. _ Ø

---

Mention that Bill fled in fear. Bill was scared and ran away. Bill got away.

Indication that the danger was over and Bill could rest. Bill rested after a while. He stopped for a breath. He ran all the way home. Bill couldn't stop for a break.

An indication that he felt better upon arriving home. He was happy to get home. He was relieved to finally get home. Bill made it home. When Bill got home he sat down and relaxed.

The fact that he loves or likes his wife must be mentioned in some form. His wife, whom he loves, met him at the door. He loved his wife and was happy to see her home. His wife met him at the door (without mention that he loves her). Bill's wife was there to greet him.

Mention of the fact that he smiled, and says that he has a lot to tell her. He smiled at her, saying that he has something to tell her. "I have a lot to tell you," he said smiling. He wanted to tell her about his day. He was very upset, saying "I've got a lot to tell you."

An indication that he started to tell her what happened. He then proceeded to tell her what happened. Bill told her about his day. He was glad to be home. His day was over. The end.
Appendix G

Scoring Criteria for Susan's Day

<table>
<thead>
<tr>
<th>Element</th>
<th>Needed</th>
<th>Examples</th>
<th>Not Acceptable</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Susan woke up very excited because today she was going on a picnic with some friends.</td>
<td>An indication that Susan was in a good mood.</td>
<td>Susan was looking forward to a picnic.</td>
<td>Susan was going on a picnic.</td>
</tr>
<tr>
<td>2. She went into the kitchen and began preparing a special dish to bring along to the picnic.</td>
<td>Mention of the fact that Susan was to prepare food to bring along.</td>
<td>Susan started to make something to bring. Susan got the food she needed to bring along.</td>
<td>Susan went into the kitchen to eat breakfast. She went to the store to get some food.</td>
</tr>
<tr>
<td>3. After putting it in the oven, Susan got dressed in her new outfit, and was very pleased with the way it looked on her.</td>
<td>Any indication that Susan was pleased with the way she looked in her outfit.</td>
<td>Susan liked the way her outfit looked.</td>
<td>Susan got dressed. Susan didn't have any nice clothes to wear.</td>
</tr>
<tr>
<td>4. An hour later she realized that she was running late.</td>
<td>Mention that Susan was late.</td>
<td>She was ready in an hour.</td>
<td>She was ready in an hour.</td>
</tr>
</tbody>
</table>
5. so she quickly got her things together and ran into the kitchen to get her casserole.  
   | An indication that she was preparing to leave. | She started getting her things together. | She ran to the car. She rushed off. |

6. She then discovered that she had forgotten to turn the oven on.  
   | The fact that Susan forgot to turn the oven on must be mentioned. | Susan never turned the oven on. The heat in the stove wasn't on. | The food wasn't cooked yet. She burned the meal. She forgot to prepare the food. |

7. "How stupid I am!" she thought, and was very mad at herself.  
   | An indication that Susan was upset at herself. | She called herself stupid. She was mad at herself for doing it. | Susan laughed at her stupidity. "Oh, well." she thought. |

8. She called a deli and ordered sandwiches instead.  
   | The fact that Susan ordered out for food must be present. | Susan called the store to order something instead. Susan had a deli make something instead. | Susan quickly made some sandwiches. |

9. but when she got there they had forgotten her order.  
   | An indication that her order had not been filled. Not ready yet is not acceptable. | The store never made the sandwiches. | The sandwiches weren't ready yet. She had to wait for her order. |

10. The deli apologized, and ended up giving her the sandwiches for free.  
    | Anything indicating that she got the food for free as compensation. | They gave her the sandwiches and apologized. She didn't have to pay for them. | She got her sandwiches and left (No indication of payment or lack of it). |
11. Susan got in her car and headed for the picnic. _Ø
   Mention of the fact that Susan was on her way. 
   Susan started off again. 
   Susan got back on the road. 
   Susan went back home. 
   Susan didn't want to go, but did any way.

12. On the way Susan noticed how the sun was shining and thought, "This is a beautiful day," smiling in anticipation.
   Recognition that Susan was pleased that it was a beautiful day.
   Susan thought it was a nice day. The sun was shining which made her happy. 
   Susan smiled because of the good weather.
   Susan was happy. There was good weather (no mention of Susan recognizing this).

13. Apparently many other people had the same idea because it took over 45 minutes to find a parking spot. _Ø
   An indication that it took her a long time to park because it was crowded.
   Susan couldn't find a place to park. There were no parking places left. 
   It took her forever to find a place to park.
   She drove up and parked.

14. She soon found one and headed off to look for her friends. _Ø
   Mention that she did eventually find a place to park.
   She found a spot and got out. She finally got a place and headed for the picnic.
   She never found a spot and went home.

15. She had a long way to walk, and ended up at the wrong end of the park. _Ø
   Some indication that Susan was not in the right place.
   She went to the wrong picnic area. She got lost on the way. 
   She couldn't find anyone (no mention that she was in the wrong place).
   Susan had trouble getting to her friends.
16. She saw someone that she knew, and was pleased to find out that he had made the same mistake as she did, +

Mention of the fact that she saw a friend who had made the same error, plus that this relieved her in some way. She was glad when she found a friend who had done the same thing. Someone showed her the way. She saw a friend who pointed out where the picnic was.

17. so the two of them headed off for the rest of the group. Æ

An indication that the two of them headed for their friends. So they took off for the picnic. They walked the rest of the way together. They said goodbye and left. They spent the day alone.

18. On the way some boys playing football knocked her down, —

"knocked down" by someone else in any form must be mentioned. Some guys knocked her over. Susan was ran into and fell. Susan tripped (fell, slipped, stumbled).

19. causing her to scrape her knee rather badly. —

An indication that Susan injured herself. She twisted her ankle (scrapped her leg, stubbed a toe). Susan was hurt when she fell. Susan got up and went on her way. causing her to drop her things.

20. She sat there for awhile quite upset and in a lot of pain. —

Recognition that she was in pain. She was really hurt. She was mad and hurt. Susan got up and shook it off. Susan brushed herself off. Susan got up and shook it off.

21. After resting she got up and continued on her way. Æ

An indication that Susan kept on going. She got up and headed for her friends. This didn't stop her. She got frustrated and just sat there. She wanted to go home.
22. Her friend happened to have some bandages, so he patched her up and made her feel a whole lot better. She cleaned herself up and felt better. Her friend gave her some bandages and the pain went away. 

23. Her frustration passed when she reached her friends because it felt good to see them all together. She was happy to finally reach her friends. She forgot about the trouble when she got to the picnic. After a while Susan forgot what had happened (without the context of her friends). It took a long time to get over what had happened.

24. Susan noticed that people were playing softball and wanted to play. She tried to get in on a game. Susan wanted to play some games with the others. Susan saw the others playing a game. Susan wanted to play a game but no one else did.

25. There were too many people, though, and Susan didn't get picked to be on a team which made her feel kind of worthless. "Susan was left out" in some form. No one wanted to play with her. Susan didn't get to be on a team. Nobody picked Susan to play. She decided not to play. Susan couldn't play. There wasn't time to get involved.

26. Susan sat and watched for a while, She watched instead. She went off by herself.
27. until someone got tired and asked her to take his place, which made her happy. 

28. During the game she made some mistakes, and felt foolish. "Felt foolish" for her play in some form must be there. 

29. She also felt that some of her friends were cruel because they laughed at her for making some mistakes, 

30. but after the game they all complimented her for being a good sport and trying her best. 

31. After the game everyone ate lunch. 

Somebody lets Susan join in. A guy asked Susan to be on his team. Someone got hurt and asked Susan to fill in. 

She played well. Susan’s team wasn’t very good. She didn’t worry about her few errors. 

The fact that Susan was ridiculed must be mentioned. Susan wasn’t very good, and the others laughed at her. Someone made fun of Susan’s ability. 

Susan wasn’t very good, and the others laughed at her. Everyone made fun of Susan’s ability. 

After the game someone said she was a good sport about it. They all knew she was trying her best, and told her. 

Susan felt that she had tried hard. She was a good sport about it, though. 

Pretty self explanatory. They started eating. It was lunchtime. 

They went hunting.
<table>
<thead>
<tr>
<th>Number</th>
<th>Text</th>
<th>Mention that she was embarrassed for having to bring deli sandwiches,</th>
<th>She felt dumb for having to bring the sandwiches.</th>
<th>Nobody said anything about her sandwiches.</th>
</tr>
</thead>
<tbody>
<tr>
<td>32.</td>
<td>Susan got embarrassed when she had to tell people why she brought deli sandwiches,</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>33.</td>
<td>but everybody said they were good, and thanked her for bringing them.</td>
<td>Recognition that the others enjoyed the sandwiches and appreciated it.</td>
<td>They liked the sandwiches.</td>
<td>They teased her about them. Nobody ate her food.</td>
</tr>
<tr>
<td>34.</td>
<td>At the end of the day Susan got excited when a man that she really liked walked her to her car.</td>
<td>A man that she likes walks her to her car.</td>
<td>A guy Susan thought was cute walked her to her car. A man she liked carried her things for her.</td>
<td>Someone helped her to her car. A friend/girl walked Susan to her car.</td>
</tr>
<tr>
<td>35.</td>
<td>On the way he asked her out on a date which made her very happy.</td>
<td>Both being asked out on a date must be present.</td>
<td>She was happy that he asked her out on a date. She got excited when he asked her out for the coming weekend.</td>
<td>She wished he would ask her out. She asked him out. He asked if her friend would go out with him.</td>
</tr>
<tr>
<td>36.</td>
<td>They made plans to get together soon, and said goodbye.</td>
<td>An indication that she left.</td>
<td>She got on the road.</td>
<td>They went home together. He left. She stupidly sat in her car for hours.</td>
</tr>
</tbody>
</table>
37. On the way home she couldn't stop thinking about what a great day it was, and was very pleased with the way things went. 

Mention that Susan felt good about the day. Susan realized what a great day it was. She thought how fun the day went. 

Susan thought about the day (no happiness). 

38. Her excitement was ruined, however, when a policeman pulled her over and gave her a speeding ticket. 

It must be mentioned that she received a traffic ticket. Susan got a ticket on the way home. She was caught speeding in her car. 

A policeman sold her a ticket to the policemen's ball. She pulled over to let a police car by. 

39. Susan realized that she wasn't paying much attention to her driving, and got upset at herself for it. 

An indication that Susan got upset at herself. Susan got mad about her driving. She new it was her fault for speeding. 

She couldn't believe the cop gave her a ticket. 

40. She finally made it home, though, and sat down to relax. 

Anything indicating that she got home. She made it home. When she got home... "I'm finally home," she thought. She watched TV when she got home. 

She went to a friend's home. She went to a movie.
41. Her cat let out a loud "Meow" and jumped up on Susan's lap. 
Mention that Susan has a cat.

42. Susan loved her cat, and felt really good when it began to purr in her arms. 
Recognition that Susan really enjoyed her cat.

43. As she began to pet her cat she realized that he felt wet, and started to look around. 
"The cat felt wet" in some form must be present.

44. "Oh, No! This is terrible!" she cried out when she saw that the cat had knocked over a $100.00 crystal vase that had flowers in it. 
Mention that an expensive vase was broken.

45. After cleaning it up she sat down and thought about what a strange day it had been. 
Susan must think about the day's events.

"What a day" she said (thought, cried, sighed, laughed).
Footnotes

1Beck (1967) has defined the schema (pl - schemata) as "a cognitive structure for screening, coding, and evaluating the stimuli that impinge on the organism. It is the mode by which the environment is broken down and organized into its many psychologically relevant facets" (p. 283). Negative self-schemata, therefore, are cognitive structures containing a negative view of the self. Upon activation of the self-schema the individual's thoughts and behaviors that relate in some way to the self are governed by its negative (or positive) view.

2It should be noted that both the imagery and cognitive instructions were adapted from Guthrie (1984). Hart and Means added a paragraph to the cognitive set and converted the questions in Guthrie's cognitive instructions to statements.