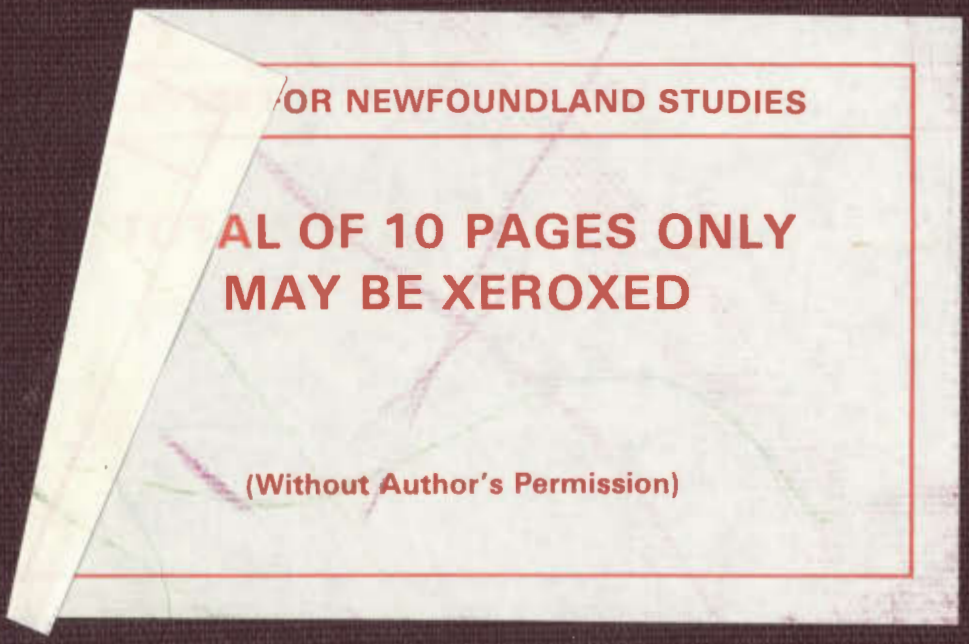
DIFFERENCES IN FREQUENCY JUDGMENTS OF POSITIVE AND NEGATIVE WORDS BY DEPRESSED AND NONDEPRESSED SUBJECTS



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DIFFERENCES IN FREQUENCY JUDGMENTS OF POSITIVE AND NEGATIVE WORDS BY DEPRESSED AND NONDEPRESSED SUBJECTS

BY

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Abstract

It was hypothesized that the frequency judgments of depressed and nondepressed subjects would be differentially affected by the use of affectively laden materials. Forty-eight female university students were selected on the basis of their scores on two standard depression measures so as to form a depressed and a nondepressed group (n = 24 for each group). Frequency judgments were obtained following the procedure of Hasher and Zacks (1979), with two changes: affectively laden adjectives were used as the stimuli, rather than common words, and subjects processed these words in a self-referent task, rather than reading the words aloud. No evidence of an interaction between subjects' level of depression and word affect was found for frequency judgments. The expectation that frequency estimates for neutral words would not differ between depressed and nondepressed subjects was also rejected. A strong main effect of depression was discovered, resulting in higher frequency judgments for the depressed subjects. The study provides findings that contrast with those of Hasher and Zacks (1979; Experiment 3) and poses some questions as to the automaticity of frequency judgments and the basis on which frequency judgments are made.

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And of course to Sandra, who paid me the greatest compliment of all by marrying me, thank you for always being there, I love you very much.

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The topic of the present study is an examination of the automatic processing of frequency information proposed by Hasher and Zacks (1979, 1984). Hasher and Zacks (1979) found that depressed and nondepressed subjects did not differ in their frequency judgments of common words. In contrast, data from clinical research suggest that depressed and nondepressed subjects process the frequency of affectively laden words differently, and that these findings are inconsistent with the automatic processing of frequency information theory put forward by Hasher and Zacks (1979). The present study is intended to clarify this apparent discrepancy.

Hasher and Zacks (1979) have proposed a framework within which a number of memory phenomena can be conceptualized. They propose that encoding operations lie on a continuum, the extremes of which are labelled automatic and effortful processing. Effortful processing occurs, according to Hasher and Zacks (1979), in such cognitive tasks as rehearsal, imagery, organization and clustering, and mnemonics. Effortful processes require effort and, as such, reduce one's capacity to engage in other effortful operations. Practice increases the efficiency of effortful processes, their use is voluntary, and we are generally aware of the effortful mechanism we are using. Finally, effortful processes show a wide range of individual differences (Hasher & Zacks, 1979).

Hasher and Zacks (1979, 1984) characterized automatic processes as follows: 1) automatic processing will occur effectively under both incidental and intentional learning conditions; 2) neither instruction nor practice will facilitate the automatic process; 3) no differences exist in automatic processing among people of varying educational, social, or cultural backgrounds; 4) automatic processes show limited developmental trends; and 5) the processing of frequency information will not be disrupted due to arousal, stress, or additional processing demands.

The prediction from Hasher and Zacks' view of automatic processing to be tested here is that certain stress states do not reduce or interfere with automatic processing. Included in the description of these stress states are high levels of arousal, disease, and depression.

> In any of these, one would expect to see the demise or diminution of effortful processes. This could be expressed in either a decrease in the number of such processes that continue to occur or in a reduction in the quality, accuracy, or efficiency with which a given process occurs. There should be no such reduction in the expression of automatic operations. (Hasher & Zacks, 1979, p.366).

As some examples of automatically encoded information, Hasher and Zacks suggest spatial location, time, and frequency of occurrence. The notion that frequency of occurrence is automatically encoded is one that they discussed at some length (e.g. Hasher & Zacks, 1979, 1984; Hasher & Chromiak, 1977). In one of the earlier studies, Hasher and Chromiak (1977) examined frequency estimates by

subjects in grades two, four, and six, and in college to see if frequency estimates show developmental changes. Subjects were informed that they would see a list of familiar words, some appearing more than once, and were to read each word aloud. Half of the subjects at each level were told a frequency judgment task would follow the presentation (informed condition) while the other half were given general memory instructions (uninformed condition). The results showed that subjects from grade two were able to process frequency information as well as college students. Also, providing explicit instructions of the task over the general memory instructions did not produce any improvement. A second experiment showed that neither practice nor feedback about performance improved frequency estimates. Hasher and Chromiak (1977) concluded that frequency counting or tagging is an essential processing component and an automatic process, and that it shows little developmental change.

Hasher and Zacks (1979) conducted a number of experiments concerning frequency estimation. In their first experiment, they used the performance of subjects in grades kindergarten, one, two, and three. The results were consistent with those of Hasher and Chromiak (1977). In Experiment 2, college students and elderly subjects were tested using Hasher and Chromiak's (1977) original method. Differences between groups were found, with the elderly subjects making lower estimates than the college group. Hasher and Zacks noted that this finding was troublesome,

but evaluated it in light of three observations: first, both groups were able to make judgments over a truncated frequency range; second, the two groups appeared to be equally sensitive to frequency differences; and finally, there is a conservative response bias among the elderly (Craik, 1969). Thus, they concluded that frequency judgments are relatively unaffected by aging, and that the study generally supported their theory of frequency judgments.

In yet a third study, Hasher and Zacks (1979) examined the frequency judgments of depressed and nondepressed subjects. Subjects were classified as depressed or nondepressed according to their scores on the Beck Depression Inventory (BDI). The study also investigated the influence of subjective repetitions of an event upon frequency judgments. To investigate this, Hasher and Zacks (1979, Experiment 3) had depressed and nondepressed subjects view and then imagine various pictures. Each picture was viewed either one, two, or three times and then imagined never, once, or three times. The results showed that the mean frequency judgments made by the two groups did not differ. Hasher and Zacks (1979) concluded that depressed and nondepressed subjects can estimate equally well the frequency with which events occur (p.374).

Research investigating the recall of performance feedback by depressed and nondepressed subjects, however, appears to conflict with Hasher and Zacks' conclusion. For example, DeMonbreun and Craighead (1977) conducted a study in which they investigated the recall of positive feedback in depressed and nondepressed subjects. Subjects were selected using the BDI, and three groups were formed: 16 depressed psychiatric outpatients (mean BDI score, M = 31.6), 16 nondepressed psychiatric outpatients (M = 6.6), and 16 nondepressed nonpsychiatric outpatients (M = 2.9). The depressed subjects had a score of 23 or higher on the BDI and the nondepressed subjects had a score of 9 or less.

DeMonbreun and Craighead (1977) showed subjects slides of three-letter nonsense syllables photographed out of focus. Subjects were then shown four syllables on a single slide and were asked which syllable was most like the slide presented. The subjects were given two trials of 40 stimulus slides each. During the first trial all subjects were randomly presented eight of each of five feedback slides following their response. Feedback slides varied from light grey to black. Subjects were informed that the lightest slide indicated perfect acceptability, the darkest slide (black) indicated total unacceptability, and intermediate shades indicated various levels of acceptability of the subjects' response. Subjects were then asked to recall how often they received feedback indicating that a response was acceptable. This estimation of the

frequency of positive feedback was described as a "cognitive summary" by DeMonbreun and Craighead and defined as "the subjects' recall at the conclusion of each half of the experiment of the number of times they had received positive feedback" (p.317).

Following this frequency judgment, subjects were administered the second trial of the experiment, with another 40 slides presented. This time subjects were randomly assigned to receive either a high (65%) or low (35%) rate of positive feedback. At the end of the 40 trials subjects were again asked to estimate how often they had received positive feedback.

The results from the first 40 trials showed the depressed subjects underestimated the amount of positive feedback they received when compared with the nondepressed psychiatric subjects, but not when compared with the nondepressed nonpsychiatric group. None of the groups were shown to differ from the expected mean of 20.

Analysis of the second half of the experiment showed that in the high-feedback condition, depressed subjects recalled receiving significantly less positive feedback than the other two nondepressed groups. Compared with the actual mean of 26, the depressed subjects had a mean estimate of 17.03, while the nondepressed psychiatrics had a mean estimate of 27.08 and the nondepressed nonpsychiatrics 25.59. Whether these mean estimates differed significantly

from the actual mean was not presented. Results from the low-feedback group showed no significant differences among groups, nor significant deviations from the expected mean for any group.

How the type of feedback influenced subjects' estimates was tested in a study conducted by Nelson and Craighead (1977). In their study, college students who scored ten or above on the BDI were classified as depressed ($M = 14.7$), while those scoring five or less were placed in the nondepressed group ($M = 2.1$). The subjects were again asked to choose which nonsense syllable was most like another that had been photographed out of focus. Subjects were placed in either a punishment (the word "BAD" on a red background) or reinforcement group ("GOOD" on a green background) and received either a high or low rate of feedback (70% or 30% of the trials, respectively).

Both depressed and nondepressed subjects experiencing the low rate of reinforcement underestimated the amount of reinforcement received, but there were no differences between groups. In the high reinforcement condition, depressed subjects significantly underestimated the amount of reinforcement but nondepressed subjects were accurate. With the low rate of punishment, the depressed subjects were accurate while the nondepressed significantly underestimated the amount of negative feedback. No differences between groups occurred in the high punishment condition. Differences from the actual mean for each group were not

reported.

In summary, both of these studies found that depressed subjects underestimated positive feedback when compared to the nondepressed group, especially at high levels of positive feedback. Differences between the two groups were not found at high levels of negative feedback; however, depressed subjects were shown to overestimate low levels of negative feedback when compared to the nondepressed group (Nelson & Craighead, 1977).

A study that provides further evidence of differing frequency judgments between depressed and nondepressed college students was conducted by Finkel, Glass, and Merluzzi (1982). The scores of 94 subjects on the BDI and the D30 scale from the MMPI were converted to z-scores and averaged. The 60 subjects whose scores fell in the top or bottom 30 z-scores were selected for the study. Means for the depressed subjects on the BDI and D30 were 10.5 and 10.8, respectively, and for the nondepressed subjects 1.7 and 2.5, respectively. Finkel et al. (1982) had subjects rate 60 statements on a positive to negative scale. There were three between-subjects conditions: a high proportion (30/60) of positive self-referent statements; a low proportion (18/60) of positive self-referent statements; and a control condition of 60 neutral, non-self-referent statements. The remaining statements in the two experimental groups contained a mixture of negative and neutral statements.

Following the rating task, subjects were asked to estimate how many positive self-referent statements they had seen. Results showed that in the control condition and the low rate condition, depressed and nondepressed subjects did not differ in their estimates. However, when the proportion of positive statements was high, depressed subjects reported having seen significantly fewer positive statements than nondepressed subjects (means of 36.0 and 41.5 respectively, compared to the actual mean of 30).

What these studies reviewed above indicate is that there are instances when depressed and nondepressed subjects differ in their frequency judgments. The studies show that frequency judgments are affected by the subjects' level of depression, the rate of feedback given to the subjects, and the type of feedback presented. Furthermore, frequency judgments are shown to reflect an interaction of depression with rate of feedback, and an interaction of depression with type of feedback.

A number of hypotheses may be put forward to explain why the feedback studies found differences in frequency judgments between depressed and nondepressed subjects while Hasher and Zacks (1979) did not. One possible source of these differences may be a result of the variation in the number of classes of items the two studies used. Hasher and Zacks (1979) presented their subjects with a high number of classes of items; that is, subjects were asked to make frequency judgments on 20 common words or pictures. In

contrast, the feedback studies used few classes of items. For example, Nelson and Craighead (1977) asked their subjects to estimate how often they saw the word "good" or "bad" in relation to their performance. These subjects only had to make estimates on two classes of items. A second difference is the frequency with which the to-be-estimated items were presented. Hasher and Zacks' (1979) items were presented no more than four times; frequencies in the feedback studies would often range in the twenties.

The influence of disparities in the presentation frequency and the number of classes of items upon frequency judgments is difficult to ascertain. According to Hasher and Zacks, however, the processing of frequency information is automatic, and should not be affected by the number of classes of items, nor the range of frequencies with which items are presented. These differences are not critical, and would not influence frequency judgments.

A further difference between the feedback studies and Hasher and Zacks' (1979) work involves the personal relevancy of the to-be-judged material. Hasher and Zacks had subjects make frequency judgments of common words, while the feedback studies involved judgments of personally relevant information (subjects' performance on a task, rating self-referent statements). A study by Rogers, Kuiper, and Kriker (1977) has shown that recall of words is even greater following a self-referent task than following a semantic task, and this has been well replicated. However,

the notion that self-referent information is processed more deeply, or that the self provides an elaborate memory structure has been challenged by Klein and Kihlstrom (1986). They propose and demonstate that the self-referent tasks generally used provide the subject with a superior organizational scheme (words that describe me versus words that do not describe me) not provided by a semantic task. Whatever the cause of the self-referent effect, extrapolating the results of a recall study to a frequency judgment study is weak, at best. There is no evidence from the literature to suggest that frequency judgments are affected by self-referent processing; indeed, just the opposite is suggested by Hasher and Zacks (1979). In their paper they state that frequency judgments should not be affected by the type of processing taking place. Therefore, whether subjects process self-referent information or common words should not affect frequency judgments, nor should it influence the outcomes of the studies mentioned above.

Another factor that may have contributed to the discrepant findings is the classification of depressed subjects by the BDI. Specifically, there are three issues here: first, the population sampled; second, the cutoff scores used; and third, the time between administration of the BDI and the experimental procedure.

The use of the BDI as a depression measure in certain populations has come under some criticism. For example Coyne and Gotlib (1983, p. 475-476) noted that many studies select mildly depressed college students as their sample population; they question whether or not results of these studies would be the same had the researchers selected subjects from clinical populations. It is interesting to note that DeMonbreun and Craighead (1977) sampled a psychiatric population, while Nelson and Craighead used mildly depressed college students, yet both found differences between depressed and nondepressed groups in their ability to make frequency judgments. It must also be noted that the BDI has been validated in its ability to select for depression in college students (Bumberry, Oliver & McClure, 1978). Hammen (1980) compared the BDI with the Research Diagnostic Criteria for Affective Disorders, as well as the Hamilton Rating Scale for Depression, and concluded in agreement with Bumberry et al. (1978) that the BDI was useful in determining depression in college students.

The second issue concerns the cutoff scores on the BDI used to classify someone as depressed or nondepressed. The cutoff scores on the BDI varied greatly in the studies reviewed above. Hasher and Zacks (1979) used a cutoff point of nine and above to describe depressed subjects, DeMonbreun and Craighead (1977) used scores of 23 and above, Nelson and Craighead (1977) 10 and above, and Finkel et al. (1982)

used the extreme ends of the subjects z-scores (obtained by combining the results of the BDI and the D30 scale), and had an average of 10.5 on the BDI for depressed subjects. While the effects of differences in the cutoff scores cannot be completely discounted, their contribution to the discrepant findings is probably minimal. The cutoffs used by Hasher and Zacks (1979) are quite similar to those used by Nelson and Craighead (1977), with the latter study finding inaccurate frequency judgments and the former not. So, it appears that the varying cutoff scores mean little when attempting to explain the discrepant findings.

The third issue is concerned with the length of time between administration of the BDI and the experimental procedure. Sacco (1981) criticized many researchers for allowing too much time to pass between initial screening of subjects with the BDI and actual testing, recommending that researchers assess depression levels just prior to testing. Because of the time between administration of the BDI and the experimental procedure, Sacco (1981) believed that many of the subjects classified as depressed would, at the time of testing, no longer meet the cutoff scores for depression. Both Hasher and Zacks (1979) and Nelson and Craighead (1977) administered the BDI just prior to the experimental task. DeMonbreun and Craighead (1977) stated that they administered the BDI "no longer than 10 days prior to participating in the experiment". Given the similarity in findings between DeMonbreun and Craighead (1977) and Nelson

and Craighead (1977), the time between the administration of the BDI and the experimental procedure does not seem to be a factor in attempting to determine why differences occurred between the frequency and the feedback studies.

A final difference between the feedback studies and studies by Hasher and Zacks is that the feedback studies used affectively laden materials. The studies by Nelson and Craighead (1977) and DeMonbreun and Craighead (1977) had subjects estimate numbers of correct and incorrect responses, each of which involve feelings of "good" and "bad" respectively. Finkel et al. (1982), used self-referent statements that were either neutral, positively laden or negatively laden. Indeed, Finkel et al. (1982) postulated

> One plausible explanation for the findings may be that there are differences in the level of processing between depressed and nondepressed individuals. In the present study, the use of self-referent, affectively loaded stimuli may have affected subjects' initial encoding of information... (p. 181).

The paradigms used by Hasher and Zacks (1979) and Hasher and Chromiak (1977), on the other hand, used common words or pictures as the stimulus base. These words, it can be argued, are neutral and have little or no affective quality attached to them. The affective quality of the material may well, therefore, determine differences in processing among depressed and nondepressed subjects. Finkel et al. (1982) reported no differences between judgments of depressed and nondepressed subjects in the

neutral condition, but did find that depressed subjects gave judgments for high rates of positive statements that were lower than the judgments of nondepressed subjects. It would appear from these studies reviewed above that the affect of the material, along with the mood of the subject, influences frequency judgments.

In extrapolated support of this inference, a number of studies have found differences between depressed and nondepressed subjects on a variety of cognitive tasks. For example, depressed subjects have been shown to exhibit a short-term memory deficit compared to nondepressed controls (Colby, 1982; Henry, Weingartner & Murphy, 1973; Sternberg & Jarvik, 1976). In story-completion tasks depressed women were shown to use more depressed-distorted responses and fewer nondepressed-nondistorted responses' than nondepressed women (Krantz & Hammen, 1979).[1] Also, depressed subjects have been shown to recall unpleasant memories faster than nondepressed subjects (Lloyd & Lishman, 1975; Teasdale & Fogerty, 1979), and to differ in attributional style (Abramson, Seligman, & Teasdale, 1978). In addition, differences in cognitive functioning have been proposed as the major theoretical distinction between depressed and nondepressed people (i.e. Beck, 1967, 1976). Given this view, and the findings of the feedback studies reviewed above, it seems reasonable to speculate that differences may occur for depressed and nondepressed subjects with respect to the encoding of frequency information as well, contrary

to the findings of Hasher and Zacks (1979, Experiment 3).

Another area of relevance here is research involving recall and mood. Studies examining how recall is affected by an interaction between the subject's mood and the affective value of the to-be-remembered material have been conducted by Bower (1981; Bower, Gilligan & Monteiro, 1981). Bower argues that the interaction between mood and the affective valence of the to-be-remembered material is critical, and has proposed a mood congruence or selectivity effect of memory. Mood congruence refers to the notion that negative material should be learned or recalled best when the learner is in a negative or depressed mood, and positive material is best learned or recalled when in a positive or nondepressed mood. Concordance of mood at exposure and at recall is not a relevant factor (Blaney, 1986). Performance should be reduced when the subject's mood is opposite that of the affective quality of the material (i.e. depressed subjects with positive material, nondepressed subjects with negative material).

Bower (1981) has demonstrated mood congruency effects when mood was induced by hypnotic suggestion. Bower (1981) induced a happy or sad mood in his subjects and had them read a narrative about two characters, one who had good things happening in his life, the other one sad. Upon recalling facts about the stories while in a neutral mood, sad subjects were shown to recall more facts about the sad character, while happy subjects recalled more facts about

the happy character. A second and similar experiment replicated these findings. Bower's (1981) research then, has generated support for mood congruence effects in recall. To speculate that frequency judgments would be similarly affected by the same factors that influence recall seems reasonable. In support of this, Rose (1984) found a small yet significant mean correlation of .25 and .21 between the recall of words and their judged frequency.

In an attempt to control for what they considered to be weaknesses in the design of Bower's research (for example the demand characteristics of mood induction-procedures; see Buchwald, Strack, & Coyne, 1981), Hasher, Rose, Zacks, Sanft and Doren (1985) conducted a number of studies to investigate the effect of naturally occurring variations in mood upon recall of affectively toned material. Specifically, Hasher et al. (1985) used standard paper and pencil tests (including the BDI), to measure the presence or absence of depression in college students. In Experiment 1, subjects read either a positive, a negative, or a neutral story, and their recall was then tested. No significant differences were found between depressed and nondepressed subjects in recall of either positive, negative or neutral information. Because recall was incidental in Hasher et al.'s (1985) Experiment 1 and intentional in Bower's (1981) study, a second experiment was conducted to see if intentionality contributed to the failure to find mood congruence effects. Hasher et al. partially replicated

Bower's (1981) Experiment 3, in which subjects read a story whose protagonist experienced good, bad, and neutral life events. Again they used measures on paper and pencil tests to determine mood at time of testing. Results were straightforward: no interaction of material affect with subject mood was found.

Hasher et al. (1985) postulated that their failure to find mood congruence effects in recall was due to the failure to activate subjects' self-schemas (cf. Clark, Milberg, & Ross, 1983; Kuiper, Derry, & MacDonald, 1982). A schema is an organized body of knowledge, characteristic of the individual, stored in long-term memory. Hasher et al. conducted a third experiment, which was a partial replication of Experiment 1. This time, a stronger attempt was made to activate subjects' schemas. Results of memory scores of the various stories again showed no interaction of mood with the affect of the story material. Thus, Hasher et al. (1985) concluded that they found no support for mood congruency effects in learning.

In summary, the theory of mood congruence predicts that recall is enhanced when the mood of the person and the mood of the material to be learned or recalled are concordant. Unfortunately, the strength of the theory is somewhat weakened by the difficulty in replicating Bower's (1981) findings. Though empirically the support for mood congruency may be weak, the theory is useful in that it provides direction to the hypothesis to be tested in the

present study.

The Present Study

The general aim of the present study is to examine the effects of the interaction between the subjects' mood and the affect of the to-be-judged material upon frequency judgments. More specifically, the study will test the hypothesis that the frequency judgments of affectively laden words differ for depressed and nondepressed subjects. This hypothesis is especially intriguing because it would be inconsistent with the findings of Hasher and Zacks (1979), while supporting a mood congruency effect in depressed and nondepressed subjects.

Differences between the outcomes of the feedback studies and Hasher and Zacks' work may stem from the fact that very different paradigms were used. In order to control for this possibility, the paradigm used by Hasher and Zacks (1979, Experiment 2) was followed, with two exceptions. The first exception was that the words presented to the subjects in the present study were affectively laden, which is the variable to be examined in the present study. Secondly, Hasher and Zacks had subjects read aloud the words that they were presented. In the present study subjects processed the words in a self-referent task. The use of a self-referent task could increase subjects' sensitivity to the affect manipulation, and yield higher frequency judgments for those words that

are consistent with subjects' mood. More importantly, according to Hasher and Zacks (1979), type of processing should not affect frequency judgments. Therefore, the use of a self-referent task seemed justified in the present study.

Explicity, the following hypothesis was made and tested in the present study:

> Frequency estimates given by depressed and nondepressed subjects will differ for positively and negatively laden words. Depressed subjects will overestimate the number of negative words they see when compared to nondepressed subjects. Conversely, depressed subjects will underestimate the number of positive words they see when compared to the nondepressed group.

An expectation of the present study is to find no difference between the depressed and nondepressed group in their estimates of the number of neutral words they view. The neutral condition will be a partial replication of Hasher and Zacks' (1979) study.

Method

Depression Measures

The D30 scale of the Minnesota Multiphasic Personality Inventory (MMPI) was developed to correlate with diagnoses

of depression (Dempsey, 1964). It consists of 30 statements to be rated true or false, according to whether or not the statement applies to the subject. One point is given for each statement that is scored as consistent with depressive thinking or behavior, and thus results in a possible low score of zero (nondepressed) and a high score of 30 (severely depressed). The D30 has a split-half reliability of .88 and .92 (Dempsey, 1964).

The Beck Depression Inventory (BDI) consists of 21 groups of four statements each designed to assess state measures of depression (Beck, Ward, Mendelson, Mock, & Erbaugh, 1961). Each group of four statements is listed in order of severity (e.g., "I do not feel sad" to "I am so sad or unhappy that I can't stand it"). Depending on the statement chosen, subjects receive from zero to three points. Scores are summed over the 21 statements for a low of zero (nondepressed) to a high of 63 (severely depressed). Beck's original category scores are as follows: zero to nine = not depressed; 10-15 = mildly depressed; 16-23 = moderately depressed; and 24-63 = severely depressed (Bumberry et al., 1978). Beck et al. (1961) reported biserial correlation coefficients of .65 and .67 with psychiatric assessment of depression. Test-retest correlations of .74 and .75 have been reported (Miller & Seligman, 1973, and Pehm, 1976, respectively).

Subjects

An in-class administration to undergraduate

introductory psychology classes of the D30 scale was used as a screening measure for depression. Students were informed that completing the D30 scale was voluntary, and that completing the form did not oblige them to participate further in the study. Students were told that the experiment was concerned with correlating measures on personality tests with the way people actually perceive themselves. Approximately 300 students in seven classes filled in the scale during the first five minutes of class. The tests were then scored by the experimenter, and only those students with scores of seven were not asked to participate further in the study. For those subjects who volunteered, a time was set for the following day for them to come and participate in the experiment. In total 88 students participated further in the study.

Prior to beginning the experiment, subjects were asked to complete the BDI. To be considered as nondepressed, subjects had to score six or less on the D30 and five or below on the BDI. Likewise, depressed subjects were those students who had scored eight or above on the D30 scale and who scored 11 or above on the BDI. These criteria were incorporated to strengthen the measure of depression used to select subjects.

A total of 40 subjects were excluded from the study. Twelve male subjects were excluded when it became apparent that no males scored high enough on the BDI to be considered depressed. If there were no males in the depressed sample,

any between-group differences found could be attributed to gender effects, and not to depression. It was decided to run only female subjects to eliminate this possible confounding. Twenty-eight females were excluded when their BDI test score failed to stay within the ranges set by the experimenter. In total then, 24 depressed and 24 nondepressed female students from introductory psychology classes at Memorial University were used as subjects.

Materials

Sixty different words were used in the present study, 20 each in the positive, negative, and neutral conditions. All subjects saw the same set of words. The words were selected from two sources. First, 20 positive words and 20 negative words were selected randomly from two groups of 30 nondepressed- and 30 depressed-content personal adjectives developed by Derry and Kuiper (see Kuiper, Derry, & MacDonald, 1982). These words had received normative ratings by 72 university students, and the lists (depressed and nondepressed) were similar in imagery value, word frequency, and word length (Kuiper et al., 1982). Two words were eliminated as possible alternatives from the group of depressed adjectives, as they also appeared in the source used to select the neutral words.

Twenty neutral words were selected from Anderson's (1968) list of 555 personality trait adjectives, in which subjects were asked to rate how much they would like a person described by the word presented. Neutral words were

selected from the words that fell between Anderson's (1968) medium-high and medium-low subranges. Care was taken to select words that were low in variance in Anderson's rating task. There were no significant differences between the positive, negative, and neutral word lists in their mean number of letters or mean number of syllables. The words used in this study are listed in Appendix A.

As stated earlier, there were 20 positive, 20 negative, and 20 neutral words in each list. Four of each of these were presented one, two, three, or four times. For example, in the positive condition there were four words presented once (four presentations), four words presented twice (eight presentations), four words presented three times (12 presentations), and four words presented four times (16 presentations). This gave a total of 40 (4 + 8 + 12 + 16) presentations. This presentation structure also held for the negative and neutral conditions. The remaining four positive, four negative, and four neutral words were not presented in the study list. These were the zero-frequency words, and were presented as new words in the frequency judgment task.

The spacing between repetitions of words was controlled with a minimum of eight and a maximum of 14 different words presented between repetitions of a given word. Four lists were constructed, to counterbalance for each word the number of times it was presented. For example, the word "CAPABLE" was presented, once in list one, twice in list two, and so

on. Then a backward list was constructed of each of the four lists to counterbalance for presentation effects, giving a total of eight word lists. The first five and last five word presentations acted as buffers against primacy and recency effects. Thus there were 130 presentations in all in each list. Word lists were assigned randomly to each subject, with the constraint that each list was presented six times and presented equally to the depressed and nondepressed groups.

Design and Procedure

The experimental design was a 2 X 3 X 5 mixed-factorial design, the between-subjects factor consisting of two levels of depression (depressed versus nondepressed), and the within-subjects factors consisting of three levels of word affect (positive, negative, or neutral), and five levels of word frequency (zero through four presentations inclusive).

Following administration of the BDI, subjects were presented a set of standard instructions (see Appendix B) upon a computer monitor, and then the study phase was begun. Subjects were given three practice trials which included one positive, one negative, and one neutral word not used in the experimental trials. This was followed by 130 experimental trials. Words were presented one at a time, and below each word subjects were asked if this word described them. Subjects indicated their responses to the self-referent question (DESCRIBES YOU?) through a keyboard in front of the monitor. Subjects pressed "1" for "yes" and "0" for "no".

Following the completion of the study phase, instructions for the second part, or the frequency judgment task, were presented on the screen (see Appendix C). Subjects were informed that some of the words had not been presented in the first section. As well, the instructions stated that no word had been presented more than six times. As each word was presented, subjects were asked to indicate how often they believed that word had been presented in the study section. Subjects made their estimates by pressing the corresponding number on the keyboard.

All 48 of the positive, negative, and neutral words in the study phase were presented in the frequency judgment test. In addition, four each of positive, negative, and neutral words that were not used in the study section were tested for frequency estimates. These words represented the zero-frequency group. Thus, in total, there were 60 trials in the frequency judgment test. These words were presented in random order to each subject.

Following the completion of the frequency judgment task an "End of Experiment" message was presented, and subjects were instructed to see the experimenter for payment. The entire experiment took from 20 to 40 minutes.

Results

Level of Depression

The depressed subjects had a mean score of 17.7 on the BDI (SD = 5.25) and the nondepressed subjects had a mean of 2.3 on the BDI (SD = 1.6).

Frequency Judgments

A 2 X 3 X 5 mixed-design analysis of variance (ANOVA) of the mean judged frequency of the words by each of the 24 depressed and 24 nondepressed subjects was carried out, with level of depression, word affect, and frequency of presentation as the main factors. Appendix D presents a summary of the ANOVA. The ANOVA indicated that the overall mean judged frequency was significantly higher, $F(1, 46) = 23.8$, $p < .001$, for depressed subjects ($M = 2.62$) than for nondepressed subjects ($M = 1.96$). Depressed subjects, then, reported seeing significantly more words than the nondepressed group. As would be expected, a main effect for frequency was found, $F(4, 184) = 475.5$, $p < .001$. The analysis showed that frequency judgments increased as actual frequency increased, $p < .05$ at all levels of actual frequency. Thus, the more frequently a word was presented, the higher the frequency judgment given that word.

The Depression X Frequency interaction was significant, $F(4, 184) = 4.90$, $p < .01$, and straightforward in its effects. Comparisons employing the appropriate mean square error from the ANOVA showed that the differences were significant between groups at each frequency level (p's < .01), except the zero condition (see Figure 1).[2] It would appear that the depressed and nondepressed subjects did not

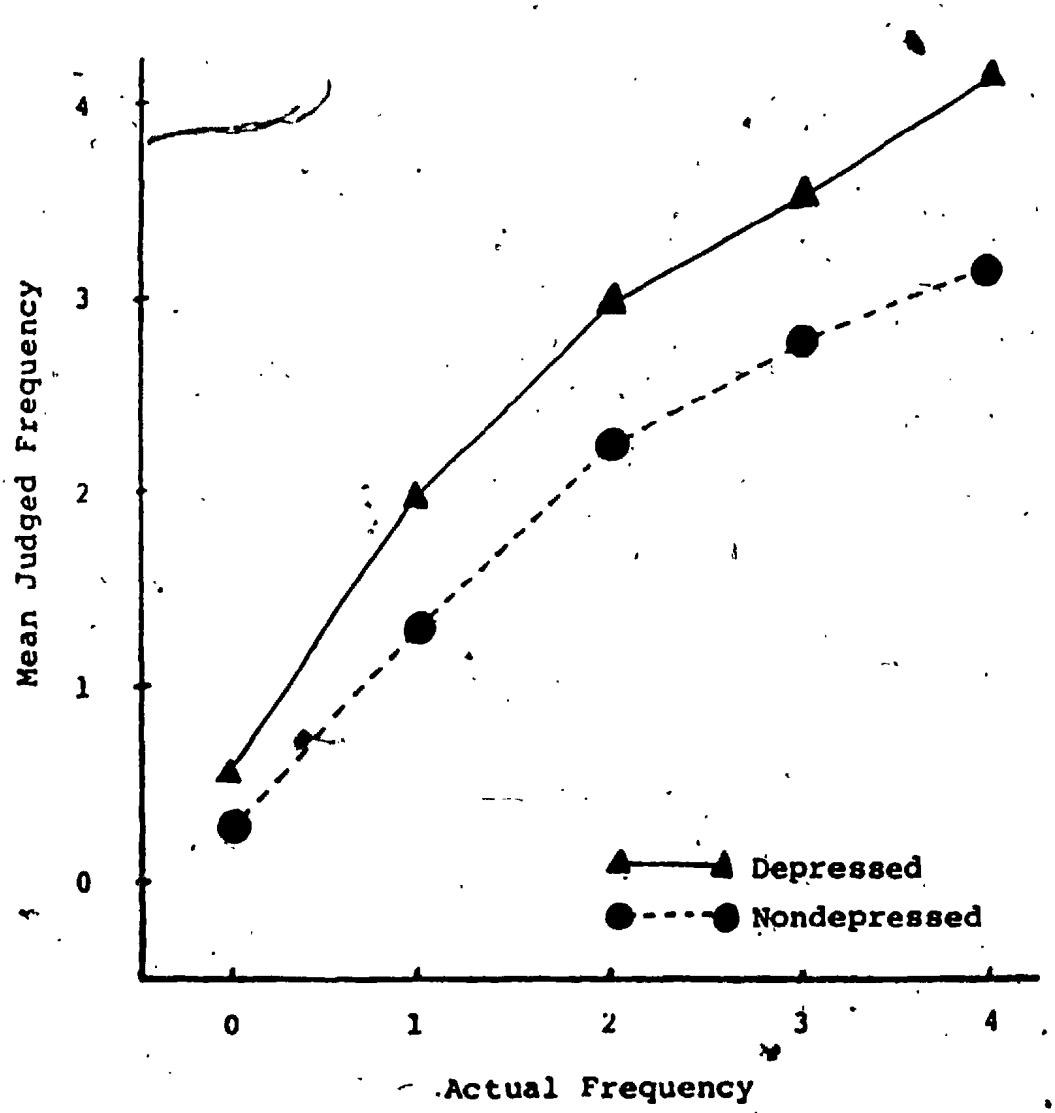

Figure 1. Mean judged frequency, depressed versus nondepressed subjects.

differ in their judgments of the frequency of new words; however, significant differences did occur for the frequency judgments of previously presented materials.

A significant main effect for word affect was also found, $F(2,92) = 4.95$, $p < .01$. Analysis showed that the positive words received the highest mean frequency judgment ($M = 2.40$), followed by the neutral condition ($M = 2.27$), and then the negative condition ($M = 2.20$). The difference between the positive and negative words was significant, $p < .05$. No significant differences were found between the negative and neutral condition, nor the positive and neutral condition. That the positive words received the highest mean judged frequency would seem consistent with the Pollyanna effect described by Matlin and Strang (1978), in which memory for positive events tends to be greater than for negative events.

The Affect X Frequency interaction (see Figure 2) attained significance, $F(8, 368) = 2.20$, $p < .05$, but is unsystematic. For example, no difference existed between positive and neutral words at the frequencies of one and three, but did at the frequency of two. This trend is difficult to explain in the context of this thesis and would appear to be of little theoretical interest.

The Depression X Affect interaction was not significant, $F < 1$. Therefore no support for the hypothesis that frequency judgments would show a mood congruency effect

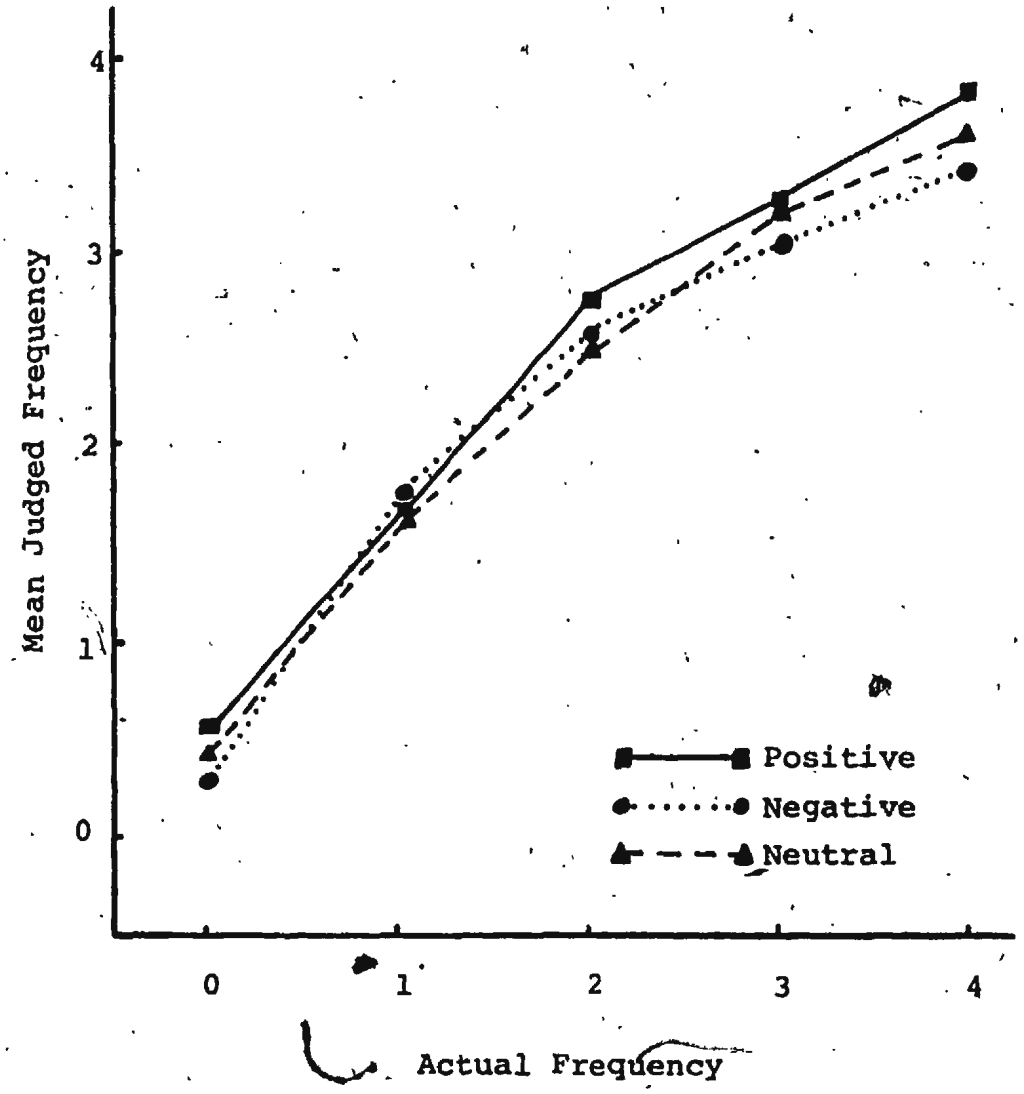

Figure 2. Mean judged frequency for negative, neutral, and positive words.

was found. As seen in Table 1, for each level of word affect, depressed subjects reported higher frequencies than the nondepressed group (p's < .01). Though the interaction predicted was not obtained, the finding that frequency estimates of depressed subjects were higher than those of nondepressed subjects does not replicate the findings of Hasher and Zacks (1979, Experiment 3).

To ascertain whether the selection of subjects who scored higher on the BDI would have yielded the predicted outcome, a median split was performed on the depressed group. This resulted in a mildly depressed group (M = 13.5 on the BDI), and a moderately depressed group (M = 21.8). A new ANOVA was performed upon the data for the two new groups and the original nondepressed group (see Appendix E). The Depression X Affect interaction still did not reach significance, $F(4, 90) = 1.02$. It would appear then that selecting subjects with higher BDI scores than were set for this experiment would not change the outcome.

Self-Referent Task

It has been reported previously (Craik & Tulving, 1975), that recall and recognition of words is greater following "yes" processing than following "no" processing. Possible differences in the way the depressed and nondepressed groups responded to the self-referent task may have influenced their respective frequency judgments. Greater "yes" responding may have yielded higher frequency estimates.

Table 1

Mean judged frequency by depressed and nondepressed subjects for negative, neutral, and positive words.

	Word Affect			
	Negative	Neutral	Positive	Mean
Depressed	2.56	2.61	2.69	2.62
Nondepressed	1.82	1.93	2.11	1.96
Difference	0.74	0.68	0.58	

A 2 X 3 mixed ANOVA (Appendix F) upon the mean number of "yes" responses given by the two groups under each word affect condition revealed a main effect of depression level, $F(1, 46) = 11.5$, $p < .01$, a main effect for word affect, $F(2, 92) = 85.7$, $p < .01$, and most importantly, a significant Affect X Depression interaction, $F(2, 92) = 35.6$, $p < .01$. Table 2 shows that depressed subjects gave more "yes" responses overall when compared to the nondepressed subjects ($p < .01$), but this was not true for all types of items. For both the neutral and negative items, depressed subjects gave significantly more "yes" responses than the nondepressed subjects , p's $< .05$. However, depressed subjects responded "yes" significantly less often than nondepressed subjects to the positive words, $p < .001$. If a greater number of "yes" responses resulted in higher mean judged frequencies, it would do so equally for both groups. Though the nondepressed subjects gave more "yes" responses to the positive words, their mean judged frequency was significantly lower for these words when compared to the depressed group. Therefore, differences in the number of "yes" responses by the depressed and nondepressed groups did not account for differences found in their frequency judgments.

<u>False Alarms and Misses</u>

False alarms and misses were examined to determine if recognition biases could account for the different frequency judgments given by the two groups. A false alarm was

Table 2

Mean Number of "Yes" Responses by Depressed and Nondepressed Subjects.

	Word Affect			
	Negative	Neutral	Positive	Mean
Depressed	15.75	22.25	21.88	19.96
Nondepressed	1.04	17.88	30.29	16.40
Mean	8.40	20.06	26.08	

defined as any frequency judgment other than zero given to any new words. False alarm rates of depressed and nondepressed subjects did not differ, $t(42.0) = 1.06$, $p > .05$. The depressed group had a mean of 3.13 false alarms per subject, and the nondepressed group had a mean of 2.33 false alarms per subject. Differences in frequency judgments between depressed and nondepressed subjects cannot be accounted for by different false alarm rates.

A miss was defined as a frequency judgment of zero given to a word that had been presented. Nondepressed subjects ($M = 2.79$) missed significantly more items than depressed subjects ($M = 1.67$), $t(32.9) = 2.93$, $p < .01$. Because a higher miss rate by the nondepressed subjects could have produced lower overall frequency judgments, judgments of frequency given correct recognition were examined. The mean frequency judgment conditional upon correct recognition was 3.2 for depressed subjects, and for nondepressed subjects 2.5. The means prior to taking into consideration correct recognition were 3.1 for the depressed subjects, and 2.4 for the nondepressed subjects. Thus, it appears that differences in frequency judgments for the two groups of subjects cannot be accounted for in terms of a higher miss rate in one group.

Correlation of Judged Frequency With Actual Frequency

For each subject a Pearson Correlation Coefficient was calculated between the judged frequency and actual frequency, following the procedure described by Flexser and

Bower (1975). The figure derived is known as the discrimination coefficient, and measures how well the subject's responses distinguish one frequency from another. A 2 X 3 mixed-design ANOVA of the discrimination coefficients was performed (see Appendices G and H). The between-subjects factor was level of depression, and the within-subjects factor the three levels of word affect. No significant interaction of depression with word affect was found, $F(2, 92) = 1.31$, $p > .05$. The mean correlation coefficient for the depressed group was .72, and the mean for the nondepressed group was also .72. Though the mean frequency judgments were higher for the depressed than for the nondepressed group, the correlations between the two groups' judgments and actual frquencies were the same. It would appear that both the depressed and the nondepressed subjects are able to discriminate relative frequencies equally well, yet depressed subjects make higher frequency judgments.

Discussion

The present study examined the hypothesis that depressed and nondepressed subjects would differ in their frequency judgments of positive and negative words. In addition, it was expected that no differences would be found in the frequency judgments of depressed and nondepressed subjects for neutral words. The findings of the present

study do not support either of these notions. No significant interaction between depression and word affect was found. Also, depressed subjects were found to give higher mean frequency judgments for neutral words when compared to the nondepressed subjects.

What is crucial to explain is the lack of an interaction between depression and affect. Failure to find the depression by affect interaction in this thesis is consistent with Hasher et al. (1985) who failed to find an interaction between depression and affective material in the recall of short stories. Hasher et al., cited others including Isen, Shalker, Clark, and Karp (1978; Experiment 2), Nasby and Yando (1982), and Natale and Hantas (1982) who failed to find an interaction of depression and affect.

Two methodological questions arise when attempting to reason why the proposed interaction was not discovered. First, was the level of depression for the depressed subjects high enough to expect an interaction, and second, was the affect of the words a strong enough variable?

Depression levels selected for the depressed subjects in the present study appeared to be set sufficiently high enough to result in the predicted interaction with word affect. A number of researchers do suggest that scores in the moderate range on the BDI (which these depressed subjects fell into, with a mean of 17.7) are not high enough to show the possible interaction of depression with affect

(Mayer & Bower, 1985; Isen, 1985; Ellis, 1985). The median split (post hoc) analysis performed upon the depressed group did not support this notion. Splitting the depressed group into low and high scoring groups on the BDI did not result in a significant depression by affect interaction. It would appear then, in the present study at least, that the level of depression and its measurement do not explain the lack of interaction between depression and word affect.

That the positive and negative words were affectively weak and incapable of producing differences in processing between depressed and nondepressed subjects is unlikely. Kuiper et al. (1982), from whom the words were drawn, were able to demonstrate differential recall of these positive and negative words by depressed and nondepressed subjects, as well as different self-referent rating times for the two groups of words. In further support, subjects in the present study responded to these words on the self-referent task as would be expected. On the self-referent task depressed subjects responded "yes" more often than the nondepressed subjects to the negative words, and the nondepressed subjects responded "yes" more often than the depressed subjects to the positive words. Based on these results it seems unlikely that the affect of the words was not strong enough to produce the necessary differences.

Even though the present study did not support the hypothesis which was made, it did produce an interesting difference in the judgments of frequency made by the two groups of subjects. In an attempt to explain why mean frequency judgments were higher for depressed subjects than for nondepressed subjects, a number of analyses were performed, and a number of possible interpretations ruled out. Although depressed subjects did give more "yes" responses following negative and neutral words on the initial self-referent task, they gave fewer "yes" responses following positive words. If greater "yes" responding resulted in higher frequency judgments, then in the positive condition one should have found mean frequency judgments of nondepressed subjects to be higher than those of the depressed subjects. In fact, the reverse was found. Depressed subjects gave higher frequency judgments for all affect conditions. Different responding to the self-referent task did not contribute to the disparity in frequency judgments made by the two groups.

An examination of misses by the two groups showed that the nondepressed subjects missed more items than did the depressed subjects. That is, they gave more zero responses to words that had actually been presented. However, an examination of judgments conditional upon correct recognition showed that depressed subjects still gave higher mean judged frequencies. Therefore, the finding that nondepressed subjects had higher miss rates did not account

for the mean judged frequency differences found between the groups.

Though a response bias by the depressed subjects to guess higher numbers cannot be ruled out, some arguments can be presented against this notion. First, a range in the frequency task was set by the experimenter (zero to six) in an attempt to set an upper limit on the subject's responses. Secondly, if depressed subjects had responded with higher numbers, a ceiling effect of their mean judged frequency might be expected. That is, the mean estimates of the depressed subjects would have approached six, the highest estimate they were allowed to give. No ceiling effect was observed. And finally, Miller and Lewis (1977), in testing to see if differences in a continuous recognition task by depressed and nondepressed subjects was real, concluded that the differences found were due to a conservative response strategy by the depressed subjects. Based on this, one would expect depressed subjects to give lower judgments, not higher judgments. In order to control experimentally for response bias, a future study may wish to examine relative frequency judgments between depressed and nondepressed subjects, following the procedure of Freund and Witte (1986, Experiment 3). Their subjects were asked to indicate the word that occurred most frequently in a word pair, forcing them to make relative, rather than absolute, frequency judgments. This would control for any tendency to estimate higher frequencies that may occur for depressed subjects.

And finally, following the procedure of Flexser and Bower (1975), a discrimination coefficient was calculated for each subject. This is the mean correlation coefficient between the true and judged frequency of an item. The mean discrimination coefficients for the depressed and nondepressed groups were equal, indicating that the two groups were equally able to distinguish one frequency from another. Yet for some reason depressed subjects gave higher frequency judgments.

The results found here may have arisen from procedural differences between the present study and those of Hasher and Zacks, though these differences do not appear to be critical. For example, Hasher and Zacks used male and female subjects in their study; the present study used only female subjects, due to a difficulty in obtaining male subjects who scored high enough on the BDI to be classified as depressed. Hasher et al. (1985) reported that an analysis was done on their research to determine if using only female subjects would have changed the outcome of their study; they reported that it would not (p. 115). The use of female subjects only seems unlikely to account for the lack of the proposed interaction.

Secondly, the present study followed Hasher and Zacks' (1979) paradigm, but lengthened it to include positive, negative and neutral words. This made the frequency judgment task more difficult. Some researchers feel that different performance on cognitive tasks between depressed

and nondepressed subjects only emerges when task difficulty is high (Weingartner, Cohen, Murphy, Martello, & Gerdt, 1981). High task demands in the present study may have made the study more sensitive than Hasher and Zacks' (1979) third experiment, and therefore between-group differences were found. If this were the case, it would present a problem for Hasher and Zacks' theory of frequency judgments. According to their theory, frequency information is recorded automatically, and is unaffected by task demands.

Finally, Hasher and Zacks (1979) had subjects read words aloud. In the study reported here, subjects carried out self-referent processing on the to-be-judged words. According to Hasher and Zacks' view, type of processing should not affect frequency judgments. If differences in the type of processing performed did produce the between-group differences, this would again contradict Hasher and Zacks' notion that frequency information is automatically encoded. However, it is of interest to note that the present study and the feedback studies discussed earlier involved the processing of self-referent information, and did find differences between depressed and nondepressed subjects' frequency estimates, while Hasher and Zacks (1979), using common words, did not. The possible role self-referent processing may play in influencing frequency judgments is discussed below. A future study may wish to examine the effect of self-referent processing versus reading words aloud on frequency judgments to see if

differences do occur with various types and levels of processing.

Evidence has been generated that contradicts the findings of Hasher and Zacks (1979). Differences in frequency judgments have been found between two groups where none are predicted. If the arguments are made that this difference is not real, but is a result of the sex of subjects used, high task demands, or type of processing, then these arguments would as well contradict the theory of the automatic encoding of frequency information proposed by Hasher and Zacks (1979).

A possible explanation for the findings from the present study comes from an unpublished manuscript by Penney and White (1986). In this paper they proposed a theory of the representation of frequency information in memory which they called the total-information hypothesis. This theory proposed that frequency judgments are based on the total amount of information retrieved about an item, including the record of mental processing carried out at input. The greater the amount of information a subject has about a to-be-judged item, or the greater the amount of processing carried out upon that item, then the higher the frequency judgment is likely to be. If the total-information hypothesis is correct, then either the depressed subjects in the present study must have had more information about each item, or the mental processing carried out by the depressed subjects must have been greater. There is no reason to

propose that depressed subjects would have more information about the self-referent adjectives used in the present study. However, there is reason to suspect that the amount of processing for the two groups differed.

Kuiper et al. (1982), in their self-schema model of depression, suggested that moderately depressed subjects have inefficient processing systems for processing self-referent information.

> Both extremes of the depressive continuum are characterized by highly efficient, content-specific schematic processing of personal information. The development of depressive symptoms at the midranges of the model's continuum seems to be accompanied by a disrupted and disorganized self-structure which no longer facilitates the efficient processing of either positive or negative personal information (Kuiper et al., 1985, p.99).

This inefficient system would therefore result in the depressed subjects doing more work on each word to answer the encoding question "Describes you?". This greater amount of processing, according to Penney and White's total-information hypothesis, would result in the depressed subjects giving higher frequency judgments than the nondepressed subjects. The lack of differences between the two groups for new words is further support for the notion that depressed subjects carried out more mental processing than the nondepressed group for words that had been presented previously. Neither group did any previous self-referent processing on the new words. Analyses showed that no differences were found between the groups' mean judged frequency or false alarm rate. It would appear that

results from the present study are consistent with the total-information hypothesis.

That increased processing of the self-referent adjectives may have led to higher frequency judgments by the depressed group is also consistent with at least two other theories. Johnson and Raye (1981), in their theory of reality monitoring, note that we confuse internally generated events with actual events, and have demonstrated that internal repetion of an event increased the perceived actual occurrence of the event (Johnson, Taylor, & Raye, 1977). As well, according to Hintzman and Block's (1971) multiple trace theory, increased internal processing of a word would increase the number of traces of that word, and would result in a higher judged frequency.

Summary

Although no support for the hypothesis made in this thesis was generated, some post hoc findings that conflicted with Hasher and Zacks' notion that frequency judgments are automatically encoded were discovered. The present study revealed that depressed subjects made significantly higher frequency judgments than the nondepressed group, and this held true for all three affect conditions studied, and for the four frequency conditions of presented items. These results are contrary to the findings of Hasher and Zacks' (1979) third experiment, and are not what would be expected if frequency information is automatically encoded.

Topics for future research include an examination of relative frequency judgments of depressed and nondepressed subjects to control for response bias, and the influence self-referent processing may have upon frequency judgments. Also of interest is the contribution depressed and nondepressed subjects' frequency estimates might have for the total-information hypothesis.

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Appendix A

Affective Word Lists

Word Lists

Positive	Negative	Neutral
FREE	HELPLESS	CAUTIOUS
DURABLE	HEARTSICK	INOFFENSIVE
HASTY	DOWNHEARTED	QUIET
GRACIOUS	GUILTY	CONSERVATIVE
FORCEFUL	OPPRESSED	SHY
JOVIAL	INFERIOR	HESITANT
PLAYFUL	DULL	AVERAGE
CAPABLE	BLUE	BASHFUL
NEIGHBOURLY	INADEQUATE	RESTLESS
NEAT	CRITICIZED	WORDY
AMIABLE	DISMAL	ORDINARY
MATERNAL	HOPELESS	EXTRAVAGANT
CONSISTENT	UNWANTED	STERN
ORDERLY	FAILU[redacted]	FORWARD
INQUIRING	BLEAK	DAYDREAMER
SOCIABLE	LISTLESS	NAIVE
POLITE	WEAK	BOLD
CURIOUS	LOSER	INNOCENT
RATIONAL	DESTROYED	STRICT
HELPFUL	DEFEATED	AGGRESSIVE
Syllables M = 2.56	2.25	2.56
Letters M = 7.50	7.56	7.25

T-tests on the mean number of syllables per group indicated that there were no significant differences between groups, $p's > .32$.

T-tests on the mean number of letters per group indicated that there were no significant differences between groups, $p's > .65$.

Appendix B

Instructions for Part One

INSTRUCTIONS

THE PURPOSE OF THIS EXPERIMENT IS TO STUDY THE RELATIONSHIP BETWEEN PERSONALITY MEASURES AND THE WAY PEOPLE PERCEIVE THEMSELVES. THERE ARE TWO PARTS TO THIS STUDY.

IN THE FIRST PART YOU WILL BE SHOWN A WORD AND ASKED IF THIS WORD DESCRIBES YOU. IF THE ANSWER IS 'YES', PRESS THE NUMBER 1, THEN THE 'ENTER' BUTTON. IF THE ANSWER IS 'NO', PRESS 0 THEN THE 'ENTER' BUTTON. MANY OF THE WORDS PRESENTED TO YOU WILL BE SEEN MORE THAN ONCE. PLEASE TRY TO ANSWER THESE AS RELIABLY AS POSSIBLE. IN THE SECOND PART OF THE STUDY YOU WILL BE ASKED SOME QUESTIONS ABOUT THE WORDS YOU SAW; THE INSTRUCTIONS FOR THIS SECTION WILL BE PRESENTED LATER. HAVE YOU ANY QUESTIONS? PRESS 'ENTER' TO BEGIN

Appendix C

Instructions for Part Two

THIS IS THE SECOND PART OF THE EXPERIMENT. AS YOU HAVE NOTICED, MANY OF THE WORDS YOU JUST RATED APPEARED MORE THAN ONCE. THE PURPOSE OF THIS SECTION IS TO ESTIMATE HOW OFTEN THESE WORDS APPEARED. A WORD WILL BE PRESENTED TO YOU AND YOU ARE TO ENTER HOW OFTEN YOU BELIEVE THIS WORD APPEARED. AS IN THE FIRST PART, PRESS A NUMBER, THEN THE 'ENTER' BUTTON.

NOTE: THE WORDS IN THE FIRST SECTION APPEARED NO MORE THAN SIX (6) TIMES. SOME OF THE WORDS THAT YOU WILL NOW SEE WERE NOT PRESENTED IN THE FIRST SECTION. THUS, YOUR ESTIMATES WILL RANGE FROM O TO 6 INCLUSIVE. PRESS 999, THEN 'ENTER' TO BEGIN FREQUENCY TASK.

Appendix D

Frequency Judgments

ANOVA Summary Table

Frequency Judgments

ANOVA Summary Table

SOURCE	DF	SS	MS	F
Depression	1	80.2	80.2	23.8 ***
Depression x S's	46	154.6	3.56	
Affect	2	5.00	2.50	4.95 **
Depression x Affect	2	0.95	0.47	0.94
Affect x Subjects	92	46.4	0.50	
Frequency	4	921.9	230.5	475.5 ***
Depression x Frequency	4	9.51	2.38	4.90 **
Frequency x Subjects	184	89.2	0.48	
Affect x Frequency	8	4.70	0.59	2.20 *
Dep x Affect x Freq	8	3.14	0.39	1.47
Affect x Freq x S's	368	98.4	0.27	

* $p < .05$ ** $p < .01$ *** $p < .001$

Appendix E

Number of "YES" Responses

ANOVA Summary Table

Number of "YES" Responses

ANOVA Summary Table

SOURCE	DF	SS	MS	F
Depression	1	455.1	455.1	11.5 *
Depression x S's	46	1821.5	39.6	
Affect	2	7763.4	3881.7	85.7 *
Depression x Affect	2	3220.7	1610.3	35.6 *
Affect x Subjects	92	4166.6	45.3	

* $p < .01$

Appendix F

Frequency Judgments - Median Split of Depressed Group

ANOVA Summary Table

Frequency Judgments - Median Split of Depressed Group

ANOVA Summary Table

SOURCE	DF	SS	MS	F
Depression	2	85.0	42.5	12.7 **
Depression x S's	45	149.8	3.3	
Affect	2	5.0	2.5	4.96 **
Depression x Affect	4	2.1	0.5	1.02
Affect x Subjects	90	45.3	0.5	
Frequency	4	921.9	230.4	494.2 ***
Depression x Frequency	8	14.7	1.8	3.95 **
Frequency x Subjects	180	83.9	0.5	
Affect x Frequency	8	4.7	0.6	2.19 *
Dep x Affect x Freq	16	5.0	0.3	1.16
Affect x Freq x S's	360	96.5	0.3	

* $p < .05$ ** $p < .01$ *** $p < .001$

Appendix G

Table of Means: Frequency Judgments

Table of Means: Frequency Judgments of Mildly Depressed, Moderately Depressed, and Nondepressed Subjects

	Word Affect			
	Negative	Neutral	Positive	Mean
Mildly Depressed	2.38	2.56	2.59	2.51
Moderately Depressed	2.77	2.67	2.78	2.74
Nondepressed	1.82	1.93	2.11	1.96
Mean	2.32	2.38	2.49	

Appendix H

P-Correlations of Judged Frequency with Actual Frequency

ANOVA Summary Table

P-Correlations of Judged Frequency with Actual Frequency

ANOVA Summary Table

SOURCE	DF	SS	MS	F
Depression	1	0.0014	0.0014	0.05 *
Depression x S's	46	1.30	0.0282	
Affect	2	0.0697	0.0348	2.14 *
Depression x Affect	2	0.0428	0.0214	1.31 *
Affect x Subjects	92	1.50	0.0163	

* p > .05

Appendix I

Table of Means: P-Correlations

Table of Means: P-Correlations

	Word Affect			
	Negative	Neutral	Positive	Mean
Depressed	0.72	0.74	0.72	0.72
Nondepressed	0.66	0.74	0.76	0.72
Mean	0.69	0.74	0.74	

Footnotes

1 In their study, Krantz and Hammen (1979) presented subjects with a forced-choice selection of story endings. For the construction of these ending statements, the depressed-nondepressed dimension referred to the presence or absence of unhappy and dysphoric content; the distorted versus nondistorted dimension denoted, in the given endings, the presence or absence of interpretations that were unwarranted in light of the available information.

2 All comparisons reported in this thesis employ the planned comparisons procedure suggested by Keppel (1982).