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The Effect of Depressive Affect on Judgments of Frequency of Occurrence

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THE EFFECT OF DEPRESSIVE AFFECT ON JUDGMENTS OF FREQUENCY OF OCCURRENCE

by

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VITA

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Carol has co-authored (with Dr. Zechmeister and J.A. Sebastian) the article "Errors in a recognition memory task are a U-shaped function of word frequency" which was published in the Bulletin of the Psychonomic Society in June 1978. She and Dr. Zechmeister have also collaborated on two papers: "Incidental learning of associations during semantic and nonsemantic processing: Is contiguity a sufficient factor?"

which was presented at the meeting of The Psychonomic Society in November 1976; and "Primacy, recency, and the availability heuristic" which was presented at the meeting of the Midwestern Psychological Association in May 1981.

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INTRODUCTION

The frequency of occurrence of events, specifically the frequency of reinforcment, has been theorized to play a major role in the maintenance of depression. Behavioral theorists (e.g., Ferster, 1974; Lewinsohn, 1974a, 1974b) have argued that depression may result from a lack or loss of reinforcement (Eastman, 1976). Cognitive theorists, on the other hand, have stressed the importance of the depressive's interpretation and distortion of his reinforcement experiences (Beck, 1974). In this view, the depressive's sensitivity to the frequency of reinforcement, i.e., the perceived frequency, is considered to be more important than the actual frequency of reinforcement.

That distortions of frequency information can and do occur is an idea that is central to cognitive theories of depression. However, Hasher and Zacks (1979) propose that acquisition of frequency information is an "automatic" process and is not affected by states that alter attentional capacity, such as depression. This theory is interesting as there is substantial evidence that shows that judgments of frequency are different for depressed and nondepressed subjects (e.g., Buchwald, 1977; Nelson & Craighead, 1977; Wener & Rehm, 1975). However, there is also evidence to support the notion that frequency encoding is an "automatic" process (and, therefore, cannot be affected by mood state) (c.f., Hasher & Zacks, 1979, Exp. 3). The present research is intended to investigate this apparent discrepancy and clarify the relationship between depression and the processing of frequency information.

REVIEW OF THE RELEVANT LITERATURE

Frequency Encoding as an Automatic Process

It is well established that human beings have an extraordinary sensitivity to differences in the relative frequency of events, even for events that seem to have no adaptive value. College students can accurately estimate the relative background frequencies of words (Shapiro, 1969), single letters (Attneave, 1953), and even pairs of letters (Underwood, 1971a). They can accurately judge the situational frequency with which words occur in a list (Hintzman, 1969), and make separate judgments of the frequency of occurrence for words that occur at varying frequencies in two different lists (Hintzman & Block, 1971; Reichardt, Shaughnessy, & Zimmerman, 1973). Subjects can also give accurate frequency judgments for verbatim repetition of sentences and can keep this information separate from frequency information about the repetition of sentences containing the same underlying meaning (Gude & Zechmeister, 1975).

In addition to this amazing sensitivity to frequency information, the ability to process frequency information is not affected by many manipulations that usually cause differences in the recall of information. Sensitivity to frequency of occurrence shows no improvement with practice (Hasher & Chromiak, 1977); instructions and instructional set have no effect on frequency sensitivity (Flexser & Bower, 1975; Howell, 1973; Rose & Rowe, 1976); and frequency sensitivity appears to be fully developed at an early age (as early as second grade, i.e.,

approximately eight years old), and shows no developmental trend thereafter (Hasher & Chromiak, 1977).

Hasher and Zacks (1979) suggest that the encoding of frequency information is an "automatic" process. They describe automatic processes as those that

> operate continually to encode certain attributes of whatever information is the focus of attention. Once a process is automatized, it can no longer be improved upon either by additional practice or by feedback about earlier performance. Automatic processes do not require either awareness or intention, and their operation cannot be willfully inhibited. They drain minimal amounts of energy from attentional capacity, allowing the organism to continue to operate even when extraordinarily high demands are made upon that capacity, as in moments of high stress or injury. The knowledge gained by automatic processes is accessible to conciousness and can then be used in a number of ways... (p. 359)

Automatic processes are contrasted to "effortful" processes which "require effort and so limit one's ability to engage simultaneously in other effortful processes. The efficiency of effortful memory operations increases with practice, and their use is voluntary, often occurring only with specific instructions. We are almost always aware of the effortful processing mechanisms we are using." (p. 362). For example, Hasher and Zacks postulate imagery, mnemonic or elaborative devices, organization and clustering, and rehearsal to be effort-

ful processes.

Underlying Hasher and Zacks' theory is the concept of attentional capacity. Viewed as a nonspecific limited resource for cognitive processing, attentional capacity is needed in varying amounts for carrying out mental operations. Variations in attentional capacity should (by definition) have major effects on the efficiency of effortful processes, but (by definition) have no effect on automatic processes. Automatic processes require minimal drain on capacity and so should not be affected by altered cognitive capacity. One state that is assumed to alter attentional capacity is depression. Therefore, if the processing of frequency information is an automatic process, judgments of frequency should be as accurate for depressives as they are for nondepressives.

Hasher and Zacks (Experiment 3) investigated differences in frequency judgments in depressed and nondepressed adults. Susceptibility to confusion from subjective sources was also examined. Subjects were classified as depressed or nondepressed on the basis of their scores on the Beck Depression Inventory (BDI). (The median BDI score of 8.5 was used as the criterion to divide the subjects. The mean BDI scores were 15.0 for the depressed group and 4.9 for the nondepressed group.) The subjects were shown 36 pictures representing common objects. There were three presentation frequencies of the pictures; a picture could be shown one, two, or three times. Subjects were given eight study trials, each of which consisted of the presentation of nine different pictures; these were alternated with eight imagination trials. The imagination trials were used in order to

study confusion from subjective sources. On each imagination trial, the experimenter named six of the pictures and the subject was required to imagine each of them for 5 sec. There were three imagination frequencies of the pictures: over the eight imagination trials, a picture could be named zero, one, or two times. A frequency test was given immediately after presentation of the last imagination trial. Subjects were again shown each picture and were asked to tell the number of times they had seen it. It was emphasized that they were to report how many times they had seen the picture, not how many times they had imagined it.

Results showed that the mean estimates of the frequency of occurrence increased with the actual frequency of occurrence, and these judgments of frequency were identical for depressed and nondepressed subjects. Imagined frequency significantly affected judgments of actual frequency: increases in imagined frequency caused increases in judgments of presentation frequency. However, these increases were the same for depressed and nondepressed subjects. Again, the groups did not differ in their estimates.

Hasher and Zacks concluded that depressed and nondepressed subjects can equally estimate the frequency of occurrence of events; both depressed and nondepressed subjects show a tendency to confuse internally generated information with externally experienced events; and depressed subjects are no more likely than nondepressed subjects to confuse actual with imagined events. The results support Hasher and Zacks contention that frequency encoding is an automatic process.

Frequency Judgments, Depression, and Availability of Information

Although Hasher and Zacks cite only their single study in support of their proposal that sensitivity to frequency information is not affected by depression, a relevant body of research already exists in this area.

In the search for the cause(s) of depression, behavioral theorists have focused on reinforcement contingencies and have suggested that depression is a function of the rate of reinforcement. Lewinsohn (1974a) has stated that a low rate of positive reinforcement acts as an eliciting stimulus for some depressive behaviors, such as feelings of dysphoria, fatigue, and a low rate of activity and verbal behavior. Lewinsohn's behavioral theory emphasizes the total or absolute amounts of positive reinforcment. For example, one of the theory's assumptions is that the total amount of positive reinforcement received by depressed persons is less than that received by nondepressed persons. In contrast to this, other theories have emphasized the cognitive aspects of depression. Beck (1974), for example, postulates that depressives construe the self, the world, and the future in a negative way, and that this negative view is maintained by cognitively distorting events that would be inconsistent with this view (minimizing achievements, maximizing problems, and ignoring contrary evidence, for example). In the cognitive theories, it is not the total or absolute amount of positive reinforcement that is important, but the depressive's perception and distortion of the amount of reinforcement.

Investigations of the relationship between amount of reinforce-

ment and depression have supported the hypothesis that depressive's judgments of the frequency of reinforcement may be inaccurate. In a study by Wener and Rehm (1975), depressed and nondepressed subjects were given either 80% or 20% positive reinforcement on a pseudosocial intelligence task. When asked to judge the frequency of positive reinforcement, the depressed subjects' estimates were significantly lower than the nondepressed subjects' estimates under both rates of reinforcement. Buchwald (1977) gave "right/wrong" correctness of response feedback on every trial of a Thorndikian (multiple-choice) learning task (50% right; 50% wrong), and found that subjects with higher depression scores (more depressed) tended to underestimate the number of correct responses more, while subjects with lower depression scores (less depressed or nondepressed) tended to underestimate less or to overestimate. Nelson and Craighead (1977), using a multiple choice perception task, gave depressed and nondepressed subjects high (70%) or low (30%) rates of either reinforcement or punishment. At a high rate of reinforcement, the depressed subjects significantly underestimated the frequency of reinforcement. At a low rate of punishment, the depressed subjects' estimates of the frequency of punishment were greater than the nondepressed subjects' estimates, but this did not reflect a tendency for the depressed subjects to overestimate the amount of punishment they had received. Rather, the depressed subjects were accurate in their estimations of frequency of punishment, while the nondepressed subjects significantly underestimated the actual frequency of punishment.

Apparently in contradiction to the Hasher and Zacks' theory, the results of these studies indicate that the judgments of frequency of occurrence (in this case, occurrence of reinforcement or punishment) are affected by a depressed mood. Although not consistent with Hasher and Zacks' theory, these results may be consistent with an availability heuristic for judging frequency. Tversky and Kahneman (1973) propose that frequency judgments are made on the basis of availability, i.e., the ease with which relevant instances come to mind. For example, in one study (1973, Exp. 8), Tversky and Kahneman presented their subjects with one of two types of lists: either a list consisting of the names of 19 famous women and 20 less famous men, or a list consisting of the names of 19 famous men and 20 less famous women. The subjects were asked either to recall the names or to judge whether more male or more female names had been presented. More famous names were recalled than less famous names (mean recall: 12.3 and 8.4, respectively), and of those subjects recalling the names, 66% recalled more famous than nonfamous names while only 15% recalled more nonfamous than famous names. Of those subjects who judged the frequency of occurrence of male and female names, 81% erroneously judged the class consisting of the more famous names to be more frequent. Tversky and Kahneman take these results and others in their study to be supportive of the notion that people judge the frequency of a class by its availability. Availability is operationally defined as what is recalled. Famous names were more easily recalled than less famous names, and so are judged to have occurred more frequently than the less famous names.

Additional support for the availability heuristic comes from a study by Beyth-Marom and Fischhoff (1977) in which Hebrew-speaking students were asked to estimate the number of countries or kibbutzim beginning with certain (Hebrew) letters. Measures of availability were successful in predicting some estimates, including some errors, but Beyth-Marom and Fischhoff caution that availability was not the only determinant of judged frequency and suggest that other, situation-specific, factors also influenced frequency estimates. Specifically, they suggest that a factor influencing their results was the subjects' knowledge of the lexicographic structure of the language, and give the example that "subjects may have known that 'Aleph' is a much more popular initial letter than 'Yud', a factor which could have tempered their reliance on availability information..." (p. 237). (Subjects may know which is a more popular initial letter because generally they can think of more words that start with one letter than the other; in other words, they may have tempered their reliance on availability information by utilizing other availability information.)

Lichtenstein, Slovic, Fischhoff, Layman, and Combs (1978) examined frequency judgments for various causes of death. In Experiment 1, causes of death with varying frequencies of occurrence were paired (for example, tuberculosis - flood). Subjects were asked to judge which cause of death was more likely and to give an estimate of how much more likely the one cause of death was than the other. (Per year per one hundred million U.S. residents, the frequency of tuberculosis is 1,800 and the frequency of flood is 100. Therefore, the ratio of occurrence

of tuberculosis to flood would be 18:1.) Lichtenstein et al. found that, for these relative frequency judgments, subjects generally were able to identify the more frequent cause of death, as long as the true ratio was 2:1 or greater. Below 2:1, discrimination was often poor. Subjects also displayed a tendency to underestimate large ratios. In Experiment 3, Lichtenstein et al. had subjects make absolute estimates of the frequencies of 40 causes of death. To help them make their estimates, subjects were given a standard: one group of subjects was told that the frequency of death in the U.S. due to motor vehicle accidents was 50,000 per year; another group was told 1,000 deaths per year were caused by electrocution. The resulting estimates, although highly correlated with true frequency, were not substantially accurate. Bias was again found: subjects underestimated high-frequency events and overestimated low-frequency events. Lichtenstein et al. also report a secondary bias: overestimation associated with highly publicized deaths (such as cancer, homicide, tornado, etc.) and underestimation associated with undramatic, "quiet" deaths (such as asthma, diabetes, tuberculosis, etc.). Lichtenstein et al. suggest that one possible explanation for these under- and overestimations can be found in the availability heuristic: sensational, highly publicized deaths which are easy to recall are judged to be very frequent, while causes of deaths, instances of which are hard to recall, are judged to be infrequent.

The results of the depression studies can also be explained by the availability heuristic. Lloyd and Lishman (1975) and Teasdale and Fogarty (1979) have found that depressed subjects retrieve unpleasant

memories to stimulus words more quickly than they retrieve pleasant memories. Johnson, Petzel, Hartney, and Morgan (1981) have also reported a differential recall effect for depressed and nondepressed subjects. Subjects were given 20 different tasks - solving mazes, cancelling vowels, decoding messages, unscrambling anagrams, etc. - and were allowed to complete half of the tasks, but were interrupted prior to completion on the other half. White (1979) has argued that completion of a task is intrinsically rewarding; therefore, subjects were assumed to be reinforced on half the tasks and nonreinforced on the other half. After administration of all tasks, the subjects were asked to write down the names or descriptions of as many of the tasks as they could recall. Johnson et al. found that depressed subjects recalled significantly more of the uncompleted (nonreinforced) tasks than the completed (reinforced) tasks. This finding was opposite of that for nondepressive subjects who recalled significantly more completed than uncompleted tasks. From these studies it can be seen that the information available to the depressive is quite different from that which is available to the nondepressive, and is in accordance with the reported frequency judgments of depressives and nondepressives, i.e., depressives underestimate positive reinforcement (it is less available) and nondepressives (at least in one study - Nelson & Craighead, 1977) underestimate amount of punishment (nonreinforcement - also less available).

Automaticity and Depression: Methodological Differences

In evaluating the effect of depression on sensitivity to frequency information, there are two sets of studies under consideration:

those studies that have been incorporated into and support Hasher and Zacks' theory of automatic encoding (hereafter referred to as the "frequency studies" since these studies tend to focus on the frequency judgments themselves); and the "depression studies" (labeled as such since these studies use frequency judgments as a method of studying depression). The results of these two sets of studies appear to conflict. This may not be the case, however, as there are several methodological differences between the sets. The two sets of studies differ in the type of stimuli that are presented, the type of judgment the subject is required to make, and what is accepted as an accurate judgment (see Table 1).

The stimuli that have been used in the frequency studies have been innocuous, neutral items, usually common nouns. Hasher and Zacks used pictures of common objects that would be familiar to young children. The depression studies, on the other hand, require subjects to make judgments about emotionally-charged events. For example, the subject is required to tell how many times he was "right" or "wrong". The subject's estimation is concerned with his performance on a task, and, therefore, reflects back on him personally.

The studies also differ in the type of judgment the subject is required to make. In the frequency studies, subjects make judgments of item frequency. The subject is presented a list of items; throughout the list, items are repeated varying number of times. The subject is then required to estimate the frequency of occurrence of each individual item. In the depression studies (and also in studies of availability),

Table 1

Major Methodological Differences

	Frequency Studies	Depression Studies
Stimuli	innocuous	emotionally-charged
Judgment Required	item frequency	category frequency
Accuracy of Judgment	relative accuracy	absolute accuracy

subjects make judgments of category frequency. The subject is presented a list of items, none of which are repeated. The subject is required to respond to each item, and then is given "success/failure" feedback on his response. After presentation of the items, subjects are required to estimate the frequency of one of the feedback categories: either the frequency of their successes, or the frequency of their failures.

The difference between the studies as to what is accepted as an accurate judgment has also contributed to the apparent conflict of results. The frequency studies accepted as accurate those judgments that were accurate in a relative sense. That is, items with an actual frequency of five are judged to be more frequent than items with an actual frequency of three. However, these judgments were not always accurate in an absolute sense: as the actual frequency of the items increased, so did the discrepancy between actual frequency and judged frequency. This has been reported by others; for example, Hintzman (1969) found that judged frequency increased with the log of true frequency. The depression studies, on the other hand, have reported their results only in terms of absolute accuracy. The results show, however, that relative judgments of frequency are accurate for both depressed and nondepressed people; that is, both depressives and nondepressives report higher frequencies of reinforcement than punishment when they have been reinforced more, and higher frequencies of punishment than reinforcement when they have been punished more. It is in the absolute judgments of frequency that the differences between depressed and nondepressed persons are found. For example, in the

Nelson and Craighead (1977) study in which the subject had been reinforced 28 times, the mean frequency judgments for the depressed subjects was 22.5, while for the nondepressed subjects, it was 29.5. While the nondepressives were accurate in their judgments (29.5 was not significantly different from 28), the depressives underestimated the amount of reinforcement they had received (22.5 was significantly different from 28 and from 29.5). After receiving 12 punishment trials, the mean frequency judgment for the depressives was 13, while for the nondepressives, it was 7.62. In this case, the depressives were accurate in their judgments of frequency while the nondepressives significantly underestimated the actual amount.

These differences in methodology suggest that the frequency studies and the depression studies may be investigating different phenomena. If this is the case, then the results of these studies may not necessarily be contradictory.

Automaticity and Availability: A Reexamination of Theory

The results of the frequency studies may be explained by Hasher and Zacks' concept of automaticity; the results of the depression studies may be explained by Tversky and Kahneman's availability heuristic. The studies themselves have been reexamined; the roles that automaticity and availability play in judgments of frequency of occurrence also need to be reexamined and evaluated. In this reexamination, it is important to note that "automatic processes" are concerned only with the encoding of information, while the availability heuristic is used only in the retrieval of information.

If frequency information is automatically encoded as Hasher and Zacks propose, and if it is stored and retrieved just as it is encoded, then mood state (and many other variables) would have no effect on judgments of frequency, either relative or absolute (this is inherent in Hasher and Zacks' definition). This is, of course, not what has been found: absolute frequency judgments can be affected by depression. Therefore, memory for frequency information must be faulty in at least one of its three phases: encoding, storage, or retrieval.

Encoding of frequency information may not, of course, be an automatic process. If the concept of automatic encoding is completely rejected, however, it becomes difficult to explain certain findings. For example, one of the components of the concept of automaticity is that "automatic processes do not require either awareness or intention, and their operation cannot be willfully inhibited" (Hasher & Zacks, p. 359). If this is rejected, can a reasonable argument be made that, in their day-to-day living, people have tried to keep track of the frequencies of words, letters, and bigrams? Clearly, the concept of automaticity cannot be rejected totally. It is useful to accept the idea that the processing of frequency information is automatic in that it is a continuous process not requiring awareness and intention. However, this does not exclude the possibility that processing can be affected by many things. For example, processing may be affected by selective attention. Indeed, Hasher and Zacks state that processing occurs on "whatever information is the focus of attention" (p. 359). Given an array of information, if it is not in the interest of a person

to pay equal attention to all parts of the array, all parts of the array may not be equally encoded, and judgments about that array may be distorted. A depressive who construes the world, himself, and the future in a negative way (Beck, 1974) finds support for his views in his failures and the negative aspects of the world and life. Seeking confirmation of our views may lead to selective attention, and this may lead to differential encoding, which would result in distorted judgments of frequency when the judgments must be made on all the information, not just that to which we attended. It is not clear whether this has produced the distorted absolute frequency judgments reported in the depression literature since the relative frequency judgments were not similarly distorted.

Even if frequency information is encoded automatically, it is unlikely that the information is retrieved exactly as it is encoded. Retrieval of information may be distorted, for example, by the person's expectations or biases. Loftus (1975) has shown that eyewitnesses who were asked "leading questions" following the witnessed event later distorted information about the event in the direction of the biased leading question. If a depressive is biased towards negativity, this bias could affect accuracy when retrieving frequency information about hedonically charged events (e.g., underestimating the amount of reinforcement received - Nelson & Craighead, 1977). An opposite bias can be seen in nondepressives. Edwards (cited in Anastasi, 1976) has shown that the tendency to choose socially desirable responses on self-report inventories is not necessarily indicative of deliberate deception. People have a tendency to want to "look good" and this bias may have

caused the distorted frequency judgments found in the nondepressives by Nelson and Craighead (nondepressives underestimated the amount of punishment - which was indicative of failure - they had received). As effort towards retrieval is minimized, these biases should have less of an effect on the frequency judgments. For example, there may be considerable effort involved in retrieving the item frequencies needed to make a judgment of category frequency, but retrieval is minimzied when only an item judgment is called for. In other words, expectations or biases should have little or no effect on item judgments, but should affect category judgments.

Clearly, automaticity and availability need not be viewed as rival approaches to the question of how judgments are made for frequency information. They should instead be viewed as approaches explaining the processing of frequency information at different stages of that processing.

The Present Experiment

The difference in methodology between the frequency studies and the depression studies leaves an ambiguous situation. With these differences, the two sets of studies are not directly comparable, and nothing conclusive can be stated about the effect of mood state on judgments of frequency of occurrence. The present study intends to link these sets of studies and clarify this issue.

Two of the methological differences will be manipulated: the type of stimuli used (innocuous/emotionally-charged), and the type of judgment made by the subject (item/category judgment). (The third

difference - what is accepted as an accurate judgment - will also be examined, but, obviously does not need to be manipulated.) Statements of self-reference will be used as stimuli. Recent studies (Bower & Gilligan, 1979; Rogers, Kuiper, & Kirker, 1977) have investigated self-reference in memory. They found that information judged in reference to oneself is remembered better than when it is judged in reference to another person. In this study, statements of self-reference will be used to create emotionally-charged and innocuous stimuli. Three categories of self-reference statements will be used: positive, negative, and neutral. Examples of these would be respectively: "I am fine", "I am a failure", "I like to watch TV". The frequency studies have used only innocuous stimuli; the depression studies used emotionally-charged stimuli. The present experiment will use both types of stimuli in one experiment (innocuous stimuli: neutral statements; emotionally-charged stimuli: positive and negative statements) so that any differences caused by the type of stimuli can be examined. As the statements also fall into distinct categories (positive, negative, and neutral), the second methodological difference between the frequency studies can be investigated. In the frequency studies, subjects made item judgments, while in the depression studies, subjects made category judgments. Judgments of frequency of occurrence for each of the statements can be gathered, as well as judgments of frequency of occurrence for each <u>category</u> of statements. These judgments of item frequency and category frequency can then be compared directly.

To a certain degree, the issue of automaticity and availability

will also be addressed. As previously discussed, when retrieval of frequency information is minimized (as in item judgments), the effect of biases and expectations of the judgments will also be minimized. Therefore, the effect of any biases that depressives have toward negativity and negative statements or nondepressives have toward positive statements (for example), will be minimized when they are making judgments of item frequency. Judgments for positive and negative items should, therefore, be as accurate as judgments for neutral items. However, when retrieval is not minimized, as when making category judgments, the availability of information should influence frequency judgments. Biases and expectations may influence availability and, therefore, have an effect on the judgments. That is, overestimation and underestimation may occur in category judgments of positive and negative items, but should not occur in category judgments of neutral items. Any biases of the depressed and nondepressed subjects in this study should, then, show their effect in the judgments of category frequency but not in the judgments of item frequency.

It is hypothesized: 1) For item frequency judgments, the only significant effect should be for the actual frequency of the items, i.e., as the actual frequency increases, so should the frequency estimates. Since retrieval is minimized when making item frequency judgments, any biases caused by mood and/or statement type should have no effect. 2) For category frequency judgments, it is hypothesized that the interaction of mood state and statement type will be significant. Since retrieval is not minimized when judging category frequencies, these

judgments could be affected by biases caused by depression. These biases should also appear when subjects recall the items. According to the availability heuristic, judgments of category frequency are made based on the availability of information. If after making category frequency judgments the subject is asked to recall the items, the items recalled should be those which the subject had available to him, i.e., those on which he based his judgments of category frequency. Therefore, it is hypothesized that 3] the analysis of the recall data will mimic the analysis of the category frequency judgments, i.e., the interaction of mood and statement type will be significant.

METHOD

Subjects

Sixty-four undergraduate students enrolled in introductory psychology courses participated in the experiment as part of a course requirement. All subjects had been given the Beck Depression Inventory (BDI; Beck, 1967) prior to participating in the experiment. Thirty-two subjects with BDI scores of ten or above were designated as depressed; 32 subjects with BDI scores of four or less were designated as nondepressed.

Lists

Three types of statements were used as stimuli: positive self-reference statements, negative self-reference statements, and neutral self-reference statements. Twelve statments of each type were composed to make a pool of 36 statements. The neutral statements were of the basic form "I like (object or activity)", e.g., "I like chocolate ice cream", "I like to ice skate". The positive and negative statements were created as follows: 12 positive adjectives (e.g., "enthusiastic") and 12 negative adjectives (e.g., "discouraged") were selected from the Depression Adjective Check List (DACL; Lubin, 1967). These adjectives were used in statements of the basic form "I (am/feel) (adjective)", e.g., "I feel discouraged", "I am unhappy", "I am an easy-going person". (See Appendix A for a list of all stimuli.)

Using these statements, eight lists were constructed, each containing 69 statements. Four of the lists contained 10 different positive

statements, 11 different neutral statements, and 12 different negative statements; the other four lists contained 10 different negative statements, 11 different neutral statements, and 12 different positive statements. Therefore, the frequency of occurrence of each of the categories was either 10, 11, or 12 (see Table 2).

Each individual statement also had a frequency of occurrence in the list of one, two, three, or four. In the category from which 10 items were included in the list, three items occurred in the list only one time, three items occurred two times, three items occurred three times, and one item occurred four times. In the neutral category, which always had 11 items included in the list, four items occurred one time, three occurred two times, three occurred three times, and one item occurred four times. In the category from which 12 items were included in the list, five items occurred one time, three occurred two times, three occurred three times, and one item occurred four times. Therefore, there were 22 occurrences of 10 items from either the positive or negative category, 23 occurrences of 11 items from the neutral category, and 24 occurrences of 12 items from either the negative or positive category (see Table 3).

The lists were constructed so that approximately one-third of the occurrences from each of the categories fell into each third of the list. Specifically, of the 22 occurrences of 10 items, seven occurred in the first third of the list, eight in the second third, and seven in the last third; of the 23 occurrences of the 11 neutral items, eight occurred in the first third, seven in the second third, and eight

Table 2

Number of Unique Statements from Each Category

	Category		
	Positive	Neutral	Negative
(4 lists)	10	11	12
(4 lists)	12	11	10

Table 3

Construction of the Lists: Number of Different Statements from Each Category by their Frequency of Occurrence in the List

		Category		
	Frequency	Positive	Neutral	Negative
(4 lists)	1	3	4	5
	2	3	3	3
	3	3	3	3
	4	1	1	1
(4 lists)	1	5	4	3
	2	3	3	3
	3	3	3	3
	4	1	1	1

in the last third; and, of the 24 occurrences of the 12 items, eight occurred in each third of the list. With this restriction, and with the restriction that the same item would not occupy adjacent positions, the occurrences were randomly assigned to positions in the list.

Eight lists were constructed, four with the category frequencies 10-positive, 11-neutral, 12-negative; and four with the category frequencies 12-positive, 11-neutral, 10-negative. Four lists were constructed of each so that each statement would have occurred in the lists with a frequency of one, two, three, and four.

Procedure

Subjects were instructed that they would see a list of statements and that they were to rate each statement on a 20-point scale for the truthfulness of the sentence as it applied to them (20 - statement is completely true; 1 - statement is completely false). The subjects were informed that all the statements would ask about themselves; subjects were told to rate the statements as they applied to how they felt "right now, today". The subjects were also told that some of the statements would be repeated and that the statements were repeated so that the subjects' consistency in rating could be checked. Subjects were cautioned to rate every statement that was presented.

The list of statements was then presented to the subjects using a Kodak Carousel projector. Each statement was presented for 6 sec. After presentation of the list, the rating sheets were collected, and the subjects made their frequency judgments.

One group of subjects (16 depressed and 16 nondepressed) were

required to make judgments of item frequency. They were given 42 statements and were asked to tell how many times each statement had appeared in the list. The 42 statements consisted of the 33 different statements presented in the list plus nine new statements. (The response forms used in the experiment are presented in Appendix B.)

The other group of subjects (16 depressed and 16 nondepressed) were required to make judgments of category frequency. The subjects were told the three categories, i.e., statements concerning positive qualities, statements concerning negative qualities, and statements concerning what they like. Examples of each of the categories were given; these were, respectively: "I feel fine", "I am a failure", "I like to watch TV". Subjects were then asked to estimate the number of <u>different</u> statements, not the number of total statements (statements with repetitions), presented in each category. After making these estimates, subjects were asked to recall as many of the statements as possible.

RESULTS

Mood State

The subjects were pre-selected for the experiment on the basis of their scores on the Beck Depression Inventory (BDI). The mean BDI scores are presented in Table 4. As the BDI was given to the subjects several weeks prior to participation in the experiment, a ratings scales score was calculated for each subject to serve as a manipulation check on the mood state of the subject. During the experiment, subjects rated the positive, negative, and neutral self-reference statements on a 20-point scale with a rating of 1 indicating that the statement was completely false, and a rating of 20 meaning the statement was completely true. A ratings score for each subject was calculated by the formula:

$$RS = \frac{\sum_{i=1}^{N} N_i}{n} + \frac{\sum_{i=1}^{P} (21-P_i)}{p},$$

where RS is the ratings score, N_i is the average rating of a negative statement across its repetitions, n is the number of different negative statements presented, P_i is the average rating of a positive statement across its repetitions, and p is the number of different positive statements presented. (Ratings of the neutral statements are ignored in the calculation of the RS score as the statements, by their very nature, were intended to be statements associated with neither depression nor nondepression.) In effect, this formula creates scores such that those subjects who gave high ratings to negative statements (rating those

Table 4

Mean Depression Scores

	BDI*	RS*
Depressed n=32 (n=26)	14.41 (14.62)**	17.55 (19.24)
Nondepressed n=32 (n=29)	1.63 (1.52)	11.31 (10.40)

* BDI = Beck Depression Inventory;
RS = scores computed from responses on the ratings scales

** In parentheses are the mean scores after "inconsistent" subjects have been removed.

statements to be true) and low ratings to positive statements (rating those statements to be false) will have high RS scores; those subjects who gave high ratings to positive statements (those are true) and low ratings to negative statements (those are false) will have low RS scores. A high RS score indicates that the subject rated himself negatively, while a low RS score indicates that he rated himself positively. The mean RS scores are presented in Table 4.

The RS scores were used as a manipulation check of the mood state of the subject. Any nondepressed subject whose RS score was above the mean RS score of the depressed group, and any depressed subject whose RS score was below the mean RS score of the nondepressed group were excluded from the analyses of the data on the basis that, at the time of the experiment, the mood of those subjects was no longer at one of the extremes (either depressed or nondepressed) for which the subject had been pre-selected. Nine subjects - six depressed (two in the item frequency judgment group and four in the category frequency judgment group) and three nondepressed (two in the item frequency group and one in the category frequency group) - were excluded from the analyses on this basis. Table 4 shows in parentheses the mean BDI and RS scores for the groups after these subjects have been removed. All analyses of the data were performed first with all the subjects and then again with these subjects removed. As the results of the analyses of the data using all the subjects were basically the same as the analyses with subjects removed, reported results will be of analyses using all subjects. Results of analyses with subjects removed follow in parentheses.

Item Judgments

In making judgments of item frequency, subjects were required to provide estimates for 42 items - 33 "old" statements and nine "new" statements. Each statement was categorized by statement type (positive, negative, neutral) and by actual frequency of occurrence (0, 1, 2, 3, or 4). The number of statements in each cell of this categorization ranged from one to five. Therefore, the item judgment analyses were based on the subject's mean frequency estimate for each cell. (These cell means are presented in Appendix C.)

The item judgments were analyzed by a 2 (mood state) X 3 (statement type) X 4 (actual frequency) analysis of variance with repeated measures on the last two factors (so that it would be comparable to Hasher and Zacks' (1979) item frequency analysis, zero-frequency items were excluded from this analysis). As hypothesized, for judgments of item frequency, the only significant effect was for the actual frequency of the items, $F(3,90) = 105.02$, $p < .01$ (see Table 5) (subjects removed: $F(3,78) = 129.96$, $p < .01$). As actual frequency of the items increased, so did the estimated frequency. There was no difference between the depressed and nondepressed subjects in their estimates, $F < 1$ (see Figure 1). These results are similar to those reported by Hasher and Zacks. Also as hypothesized, statement type (positive, negative, or neutral) had no effect on judgments of item frequency, $F < 1$, nor were any of the interactions significant.

A 2 (mood state) X 3 (statement type) analysis of variance with repeated measures on the last factor was performed on the zero frequency

Table 5

Analysis of Variance of Item Frequency Judgments (All Subjects)

	SS	df	MS	F
Between Subjects				
M (Mood State)	6.28	1	6.28	< 1
S(M)	387.34	30	12.91	
Within Subjects				
T (Statement Type)	0.42	2	0.21	< 1
MT	0.45	2	0.22	< 1
TS(M)	38.66	60	0.64	
A (Actual Frequency)	338.85	3	112.95	105.01*
MA	1.90	3	0.63	< 1
AS(M)	96.79	90	1.08	
TA	5.64	6	0.94	2.00
MTA	0.83	6	0.14	< 1
TAS(M)	83.61	180	0.46	

* $p < .01$

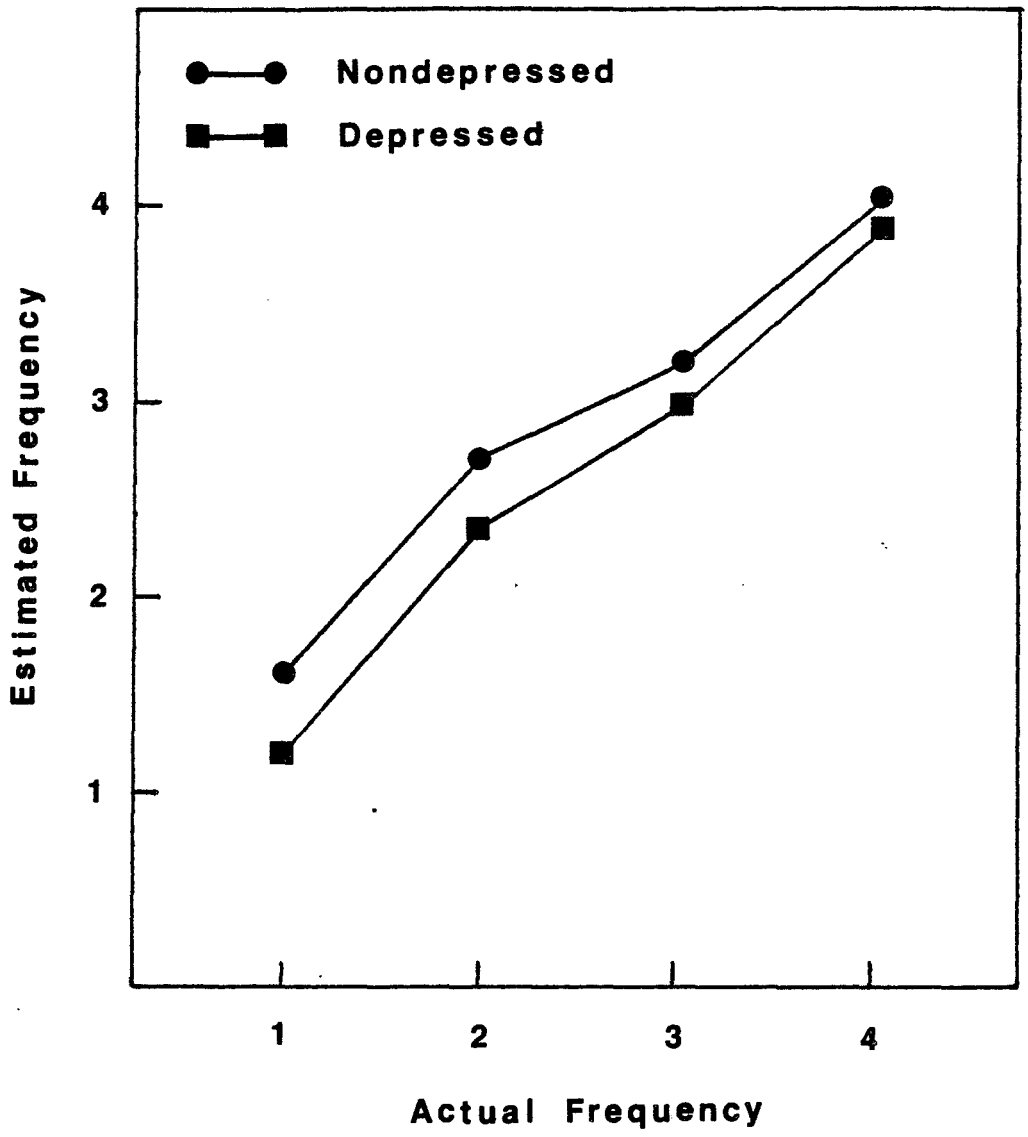

Figure 1. Item frequency estimates for depressed and nondepressed subjects.

items. This analysis revealed a significant effect for statement type, F (2,60) = 13.91, $p < .01$. The main effect of mood state and the interaction were not significant (see Table 6). As can be seen in Figure 2, positive zero-frequency statements were much more likely to be estimated as having occurred previously than were negative and neutral zero-frequency statements.

Category Judgments

The judgments of category frequency were analyzed by a 2 (mood state) X 2 (list type) X 3 (statement type) analysis of variance with repeated measures on the last factor. There were two list types in the experiment: the list consisted of either 10 positive statements, 11 neutral statements, and 12 negative statements, or it consisted of 12 positive, 11 neutral, and 10 negative statements. Although there were actual differences in the category frequencies between lists, the analysis of variance revealed that list type had no effect on the category judgments, F (1,28) = 1.63, $p > .05$.

It was hypothesized that the interaction of mood and statement type would have a significant effect on judgments of category frequency. This was not the case; the interaction was not significant, F (2,56) = 1.53, $p > .05$ (see Table 7) (subjects removed: $F < 1$). There was no significant main effect for mood, $F < 1$ (subjects removed: F (1,23) = 1.18, $p > .05$), however, the main effect for statement type was significant, F (2,56) = 4.29, $p < .05$ (subjects removed: F (2,46) = 4.79, $p < .05$). Examination of the overall mean estimates for the three categories of statement type revealed that positive statements were judged

Table 6

Analysis of Variance of Judgments of Zero-Frequency Items (All Subjects)

	SS	df	MS	F
Between Subjects				
M (Mood State)	0.03	1	0.03	< 1
S(M)	4.47	30	0.15	
Within Subjects				
T (Statement Type)	3.51	2	1.76	13.91*
MT	0.07	2	0.04	< 1
TS(M)	7.58	60	0.13	

* $p < .01$

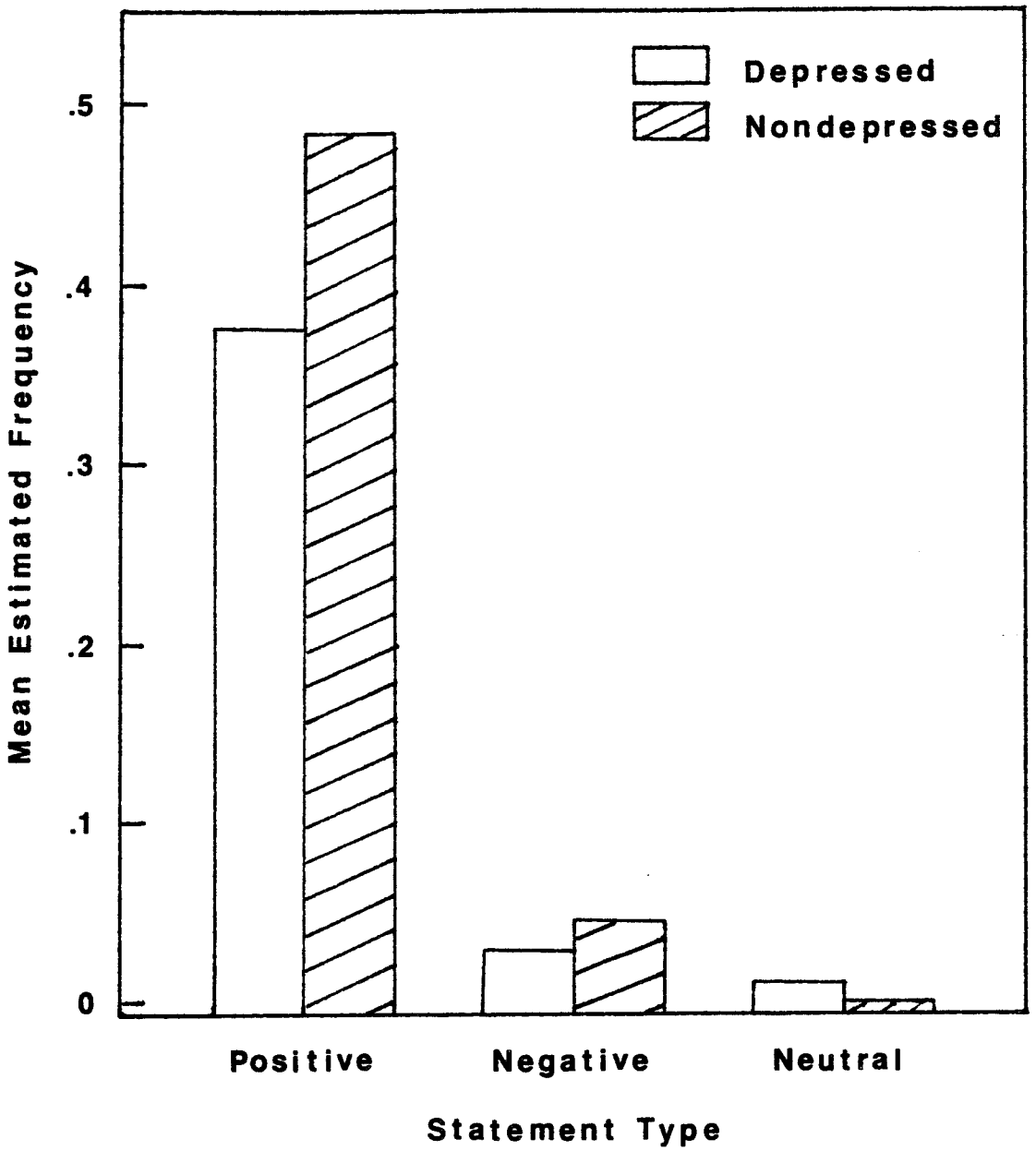

Figure 2. Frequency estimates for zero-frequency items from each category.

Table 7

Analysis of Variance of Category Frequency Judgments (All Subjects)

	SS	df	MS	F
Between Subjects				
M (Mood State)	123.76	1	123.76	< 1
L (List Type)	207.09	1	207.09	1.63
ML	82.51	1	82.51	< 1
S(ML)	3553.63	28	126.92	
Within Subjects				
T (Statement Type)	298.90	2	149.45	4.29*
MT	106.64	2	53.32	1.53
LT	16.94	2	8.47	< 1
MLT	45.02	2	22.51	< 1
TS(ML)	1952.50	56	34.87	

* $p < .05$

to be most frequent ($\bar{X}$ = 16.06), negative statements were judged to be next frequent ($\bar{X}$ = 14.16), and neutral statements were always judged to be the least frequent category ($\bar{X}$ = 11.75). A Newman-Keuls analysis of these means indicated that the means for both positive and negative statements were significantly different from the mean of the neutral statements, but that the means of the positive and negative statements did not differ significantly.

Recall

The recall data was analyzed by a 2 (mood state) X 2 (list type) X 3 (statement type) analysis of variance with repeated measures on the last factor.

It had been hypothesized that the analysis of the recall data would mimic the analysis of the category frequency judgments, i.e., it was hypothesized that the interaction of mood state and statement type would be significant. In the analysis including all subjects, this interaction just reached significance, F (2,56) = 3.13, p = .05 (see Table 8). When subjects were removed from this analysis, instead of increasing this interaction (removal of subjects "inconsistent" in their mood state should lead to more homogeneous groups and increase the differences between the groups), the interaction dropped below significance, F (2,46) = 3.02, p = .06. It is debatable, therefore, whether this interaction can be considered real. Figure 3 presents the mean number of statements recalled in each category. Simple effects and Newman-Keuls analyses indicated that, if real, the interaction lies in the recall of the neutral statements. Recall did not differ signifi-

Table 8

Analysis of Variance of Recall Data (All Subjects)

	SS	df	MS	F
Between Subjects				
M (Mood State)	3.62	1	3.62	1.50
L (List Type)	7.88	1	7.88	3.26
ML	7.95	1	7.95	3.29
S(ML)	67.91	28	2.42	
Within Subjects				
T (Statement Type)	70.96	2	35.48	17.29**
MT	12.84	2	6.42	3.13*
LT	4.96	2	2.48	1.21
MLT	1.90	2	0.95	<1
TS(ML)	114.91	56	2.05	

* $p = .05$

** $p < .01$

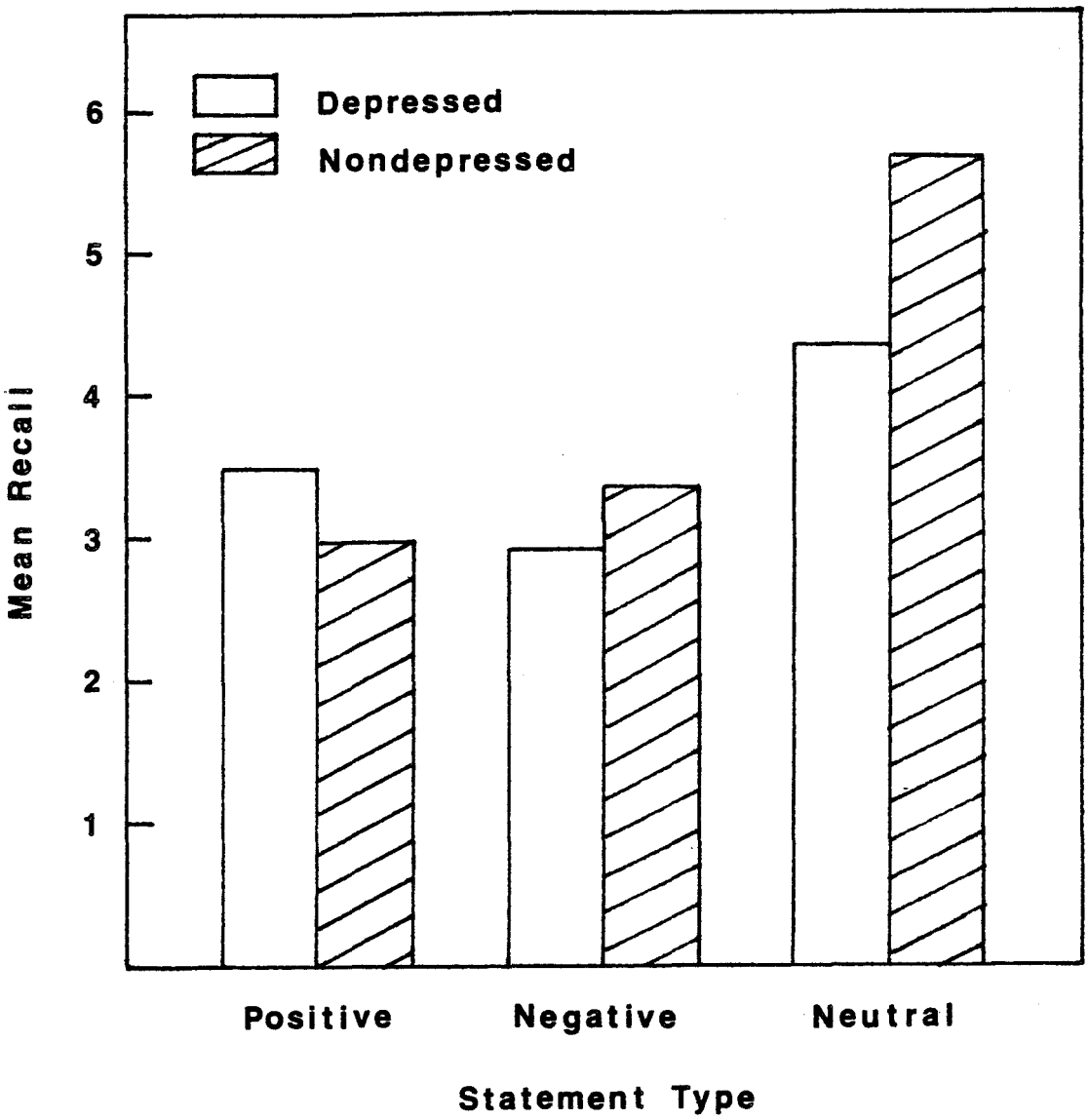

Figure 3. Mean number of statements recalled in each category for depressed and nondepressed subjects.

cantly between positive and negative statements or between depressives and nondepressives for these statements. There was, however, a significant difference between depressives and nondepressives for recall of the neutral statements. Also, recall of neutral statements differed significantly from recall of both positive and negative statements for nondepressives, while recall of neutral statements differed from recall of negative statements (but not from positive statements) for depressives.

The analysis of the recall data did mimic the analysis of the category judgments in that the main effect of statement type was significant (F (2,56) = 17.29, $p<.01$), and no other main effect or interaction was significant (with the possible exception of the mood state by statement type interaction). However, the pattern of recall for statements of various types did not mimic the pattern of category estimates as should follow from the availability heuristic. In the category judgments, positive and negative statements were judged to have occurred more frequently than neutral statements. If category judgments are based on what is available to the subject, as suggested by the availability heuristic, then what was avilable to the subject should have been positive and negative statements. However, neutral statements were recalled the most ($\bar{X}$ = 5.00), while positive and negative statements were recalled with approximately equal frequency ($\bar{X}_{positive}$ = 3.21, $\bar{X}_{negative}$ = 3.15). A Newman-Keuls analysis indicated the difference between the neutral statements and the positive and negative statements to be significant, while the difference between the positive statements

and the negative statements was not significant. This Newman-Keuls mimics the Newman-Keuls for category judgments in that positive and negative statements do not differ, but they do differ from neutral statements. Contrary to the availability heuristic, however, the more that was available to the subject (i.e., recalled), the lower was the frequency estimate.

DISCUSSION

Individually, the results of the item judgments and the results of the category judgments are important for various theories concerning the processing of frequency information. Taken together, it was hoped that they would clarify and/or resolve the apparent conflict of results between the frequency literature and the depression literature. In short, the results were not able to resolve the conflict, did provide support for one theory but problems for another, and suggested a reconciliation of the two theories.

The present study attempted to clarify the effect of mood state on judgments of frequency of occurrence by linking two apparently conflicting sets of results through the methodological differences between the studies producing those results. Briefly, Hasher and Zacks (1979) propose that the encoding of frequency information is an automatic process and cannot be affected by depression; this is in conflict with the depression literature which has shown that depression can affect judgments of the frequency of reinforcement and/or punishment. The methodological differences between the studies (type of stimuli used, type of judgment required) were hypothesized to be the cause of this apparent conflict. Therefore, an attempt was made to replicate both Hasher and Zacks' results and the results of the depression studies in one experiment. Had both of these results replicated, it would have been shown that judgments of the same information appeared to be both

affected and not affected by depression, depending on the type of judgments required. Unfortunately, both results were not replicated. Hasher and Zacks' results were replicated in the item judgments (mood did not affect item judgments), but the category judgments did not replicate the results of the depression literature (i.e., that depression affects category judgments). Although the results of the depression literature were not replicated and it was not shown that depression affected the category judgments while not affecting the item judgments thereby causing an apparent conflict, the possibility that this could happen cannot be ruled out. In fact, another variable had this very effect. Type of statement (positive, negative, or neutral) had no effect on item judgments, while it did have an effect on category judgments: the positive and negative statements were estimated as occurring more frequently than neutral statements. If one variable can produce this apparent conflict between item and category judgments, it is likely that other variables (e.g., mood state) may also be capable of producing this apparent conflict. It is proposed that depression did not have this effect in the present study because the stimuli used (self-reference statements) were not information that is affected by mood state. In other words, rating self-reference statements is not equivalent to the experience of reinforcement/punishment used in the depression studies. Had stimuli of this nature been used, the possibility exists that while depression would be shown to have an effect on judgments of category frequency, judgments of item frequency would remain unaffected.

Although the results of the present study could not resolve the

issue of how depression relates to judgments of frequency, it is important to examine them in terms of their relationship to various theories concerning frequency judgments. To be specific, the present results bear on Hasher and Zacks' theory of the automaticity of frequency encoding, and on Tversky and Kahneman's (1973) availability heuristic.

Hasher and Zacks' theroy that the encoding of frequency is an automatic process and cannot be affected by depression was supported by the results of the item judgments. It is important to note, however, that Hasher and Zacks' theory found support only in judgments of item frequency. Although judgments of category frequency were not affected by depression, neither did they follow the pattern expected if frequency encoding is an automatic process. In an experiment by Alba, Chromiak, Hasher, and Attig (1980), judgments of category frequency increased as the actual frequency of category exemplars increased. They concluded from this that category frequency was automatically encoded. However, for the category judgments in the present experiment, the list type by statement type interaction was not significant. This indicates that the actual frequency of statements in each category made no difference when making the category judgments. In Hasher and Zacks' Experiment 3 and in the present experiment, estimates of item frequency increased with actual frequency. This did not occur in the estimates of category frequency. Not only did actual frequency make no difference, but the category judgments were affected by the type of information that made up the category (the positive and negative categories were given higher

estimates than the neutral category regardless of actual frequency). This would not be expected if frequency was automatically encoded and was retrieved as it had been encoded.

The results of the category judgments, along with the recall data, also present a problem for Tversky and Kahneman's availability heuristic. According to the availability heuristic, judgments of frequency are made on the basis of availability, i.e., the ease with which relevant instances come to mind. Availability has always been operationally defined as what is recalled. In the present experiment, contrary to what would be predicted by the availability heuristic, the more that was recalled from a category, the lower was the estimated frequency of that category. Obviously, frequency was not estimated on the basis of what could be recalled after making the estimates (presumably recalling the information on which the estimates were based). Nor are frequency estimates made on the basis of what can be recalled before making the estimates. Curt and Zechmeister (1981) had subjects recall items prior to making frequency estimates. It was found that the estimates were affected by this initial task and that recall did not predict the pattern of frequency estimates made by subjects who did not recall items prior to making their estimates. These results indicate a problem in defining availability solely in terms of recall.

Not only do the results of the category judgments and recall indicate a problem in defining availability, but the results of the category judgments also lend support to Beyth-Marom and Fischhoff's (1977) proposition that availability is not the only determinant of

judged frequency. In their study, it appeared that category judgments were influenced by their subjects' knowledge of the lexicographic structure of the language. Beyth-Marom and Fischhoff suggest that situation-specific factors such as this can influence frequency estimates. A situation-specific factor may have influenced the category judgments in the present study. Matlin (cited in Matlin, 1979), in a study investigating estimates of the background frequency of pleasant, neutral, and unpleasant words, found that subjects gave lower frequency estimates for neutral words than for pleasant or unpleasant words. Essentially the same results were found in the present study. Estimates of the situational frequency of neutral items were significantly lower than estimates of positive and negative items (which did not differ). It appears that a bias towards estimating emotionally-charged (pleasant and unpleasant) items as occurring with a greater frequency than innocuous (neutral) items could have influenced the category judgments in this study.

The results of the present study suggest that both Hasher and Zacks' theory of the automaticity of frequency encoding and Tversky and Kahneman's availability heuristic need to be amended. The automaticity theory should specify that it is applicable only to judgments of item frequency and not to judgments of category frequency. (Although Alba et al. (1980) concluded from their results that category frequency is automatically encoded, in their study only neutral stimuli were used, they did not address themselves to the results of the depression literature, and they based their conclusion solely on the fact that

categories with more exemplars in the list were reported to have occurred more frequently than categories with fewer exemplars (relative frequency judgments). Using this criterion, the same conclusion would be drawn from the results of the depression studies since both depressives and nondepressives report higher frequencies of reinforcement when they have been reinforced more, and higher frequencies of punishment when they have been punished more (see Review of the Relevant Literature, pps. 14-15). What needs to be explained is the systematic distortions that occur in certain types of frequency information for certain people. These distortions were not discussed by Alba et al., and would not have been expected to appear in a study, such as theirs, in which only neutral stimuli were used.) The availability heuristic needs to redefine "availability" and account for other factors that influence frequency judgments besides availability. Though the results of the present study suggest these changes in theory, they also suggest and support a reconciliation of the two theories. Since the automaticity theory is concerned only with the encoding of frequency information and the availability heuristic is used only in the retrieval of information, the two theories should be viewed not as rival approaches, but as two approaches explaining different stages in the processing of frequency information. The two theories can then be reconciled into a more complete theory of the processing of frequency information. In this reconciliation, it is theorized that frequency information about individual items is encoded automatically. Since the frequency of individual items is encoded, the effort towards retrieval of this information (item

judgments) is minimized and the judgments are relatively accurate. On the other hand, category frequencies are not encoded automatically. A single item could be part of many different categories (e.g., pleasantness vs. unpleasantness, high vs. low imagery, short word vs. long word, whether the item describes my cat or not, etc.), and categories to which the item may belong may not even be known until many items have been presented. It is doubtful that frequency information is automatically encoded for each of the many different categories into which an item could belong. Therefore, to make an estimate of the frequency of items occurring in a particular category, considerable effort is required: A search through all the items is necessary to find those items that make up the category. The frequencies of these items must then be retrieved and this information complied. As this process takes place, many factors could influence the final estimate: for example, the availability of the searched-for items, biases peculiar to the type of information involved (situation-specific facotrs), or the person's expectations or biases about the information and the task he is asked to perform. Factors such as these could distort the final category judgment so that it would appear that the information had not been automatically encoded. The results of the present study support this proposed reconciliation of the two theories: the item judgments were accurate while the category judgments were not, and the category judgments could have been biased by a general tendency to estimate higher frequencies for emotionally-charged items than for innocuous items.

The preceding reconciliation of the two theories provides a more

complete model of the processing of frequency information. Needless to say, further research is now needed to substantiate this model.

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APPENDIX A

APPENDIX A

Positive Self-Reference Statements

I am a healthy person.
I feel optimistic.
I am lucky.
I am a lively person.
I feel bright.
I am an easy-going person.
I am enthusiastic.
I feel alert.
I feel light-hearted.
I am composed.
I feel peaceful.
I feel light.

Negative Self-Reference Statements

I feel dejected.
I am discouraged.
I feel burdened.
I feel chained.
I am crestfallen.
I feel alone.
I am unhappy.
I am exhausted.
I am a moody person.
I am weary.
I feel gloomy.
I feel miserable.

Neutral Self-Reference Statements

I like chocolate ice cream.
I like roses.
I like to go to movies.
I like to read.
I like cats.
I like the color green.
I like to ice skate.
I like science fiction stories.
I like to sleep.
I like to go to the zoo.
I like summer.
I like to jog.

APPENDIX B

APPENDIX B

Response Form for Judgments of Item Frequency

____ I feel alert.	____ I am crestfallen.
____ I am enthusiastic.	____ I like summer.
____ I am unhappy.	____ I am a moody person.
____ I am unfeeling.	____ I like strawberries.
____ I am composed.	____ I like science fiction stories.
____ I like to read.	____ I feel dejected.
____ I am discouraged.	____ I like to jog.
____ I like to sleep.	____ I feel burdened.
____ I like to ski.	____ I feel bright.
____ I feel alive.	____ I like to ice skate.
____ I feel optimistic.	____ I am hopeful.
____ I feel peaceful.	____ I am weary.
____ I like chocolate ice cream.	____ I am a healthy person.
____ I am lucky.	____ I am an easy-going person.
____ I feel alone.	____ I feel chained.
____ I like the color green.	____ I like to go to the zoo.
____ I am exhausted.	____ I like cats.
____ I like roses.	____ I feel poor.
____ I feel miserable.	____ I feel light-hearted.
____ I feel gloomy.	____ I feel light.
____ I am a lively person.	____ I like to go to movies.

Response Form for Judgments of Category Frequency

Positive Qualities _____

Negative Qualities _____

Neutral Statements ("I like...") _____

APPENDIX C

APPENDIX C

Cell Means for Item Frequency Estimates

		Actual Frequency				
		0	1	2	3	4
Positive Statements	D	0.38	1.34	2.48	3.17	3.75
	ND	0.48	1.79	2.94	3.29	3.81
Negative Statements	D	0.03	1.29	2.31	3.06	3.94
	ND	0.05	1.75	2.67	3.25	4.25
Neutral Statements	D	0.02	1.08	2.31	3.02	4.25
	ND	0.00	1.36	2.65	3.25	4.06

Note: Each mean is based on an n of 16.

APPROVAL SHEET

The thesis submitted by Carol L. Curt has been read and approved by the following committee:

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The final copies have been examined by the director of the thesis and the signature which appears below verifies the fact that any necessary changes have been incorporated and that the thesis is now given final approval by the Committee with reference to content and form.

The thesis is therefore accepted in partial fulfillment of the requirements for the degree of Master of Arts.

10/9/81
Date

Director's Signature