Construct Accessibility and Depression: An Examination of Cognitive and Affective Factors

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Two studies in which the parameters of construct accessibility in depression were examined are reported. In Experiment 1, depressed and nondepressed subjects were required to name the colors of tachistoscopically presented depressed-content, neutral-content, and manic-content words. Because of the predicted accessibility and interference effects of the depressed-content words, the depressed subjects were expected to demonstrate longer response latencies to these words than to the nondepressed-content words. This response pattern was found for the depressed subjects; the nondepressed subjects did not demonstrate differential response latencies. In Experiment 2, a mood-induction paradigm was used to investigate whether the interference effects obtained in Experiment 1 were due to temporary mood differences between the depressed and nondepressed subjects, or were a function of more stable depression-associated patterns of information processing. Although predicted group differences were obtained on a mood adjective checklist, no effects were found for task performance. These results suggest that transient mood is not a sufficient explanation for the results obtained in Experiment 1. The implications of the present findings for the understanding of both construct accessibility and depression are discussed, and directions for future research are suggested.

There is a rapidly growing body of literature in which the role of cognitive processes in the development and maintenance of depression is examined. These studies are based largely on Beck's (1967, 1976) cognitive model of depression, in which depressed persons are characterized by a "cognitive triad": a negative view of the self, the world, and the future. This conceptualization of depression ascribes considerable importance to the role of cognitive schemata. Schemata are generally viewed as cognitive structures that affect the encoding, storage, and retrieval of information (Taylor & Crocker, 1981). According to Beck, the schemata used by depressed individuals are negative in nature, leading the depressed person both to selectively filter out positive information and to perceive negative or neutral information as being more negative than it actually is; consequently, the depressed individual is often inaccurate in his or her perception of the environment.

Empirical support for this model has come from studies in which the differential accuracy of recall of reinforcement in depressed and nondepressed subjects is assessed. For example, Wener and Rehm (1975), Buchwald (1977), and Gotlib (1981) reported that depressed subjects underestimated the number of reinforcements they received on a laboratory task. In addition, Gotlib (1983) found that depressed psychiatric patients recalled an interpersonal evaluation as being significantly more negative than was actually the case.

These investigations, then, provide support for Beck's (1967, 1976) conceptualization of depression, which suggests that this disorder is characterized by the operation of negative schemata. The results of a number of other studies, however, are not consistent with this formulation. For example, in a study designed to examine both perception and recall of neutral feedback in depression, Craighead, Hickey, and DeMonbreun (1979) found no differences between depressed and nondepressed students. Furthermore, several investigations have presented data that suggest that it is nondepressed...
individuals who distort their environment, whereas depressed persons are painfully accurate. Nelson and Craighead (1977) reported that consistent with predictions derived from Beck's model of depression, depressed students recalled receiving a higher rate of punishment than did nondepressed students. This difference, however, was due to the nondepressed students underestimating the amount of punishment they had actually received; the depressed students were accurate in their recall. Lewinsohn, Mischel, Chaplin, and Barton (1980) reported an analogous finding in which the degree of concordance between self-ratings and observer ratings of social competence was higher in depressed than in nondepressed subjects. Finally, both Alloy and Abramson (1979) and Golin and his colleagues (e.g., Golin, Terrell, & Johnson, 1977; Golin, Terrell, Weitz, & Drost, 1979) reported results suggesting that nondepressed individuals see themselves as having more control in experimental situations than is actually the case, whereas depressed persons are relatively accurate in their assessment of response–outcome contingencies.

There are discrepancies, therefore, in the results of studies examining the perception and recall of environmental information in depression. To understand the nature of these differences, it is important to note that these investigators have not attempted to distinguish among the various motivational (cf. Alloy, 1982) and cognitive processes involved in their experimental tasks. Therefore, the extent to which each of these researchers assesses the operation of cognitive or motivational processes is unclear. Furthermore, studies of cognition in depression are characterized by an inattention to more molecular aspects of information-processing, which virtually prevents one from precisely ascertaining the nature of the deficits demonstrated by depressed individuals. The present studies represent an attempt to address these limitations through a delineation of the parameters of construct accessibility in depression (cf. Higgins & King, 1981; McCann & Higgins, in press).

It has long been suggested (Bartlett, 1932; Bruner, 1957) that when exposed to stimulus input, individuals engage in a process of "effort after meaning," in which incoming stimuli are interpreted with reference to the person's preexistent cognitive structures. Researchers postulate that both the stimuli attended to and the interpretations placed on those stimuli are influenced by the relative accessibility of various constructs or schemata (cf. Higgins, Rholes, & Jones, 1977; Wyer & Srull, 1981). Accessibility, in this context, refers to "the readiness with which a stored construct is utilized in information processing" (Higgins & King, 1981, p. 71).

Higgins and King (1981) found that the accessibility of constructs is a function of such factors as the expectations of the individual and the recency and frequency of activation of the construct. In addition to these temporary differences in accessibility, it is likely that individuals demonstrate more stable differences in the accessibility of particular types of constructs because of such factors as their previous socialization experiences (cf. McCann & Higgins, in press). In this context, and consistent with Beck's (1967, 1976) concept of the schema, both Higgins and King (1981) and McCann and Higgins (in press) suggested that depressed individuals may differ from nondepressed persons in the relative accessibility of negative-content constructs.

In this article we describe two studies conducted to gain a better understanding of the nature of negative schemata in depressed individuals. In the first study we assess the relative accessibility of positive and negative constructs in depressed and nondepressed university students. The second study is an attempt to replicate the findings of the initial investigation through a mood induction paradigm.

Experiment 1

If depressed individuals are in fact characterized by negative schemata through which they filter environmental information, they should be naturally "primed" to perceive negative-content stimuli. This priming is viewed as the result of the relatively greater accessibility of negative constructs for depressed individuals.

The phenomena of priming and construct accessibility have received considerable attention from investigators concerned with the mechanisms involved in information processing. In one procedure used to assess differential construct accessibility, the Stroop
(1935) color word task is used. The original Stroop procedure requires subjects to name the color of ink in which color names are printed. Thus, for example, on seeing the word red printed in blue ink, the correct response from the subjects would be “blue.” Subjects typically demonstrate longer reaction times to naming the ink colors of color words (e.g., red, green, yellow) than of noncolor words (e.g., sock, cup, drawer). Investigators have interpreted this differential response latency in terms of response competition: The processing of the content of the color word interferes with the response of naming the color of ink in which it is printed.

Warren (1972, 1974) and Conrad (1974, 1978) have used a variation of this task in demonstrating accessibility or priming effects that are due to recency of construct activation. Warren (1972), for example, first aurally presented subjects with three words that all had the same category name, (e.g., aunt, uncle, cousin). This was followed by the visual presentation of one of three different words: a word that was in the original list (e.g., uncle), the category common to all of the words in the list (e.g., relative), or an unrelated word (e.g., coal). As in the original Stroop task, these words were printed in colored ink, and the subjects’ task was to name the color in which the word was printed as quickly as possible after the word was presented. Warren found that color-naming reaction times were significantly longer to both category names and words from the list than for unrelated words. He explained this finding by suggesting that the category designation of a word is activated as part of the word’s encoding, and both the category and the word itself, therefore, produce interference effects on this Stroop procedure through response competition.

This paradigm can be profitably extended to the study of depression. If Beck’s (1967, 1976) postulation that depressed individuals are characterized by the primacy of negative schemata is valid, the relatively greater accessibility of negative constructs in depressed individuals would be expected to produce interference effects for negative-content words analogous to those found by Warren (1972). We therefore predicted that depressed subjects would demonstrate longer response latencies to naming the colors of depressed-content than neutral- or manic-content words. On the basis of results of previous work by Kuiper and his colleagues (e.g., Derry & Kuiper, 1981), depressed subjects were also expected to recall a greater number of depressed-content than neutral- or manic-content words on a subsequent incidental recall task. We predicted that nondepressed subjects, on the other hand, would not exhibit either differential reaction times or differential recall for the three types of words.

Method

Subjects. Thirty undergraduate students at the University of Western Ontario constituted the final sample of subjects for this study. These subjects were selected on the basis of their scores on the Beck Depression Inventory (BDI; Beck, Ward, Mendelson, Mock, & Erbaugh, 1961). Fifteen subjects had BDI scores of 4 and below, and the remaining 15 subjects all obtained scores of 9 or above (nondepressed: \( M = 1.00, SD = 1.25 \); depressed: \( M = 15.80, SD = 3.78 \)). The nondepressed group comprised 5 men and 10 women, and the depressed group comprised 2 men and 13 women.

Materials and equipment. One hundred and fifty different words were used as stimuli in the present study. One hundred of these words were drawn from a list developed by Myers (1980), who obtained ratings of the degree of self-description of each of 400 adjectives from psychiatric patients diagnosed as either depressed or manic. The 50 adjectives rated both by the depressed patients as most self-descriptive and by the manic patients as least self-descriptive were selected as the depressed-content words; similarly, the 50 adjectives rated both by the depressed patients as least descriptive and by the manic patients as most descriptive were chosen as the manic-content words. Finally, 50 neutral-content words were chosen from the list presented by Thorndike and Lorge (1944), and were matched with the depression- and manic-content words with respect to frequency of occurrence in English. None of the neutral-content words were contained in the list of 400 self-descriptive adjectives used by Myers.

Each of the 150 words was printed in capital letters \( \frac{1}{16} \) in. (8 mm) high on a 4 x 6 in. (10.2 x 15.3 cm) white index card. Each word was printed in one of five colors of ink (red, yellow, green, brown, or blue). Ten of the 50 words in each content category were printed in each of the five colors, and the length of the words was matched as closely as possible for each color.

Procedure. Each subject was tested individually. Sub-
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Table 1
Group Means and Standard Deviations on Color-Naming Response Latencies to the Stimulus Words

<table>
<thead>
<tr>
<th>Word type</th>
<th>Depressed</th>
<th>Neutral</th>
<th>Manic</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td></td>
</tr>
<tr>
<td>Subject group</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nondepressed</td>
<td>694.67</td>
<td>76.88</td>
<td></td>
</tr>
<tr>
<td>Depressed</td>
<td>762.40</td>
<td>94.94</td>
<td></td>
</tr>
</tbody>
</table>

Note: Ms are in msec

jects first completed the BDI and were told to name aloud the colors of a series of words. The words were presented in random order for each subject via a Ralph Gerbrands Co. two-field tachistoscope (Model T-2B-10). An Electro-Voice Inc. (Model 621) microphone was positioned approximately 2¼ in. (7 cm) from the subject's mouth. The microphone was connected to a Lafayette Instruments Co. (Model 18010) voice-activated relay, which stopped a Hunter-Klockounter (Model 120) timer at the initiation of the subject's vocal response. Subjects were told that five colors would be used and were given five practice trials, which involved naming the colors of the words one, two, three, four, and five, as quickly as possible. When it was clear that each subject understood the task requirements, the experimenter presented the 150 stimulus words. Each trial consisted of a 1-s presentation of a fixation cross followed by a 250-msec blank interval followed by the presentation of a stimulus word. Onset of the stimulus started the timer, which was stopped by the subject's vocal response. Each stimulus remained in view for 1.5 s, regardless of the subject's reaction time. The interval between stimulus presentations was used by the experimenter to record the response latency and to reset the equipment for the next trial. Thus this time interval was not held constant, but was generally around 5 s.

After the presentation of the 150 stimulus words, subjects were asked to write down, in any order, as many of the words as they could recall, and were given 3 min to complete this task. Following the recall task, subjects were thanked for their participation and were fully debriefed.

Results

Response latency. As is typically the case in vocal reaction time tasks, errors were virtually nonexistent, occurring on only 1.3% of the trials given (57 errors in 4,500 trials). These errors consisted of calling out the word name, prematurely tripping the voice key with a hesitation sound such as "ah" or "er," or responding too quietly to trip the voice key. The trials on which errors occurred were excluded from further analysis.

Response latencies for each subject were averaged across the 50 words within each of the three content categories. Means and standard deviations for the color-naming latencies for

the depressed and nondepressed subjects on the depressed-, neutral-, and manic-content words are presented in Table 1. A two-way repeated measures analysis of variance (ANOVA) was performed on the data with subject group (depressed, nondepressed) and word content type (depressed, neutral, manic) as factors. The analysis revealed a significant effect only for the Group X Word Type interaction, $F(2, 56) = 3.27, p < .05$. Neither of the main effects attained statistical significance: for group, $F(1, 28) = 3.54, p > .05$; for word type, $F(2, 56) = 1.77, p > .1$. Newman-Keuls post hoc tests revealed that whereas the nondepressed subjects did not demonstrate significantly different response latencies to the three types of words, the depressed subjects took significantly longer ($p < .05$) to name the colors of the depressed-content words than they did to name the colors of either the neutral- or the manic-content words; those two times did not differ significantly from each other.

Recall of words. Means and standard deviations for the number of words recalled from each of the three content categories by subjects in the two groups are presented in Table 2. A two-way repeated measures ANOVA conducted on these data yielded a significant effect only for word type, $F(2, 56) = 7.85, p < .001$; neither the main effect for group nor the Group X Word Type interaction attained statistical significance (both $Fs < 1$). Newman-Keuls post hoc tests indicated that all subjects recalled significantly more depressed-content than either neutral- or manic-content words ($p < .05$).

Discussion

The results of this study provide empirical support for an important aspect of Beck's
Table 2

<p>| Group Means and Standard Deviations on Number of Stimulus Words Recalled |
|-----------------------------|-----------------------------|-----------------------------|</p>
<table>
<thead>
<tr>
<th></th>
<th>Depressed</th>
<th>Neutral</th>
<th>Manic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subject group</td>
<td>M</td>
<td>SD</td>
<td>M</td>
</tr>
<tr>
<td>Nondepressed</td>
<td>3.67</td>
<td>1.54</td>
<td>2.47</td>
</tr>
<tr>
<td>Depressed</td>
<td>3.53</td>
<td>2.17</td>
<td>1.60</td>
</tr>
</tbody>
</table>

(1967, 1976) model of depression. Depressed university students evinced longer color-naming response latencies to depressed-content than to neutral- or manic-content words. In contrast, nondepressed students did not demonstrate differential reaction times to the three types of words. In addition to providing support for Beck's concept of a “negative schema” in depression, the obtained results are consistent with McCann and Higgins's (in press) position that depressed individuals differ from nondepressed persons in the relative accessibility of positive and negative cognitive constructs.

The absence of differential response latencies to the three types of words for the nondepressed subjects suggests that the accessibility of nondepressed words for nondepressed individuals is not as well or specifically organized as that of depressed persons for depressed words. Another possibility, however, is that the type of words used to examine category accessibility in nondepressed individuals was not appropriate for assessing this construct. The words used in this study were based on ratings obtained by depressed and manic psychiatric patients, and it is likely that the manic self-descriptive adjectives were not salient to nondepressed university students, and therefore were not differentially accessible. It would be important in future work to obtain adjectives more descriptive of nondepressed students and to attempt to replicate the results obtained with the depressed subjects in this study.

The finding that depressed and nondepressed subjects did not differ with respect to their recall of the three types of words warrants comment. A number of studies have demonstrated that depressed individuals, relative to nondepressed subjects, recall (a) receiving fewer reinforcements on laboratory tasks (Gotlib, 1981; Nelson & Craighead, 1977), (b) evaluations to be more negative than is actually the case (Gotlib, 1983), and (c) a greater number of depressed-content adjectives that they have rated as self-referent (Derry & Kuiper, 1981). The discrepancy between the findings of these investigations and those of our study likely involves the different levels of stimulus-processing demanded in these studies. Craik and Lockhart (1972) have suggested that the greater is the depth to which a stimulus is processed, the greater is the probability that it will later be recalled. Consistent with this formulation, depressed individuals appear to demonstrate a bias in their recall of stimuli only if they are required to explicitly attend to the information. Subjects in this study did not explicitly process the stimulus words, and this fact may account for the absence of depression-associated differences in recall. Parenthetically, this explanation may also account for the present finding of a response latency effect in the absence of recall differences. Craik and Tulving (1975), for example, have demonstrated that latency and recall measures are not necessarily concordant, and, consistent with a levels-of-processing formulation, Shiffrin and Schneider (1977) suggest that stimuli that are processed automatically (as in the present study) are not necessarily encoded in long-term memory and available to recall. Clearly, further research is required in order to examine more systematically the effects of levels of processing on response interference and stimulus recall in studies of depression.

A related point involves the finding that subjects in both groups recalled significantly more depressed-content than either neutral- or manic-content words. These three types of words were matched with respect to frequency of occurrence in English, and this dimension, therefore, cannot account for this finding. However, Rubin (1980) has demonstrated that other characteristics of words, such as emotionality, associative frequency, pronounceability, and imagery, all affect the ease with which the words are recalled. Therefore, although the three types of words were matched with respect to frequency, it is likely that they differed along one or more other dimensions, resulting in enhanced recall by all subjects of the depressed-content words.
Finally, it is not clear whether the interference effects observed in the depressed subjects are due to a temporary dysphoric mood state or are a function of more stable patterns of information-processing in depressed individuals. This question is especially important in light of Beck's (1967, 1976) formulation of cognition as causal in depression. If the accessibility effects are simply due to sad mood, Beck's proposition that cognitive styles in depressed individuals are stable and precede dysphoric affect would be challenged. Experiment 2 was designed to examine this issue, attempting to replicate the results of Experiment 1 through a mood induction procedure.

Experiment 2

The results of Study 1 suggest that, whereas depressed individuals have more negative content categories accessible to them than positive content categories, nondepressed individuals are not characterized by differential accessibility. It becomes important now to examine the processes underlying this depressed-nondepressed difference in category accessibility. Higgins and his colleagues (e.g., Higgins & King, 1981; McCann & Higgins, in press) have demonstrated that temporary increases in accessibility can be produced by both the recency and frequency of category activation. Higgins suggests further that analogous "chronic" effects may be operative in a number of individual difference variables, and specifically cites depression as an example. In the case of depressed persons, it is possible that chronic increases in negative category accessibility could result from such factors as the frequency with which negative labels have been applied to their behavior, both by themselves and by others. Such a cognitive interpretation is clearly compatible with other current cognitive and interpersonal analyses of depression (e.g., Beck, 1967; Gotlib & Robinson, 1982; Lewinsohn, 1974).

Within this context, the depression-associated patterning of response latencies obtained in Study 1 can be interpreted as reflecting the operation of differential category accessibility, a cognitive process difference. There is, however, an equally viable alternative explanation for these results: The cognitive differences are viewed as reflecting mood differences between depressed and nondepressed individuals. According to this interpretation, differential moods associated with depressed and nondepressed states may serve to increase the accessibility of mood congruent cognitive categories. Thus although these two explanations are concordant with respect to the importance of the role played by category accessibility in producing the results obtained in Study 1, they differ in the role ascribed to temporary (or chronic) mood differences. Although the mood interpretation is weakened somewhat by the failure in Study 1 to find evidence for increased accessibility of positive or neutral categories for the nondepressed subjects, it is compatible with a large body of literature in which the effects of mood on a variety of cognitive and memory processes are demonstrated (e.g., Bower, 1981; Clark & Isen, 1982; Isen, Shalker, Clark, & Karp, 1978; Teasdale & Fogarty, 1979; Zajonc, 1980).

Study 2 was designed to examine the possibility that the effects obtained in Study 1 were due simply to mood differences between the depressed and nondepressed subjects. To this end, we used the Velten Mood Induction Procedure (Velten, 1968) to produce positive, neutral, and negative moods. A substantial body of recent research provides empirical support for the contention that such mood induction procedures do in fact manipulate subjects' moods. Hale and Strickland (1976) and Strickland, Hale, and Anderson (1975), for example, found that subjects in a depression-induction condition, relative to subjects who underwent an elation-induction, indicated feeling more depressed, anxious, and hostile, were less expansive in graphic expression, wrote more slowly, and performed more poorly on the Digit Symbol Test. These results have been extended and supported by several other investigations (e.g., Alloy, Abramson, & Viscusi, 1981; Natale, 1977; Natale & Hantas, 1982; Riskind, Rholes, & Eggers, 1982). Therefore, if the mood interpretation of the effects of Study 1 is correct, similar results should be obtained in Study 2. If, however, the effects of Study 1 are due to cognitive differences associated with more chronic characteristics of depression, no such effects should be obtained in Study 2.

Method

Subjects Thirty undergraduate students at the University of Western Ontario received course credit for par-
ticipating in the present study. Subjects were randomly assigned to one of three experimental conditions: induced depression, induced elation, or neutral mood. There were 2 men and 8 women in each of the three conditions.

Procedure. Each subject was tested individually. Subjects were told that the study concerned the effects of mood on perceptual processes. Each subject first completed the BDI and then participated in Velten's (1968) mood induction procedure. Subjects in the elation-induction condition were asked to read first silently, then aloud, each of 50 statements progressing from relative mood neutrality (e.g., "Today is neither better nor worse than any other day") to elation (e.g., "God, I feel great"). Subjects in the depression-induction condition read 50 statements progressing from relative mood neutrality to depression (e.g., "I want to go to sleep and never wake up"). Subjects in the neutral condition read 50 neutral statements (e.g., "The review is concerned with the first three volumes") to control for the effects of reading statements. All statements were typed on separate 4 × 6 in. (10.2 × 15.3 cm) white index cards; subjects were first shown a card containing Velten's standard instructions encouraging them to try to respond to the feeling suggested by each statement. Subjects were asked to read the statements at their own speed and were given 7.5 min to complete this task; the experimenter was out of the room. Subjects were further instructed that if they finished reading the statements before the experimenter returned, they were to reread some of the statements.

After the 7.5 min had elapsed, the experimenter returned to the room and asked the subjects to complete the Brief Form of the Multiple Affect Adjective Check List (MAACL; Zuckerman & Lubin, 1965). In order to heighten or reinstate the induced mood, subjects were then given 3.5 min to reread the last 25 statements. Following this reinduction, subjects were told that they were to name aloud the colors of a series of words. As in Experiment 1, the 150 stimulus words were presented in random order, and the subjects' response latency to naming the color of each word was recorded.

Following the presentation of the 150 words, subjects were asked to write down, in any order, as many of the words as they could recall, and were given 3 min to complete this task. Following this recall task, subjects were thanked for their participation in the study and were fully debriefed. In addition, subjects in the depression-induction condition read the 50 elation-induction statements before leaving.

Results

Mood. An ANOVA conducted on the BDI scores of subjects in the three experimental conditions proved nonsignificant, F(2, 27) < 1. (The mean BDI score for all subjects was 4.03, with a SD of 2.85). Thus there was no difference in level of depression among subjects in the three experimental conditions before the mood induction procedure.

Means and standard deviations for the responses of subjects in the three induction groups to the depression, anxiety, and hostility subscales of the MAACL are presented in Table 3. A multivariate analysis of variance conducted on the data yielded a significant effect, F(6, 50) = 2.55, p < .05. Subsequent univariate ANOVAs produced significant effects for the depression and hostility subscales: for depression, F(2, 27) = 7.55, p < .005, and for hostility, F(2, 27) = 3.33, p < .05; the effect for the anxiety subscale did not reach significance, F(2, 27) = 2.45, p > .1. Newman-Keuls post hoc tests indicated that subjects in the depression-induction group reported feeling significantly more depressed (p < .01) and more hostile (p < .05) following the induction procedure than did subjects in either the neutral- or the elation-induction groups, who did not differ significantly from each other.

Response latency. As was the case in Experiment 1, subjects made very few errors on the color-naming task (54 errors in 4,500 trials, for a 1.2% error rate). The trials on which errors occurred were excluded from further analysis.

Response latencies for each subject were averaged across the 50 words within each of the three content categories. Means and standard deviations for the color-naming latencies for subjects in the three mood induction groups on the depressed-, neutral-, and manic-content words are presented in Table 4. A two-way repeated measures ANOVA conducted on these data failed to reveal significant effects: for group, F(2, 27) < 1; for word type, F(2, 54) =

Because this study was concerned with the effects of induced mood, it was necessary that subjects be initially nondepressed. Therefore, the BDI was administered to each subject at the beginning of the experimental session, and the data from those subjects who obtained scores of 9 or above were excluded from further analysis. The final sample consisted of 30 subjects.
Table 4

Induction Group Means and Standard Deviations on Color-Naming Response Latencies to the Stimulus Words

<table>
<thead>
<tr>
<th>Condition</th>
<th>Depressed</th>
<th>Neutral</th>
<th>Manic</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>M</td>
</tr>
<tr>
<td>Depression</td>
<td>778.50</td>
<td>146.55</td>
<td>770.10</td>
</tr>
<tr>
<td>Neutral</td>
<td>762.90</td>
<td>87.49</td>
<td>750.80</td>
</tr>
<tr>
<td>Elation</td>
<td>744.20</td>
<td>86.97</td>
<td>736.90</td>
</tr>
</tbody>
</table>

Note. Ms are in msec.

1.49, \( p > .1 \); for Group × Word Type, \( F(4, 54) < 1 \). Thus subjects in the three mood induction groups were indistinguishable with respect to their color-naming latencies; furthermore, subjects did not respond differentially to the three types of words.

Recall of words. Means and standard deviations for the number of words recalled from each of the three content categories by subjects in the three mood induction groups are presented in Table 5. A two-way repeated measures ANOVA conducted on these data failed to yield significant effects (all \( Fs < 1 \)). Subjects in the three groups, therefore, did not differ in the number of words recalled from each of the three content categories.

Discussion

In Study 1, depressed subjects evidenced greater response latencies to depressed-content words, whereas nondepressed subjects did not demonstrate differential reaction times. Study 2 was designed to assess the possibility that these results were due to mood-related increases in category accessibility rather than to more stable cognitive differences associated with depression. Thus the procedure of Study 2 was modeled after that of Study 1, but instead of assessing depressed and nondepressed subjects, it induced depression and elation.

The first issue of concern involves the success of the present procedure in inducing the intended moods. Researchers have shown that Velten’s (1968) mood induction procedure is successful in effecting changes in such variables as speed and expansiveness of writing (Hale & Strickland, 1976), time and strength of retrieving pleasant and unpleasant memories (Natale & Hantas, 1982; Teasdale & Fogarty, 1979), and mood and self-devaluation (e.g., Frost, Graf, & Becker, 1979; Riskind et al., 1982). The results of the analyses of the MAACL subscales in the present study suggest that appropriate moods were in fact induced: Subjects who underwent the depression induction reported more depressed affect following the induction procedure than did subjects who participated in the elation induction.

If the differential response latencies obtained in Study 1 were due solely to differences in mood between the depressed and the nondepressed subjects, then similar results would be expected in this second study with depression- and elation-induced subjects. The results of this study indicated that this predicted pattern was not obtained. No group differences were found with respect to response latencies to the three types of words. Interestingly, an examination of the mean response latencies for this study presented in Table 4 suggests that subjects in all the induction groups responded to the stimulus words with reaction times similar to those demonstrated by the nondepressed subjects in Study 1 (see Table 1). Given the fact that all subjects in the second study were nondepressed before the mood manipulation,
these results suggest that the group effects obtained in Study 1 are not due solely to transient mood differences between the depressed and nondepressed subjects. This is not to state, of course, that mood plays no role in increasing the accessibility of mood-congruent categories, but simply that mood is not a sufficient explanation for the original pattern of results.

Several previous investigations have reported results suggesting that mood induction procedures can affect the relative accessibility of positive and negative life experience memories (e.g., Teasdale & Fogarty, 1979; Teasdale & Taylor, 1981). It may be instructive, then, to discuss briefly our finding that mood induction did not affect construct accessibility. Two explanations may account for this discrepancy. First, whereas previous researchers have examined memory for life experiences, response interference that was due to construct activation was assessed in the present study. Tulving (1972) has distinguished between these two kinds of information processing systems and has argued that memory for experiences (episodic memory) is dependent to a much greater extent on context (e.g., mood) than is memory for meaning and associations (semantic memory). The present results are fully consistent with this formulation. Second, previous investigations have examined intentional activation of memory, and it may be that this type of activation is more susceptible to changes in mood than is the automatic activation examined in this study. It remains for future research to examine these two possibilities more explicitly.

The results of this study have important implications for Beck's (1967, 1976) cognitive model of depression. Beck suggests that dysfunctional cognitions or negative schemata cause the depressed mood and other affective and somatic symptoms of depression. The difficulties of unambiguously demonstrating the fundamental causal role of cognition in depression have recently been discussed in detail by Coyne and Gotlib (1983). The present results suggest that depression-associated differences in construct accessibility are not a consequence of depressed affect. Although this finding does not constitute a direct test of Beck's causality-of-cognition hypothesis, it is nonetheless consistent with the position that negative cognition preceeds rather than follows depressed affect.

The finding in Study 1 that all subjects recalled more depressed-content than either neutral- or manic-content words was not replicated in Study 2. The most likely explanation for this discrepancy involves the method used to induce mood in Study 2. The Velten (1968) procedure requires that subjects read a series of 50 statements printed on index cards. It may be that this procedure of reading and encoding words immediately before undertaking the Stroop task produced a form of proactive interference for recall of the stimulus words. Interestingly, the direction of the difference in the mean number of words recalled by subjects in the two studies is consistent with this explanation (Study 1: \( M = 8.2 \); Study 2: \( M = 6.3 \)). In the future researchers might explore this possibility by examining differential effects of the Velten procedure and other less explicitly verbal mood induction techniques (e.g., hypnosis, free gifts) on cognitive processing.

One final issue relevant to the present study concerns the possible role played by demand characteristics (cf. Orne, 1962). Several researchers have recently questioned whether the experimental effects obtained through mood induction procedures are the result of an actual change in affect or, rather, are due to demand characteristics (e.g., Buchwald, Strack, & Coyne, 1981; Polivy & Doyle, 1980). For an experimental effect to be caused by demand characteristics, it is necessary that subjects be aware of the expected results of a manipulation and act in such a way as to confirm the perceived hypotheses. The only explicit demands of the Stroop procedure used in the present study seem to be similar to those inherent in the writing speed task used by Hale and Strickland (1976)—that is, for the depression-induced subjects to respond more slowly than normal and the elation-induced subjects to respond more quickly than normal, regardless of word type. This pattern, a main effect for group, was not found in this study, and it is unlikely, therefore, that demand characteristics played a significant role in affecting the obtained results.

General Discussion

The research reported in this article was designed to examine the relative accessibility of negative and positive trait constructs in de-
pressed and nondepressed individuals. On the basis of the work of Higgins and King (1981) and McCann and Higgins (in press), we hypothesized that depressed individuals would be characterized by a greater accessibility of negative than of positive cognitive constructs. The color-naming response latencies of depressed and nondepressed subjects on a modified Stroop task were assessed as a function of the valence of the stimulus words (i.e., positive, neutral, and negative). As predicted, depressed subjects exhibited significantly longer response latencies to negative than to positive or to neutral words, reflecting the operation in the depressed subjects of interference effects for the negative words. In contrast, nondepressed subjects evinced no such differential pattern in their reaction times. These results were interpreted as supporting the hypothesized accessibility differences between depressed and nondepressed individuals.

Study 2 was designed to further clarify the relation between depression and construct accessibility. It was suggested that rather than being due to cognitive factors associated with depression, the interference effects obtained in Study 1 may have been a function of differences in mood between the depressed and nondepressed subjects. In order to assess this possibility, Velten's (1968) mood induction procedure was used in Study 2 to experimentally induce depressed and elated mood states. In this study, initially nondepressed subjects participated in the Study 1 color-naming task after being exposed to a depressed-, elated-, or a neutral-mood induction procedure. Although subjects in these three experimental conditions responded differentially to a mood adjective check list, no group differences were found in task performance. These results suggest that the significant depression-associated effects demonstrated in Study 1 are more likely the result of cognitive than of affective differences between the depressed and nondepressed subjects. The results of these two studies together provide support for Beck's (1967, 1976) cognitive model of depression and particularly for Beck's conceptualization of negative schemata operational in this disorder.

Recent interest in factors involved in the etiology and maintenance of depression has resulted in the examination of its interpersonal (e.g., Alloy, 1982), and cognitive (e.g., Beck, 1976) antecedents, concomitants, and consequences. Perhaps the greatest proportion of research in this area has been addressed to an assessment of Beck's cognitive model of depression. According to this model, depressed individuals are characterized by the presence of a cognitive triad by which they view themselves, the world, and the future in negative terms. The depressed individual's thinking is seen to reflect automatic and systematic cognitive distortions (e.g., selective abstraction and arbitrary inference) that compound his or her current depressed state. Beck postulated that these negative cognitions are the result of the operation of negative cognitive structures, or schemata, that constitute "the basis for screening out, differentiating, and coding stimuli that confront the individual" (Beck, Rush, Shaw, & Emery, 1979, p. 13). Although a great deal of research has been cited in support of this model, little effort has been devoted to examining the nature of the mechanisms responsible for the pervasiveness of the depressed persons' cognitive distortions. The present studies represent an attempt to address this issue within the context of recent work in social cognition.

Social perception is often viewed as a process wherein the perceiver encodes incoming stimuli in terms of preexistent cognitive structures that affect the encoding, storage, and retrieval of information (cf. Taylor & Crocker, 1981). Temporary experimentally induced increases in the accessibility of certain structures or constructs have been shown to dramatically affect how incoming stimuli are processed (see McCann & Higgins, in press, and Wyer & Srull, 1981, for reviews of this work). It has been suggested, however, that individuals may also evidence more stable differences in their accessibility of cognitive constructs (cf. Higgins, King, & Mavin, 1982; McCann & Higgins, in press). One specific area to which this suggestion has been applied is that of depression. Higgins and his colleagues have postulated that depressed individuals may be characterized by highly accessible negative cognitive constructs, and the results of the present studies provide strong empirical support for this hypothesis.

It is instructive to consider the present results in relation to studies in which different
methodologies are used to assess schematic processing in depressed and nondepressed individuals. Most notably, Derry and Kuiper (1981) and Kuiper and MacDonald (1982) have conducted a series of investigations designed to delineate the parameters of depressive self-schemata. Their paradigm requires depressed and nondepressed subjects to make explicit ratings of depressed- and nondepressed-content adjectives on a number of different scales, and the time taken to make each rating is assessed. They found that depressed psychiatric patients make judgments about depressed-content adjectives as quickly as nondepressed individuals make judgments concerning nondepressed-content adjectives. In the present studies, subjects were not asked to attend to the content of the stimulus words; indeed, they were implicitly required to ignore it. The fact that even under these instructions depressed individuals exhibited interference effects for negative-content adjectives provides convergent evidence for the strength of construct accessibility in depression.

Also of interest is the absence in Study 1 of differential response latencies in the nondepressed subjects. As discussed earlier, these results may be due to the organization of accessible constructs in nondepressed individuals, or to the relative lack of salience to these subjects of the stimulus words used in this study. Although it remains for future research to address these issues more explicitly, these results are nonetheless important in light of a number of theoretical formulations whereby nondepressed persons interpret their environment in a self-enhancing manner. Lewinsohn et al. (1980), for example, have described an "illusory warm glow" evidenced by nondepressed individuals. Similarly, both Miller and Ross (1975) and Bradley (1978) have discussed the concept of "self-serving attributions," and Golin and his colleagues (e.g., Golin et al., 1977, 1979) have demonstrated an "illusion of control" in nondepressed persons. Researchers postulate that these "positivity biases" are ego-enhancing or ego-protective (cf. Alloy, 1982), and if this is in fact the case, one would not expect nondepressed individuals to demonstrate biases on tasks that do not involve threats to the subjects' egos. The task used in the present study clearly conforms to this criterion, and the absence of longer response latencies by the nondepressed subjects to the positive or manic words adds credence to this motivational formulation.

The present analysis suggests that the negative cognitions, distortions, and inferences attributed to depressed individuals may be due at least in part to the relatively greater accessibility of negative than positive constructs activated in their processing of environmental information. Moreover, this differential accessibility appears to be a function not simply of depressed mood but of more stable, cognitive factors associated with depression. These findings may have important implications for approaches to therapy with depressed persons. A number of theorists (cf. Costello, 1972; Ferster, 1974) have conceptualized depression as resulting from a low rate of positive reinforcement, and Lewinsohn (1974) has used this formulation in suggesting that therapy with depressed persons focus on increasing the amount of positive reinforcement received. The present results suggest that this approach to therapy may be less effective than postulated because depressed individuals may not be primed to perceive reinforcement in their environment. The present findings also suggest that the efficacy of cognitive therapies that are based upon rational thought-testing procedures (e.g., Beck et al., 1979; Ellis, 1973) will be increased if these therapies are complemented by techniques designed explicitly to alter the relative accessibility to depressed individuals of positive and negative constructs. It remains for researchers in the future to examine these postulations.

Finally, two limitations of the present results warrant comment. First, subjects in these two studies were university students, some of whom were experiencing mild depression. A number of investigators have cautioned that empirical results obtained with this population may not be generalizable to more clinical forms of depression (e.g., Depue & Monroe, 1978; Gotlib, 1984; Gotlib & Asarnow, 1979). Before implications of the present findings for the understanding of clinical depression can be advanced, therefore, it is important that these results be replicated with a sample of clinically depressed individuals. Second, the studies reported in this article did not address the issue of the specificity of differential construct accessibility to depression. It is possible that
greater accessibility to negative than to positive constructs is not specific to depression, but rather is characteristic of global psychopathology. In the future, researchers must examine this issue, assessing construct accessibility in individuals demonstrating forms of psychopathological behavior other than depression. The results of these investigations, in conjunction with those of the present studies, promise to further elucidate the nature of cognitive functioning in depression, leading to a more comprehensive understanding of this disorder.

References


