

# Self-Referent Versus Other-Referent Information Processing in Dysphoric, Clinically Depressed, and Remitted Depressed Subjects

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## ABSTRACT

Two studies examined the processing of responses directed toward the self versus others by dysphoric, clinically depressed, and remitted depressed subjects. Study 1 showed that dysphoric subjects found positive and negative responses toward the self equally informative. Nondysphoric subjects found positive responses toward the self more informative than negative responses. When responses were directed toward others, dysphoric subjects found positive responses more informative than negative responses. In contrast, nondysphoric subjects found positive and negative responses directed toward others equally informative. Study 2 replicated these results with clinically depressed versus nondysphoric subjects. Study 2 also showed that remitted depressed subjects found positive responses more informative than negative responses, regardless of whether they were directed toward the self or toward others. Results suggest that positive and negative constructs are differentially accessed by dysphoric, clinically depressed, remitted depressed, and nondysphoric subjects when processing information directed toward the self versus others.

Research has consistently revealed that, in contrast with nondysphoric individuals, dysphoric subjects identify more negative attributes as self-descriptive (e.g., Gotlib & Olson, 1983; Kuiper, 1982; Pietromonaco & Markus, 1985; Tabachnik, Crocker, & Alloy, 1983), recall more negative events from the past (DeMonbreun & Craighead, 1977; Dobson & Shaw, 1981; Lishman, 1972; Lloyd & Lishman, 1975), and provide more pessimistic predictions about the future (Garber & Hollon, 1980; Hammen & Krantz, 1976). According to Beck (1967, 1976), depressive information processing stems from the activation of pathological cognitive structures or schemas. Depressive schemas develop early in life in response to acutely stressful experiences such as the perception of parental rejection or emotional deprivation. Once established, negative schemas about the self, the world, and the future may become activated during adulthood in response to similarly stressful experiences. The activation of negative schemas is believed to produce various

cognitive errors (e.g., arbitrary inference, selective abstraction, magnification and minimization) and to result in a systematic negative bias in self-referent information processing.

A fundamental assumption of Beck's (1967, 1976) theory is that the activation of depressive schemas interferes with the processing of positive information related to the self. This assumption has also been adopted by several contemporary theorists who have extended, elaborated, and modified Beck's theory on the role of the self in depression. For example, Kuiper and his colleagues (Derry & Kuiper, 1981; Kuiper & MacDonald, 1982) suggested that negative content in the self-representations of dysphoric individuals facilitates more efficient processing of negative rather than positive self-referent information. More recent models have argued that dysphoric and nondysphoric individuals do not differ in the extent to which positive and negative self-constructs are available in memory (i.e., construct availability) but, rather, differ in the readiness with which these self-constructs are invoked during information processing (i.e., construct accessibility; Bargh & Tota, 1988; Gotlib & McCann, 1984).

The common theme across these models is that self-reference is an important determinant of depressive and nondepressive information processing. In one of the earliest studies to test this hypothesis, Hoehn-Hyde, Schlottman, and Rush (1982) asked depressed psychiatric patients, remitted depressed patients, and nondepressed controls to rate the amount of positive, negative, and neutral content in videotaped scenes depicting common social interactions. Depressed subjects consistently rated social interactions less positively when they imagined that the interactions were directed toward themselves versus others. In contrast, nondepressed subjects rated the interactions more positively when they imagined the interactions were directed toward themselves versus others. In a more recent study, Bargh and Tota (1988) found that negative constructs were more accessible for dysphoric than for nondysphoric subjects only during the processing of self-referential information. Such findings are consistent with the results of other studies in suggesting that processing biases in depression are restricted to self-referent information and involve inhibited processing of positive information and/or facilitated processing of negative information (Greenberg & Alloy, 1989; Martin, Abramson, & Alloy, 1984; Pietromonaco & Markus, 1985; Pyszczynski & Greenberg, 1987; Sweeney, Shaeffer, & Colin, 1982). In contrast, nondysphoric subjects have been characterized as possessing a positive *cognitive set* or orientation to the self that inhibits the processing of negative information related to the self (see Taylor & Brown, 1988).

Not all studies, however, have found that depressive information processing is restricted to the self. For example, Alloy and Ahrens (1987) asked dysphoric and nondysphoric subjects to estimate the likelihood that positive events (making the dean's list) versus negative events (being put on academic probation) would occur in the future for themselves versus others. Compared to nondysphoric subjects, dysphoric subjects were more pessimistic in their forecasts for both themselves and others. Tabachnik et al. (1983) also found that dysphoric subjects' evaluations of themselves and others were equally negative. Evidence of a pervasive processing bias for self and others is difficult to reconcile with the cognitive model of depression and recent developmental models that emphasize the emergence of avulnerable self as a precondition to dysphoria and depression (Higgins, 1989; Moretti & Higgins, 1990).

There are several factors that contribute to the disparity in research findings. To date, studies have used a variety of samples ranging from subjects exposed to negative mood induction (e.g., Gotlib & McCann, 1984, Study 2) to dysphoric college students (e.g., Bargh & Tota, 1988; Tabachnik et al., 1983) and clinically depressed psychiatric patients (e.g., Derry & Kuiper, 1981; Hoehn-Hyde et al., 1982). Although these approaches have been valuable in assessing the degree to which processing biases may occur in different populations and whether these biases can be induced experimentally, it is likely that these samples differ in important ways other than depression that influence their performance on processing tasks. The responses of subjects who have been exposed to negative mood induction are unlikely to be influenced by the same intensity of negative mood and history of negative life experiences as are the responses of clinically depressed individuals. Dysphoric subjects may experience a broad range of subclinical symptoms beyond the diagnostic category of depression and, therefore, differ considerably from clinically depressed subjects (Quiner, Schmidt, & Metalsky, 1994; Kendall, Hollon, Beck, Hammen, & Ingram, 1987). Studies have not included multiple samples to allow for direct comparison of performance on the same measures. The present research included nondysphoric, dysphoric, clinically depressed, and remitted depressed individuals to assess how similar and different processing biases are in these different samples.

Equivocal research findings may also reflect the fact that previous studies have varied in the types of processing conditions that they have examined. Some studies have compared dysphoric versus nondysphoric subjects under self-referential processing conditions (e.g., Dobson & Shaw, 1987), whereas others have focused on processing biases associated with self-reference versus

other-reference. To delineate the specific conditions under which processing biases take place, it is necessary to include conditions in which dysphoria and depression should influence processing, as well as conditions in which it should not influence processing. In this regard, it is interesting to note that there is a growing movement toward understanding depression within an interpersonal context (Blatt & Zuroff, 1992; Coyne, 1976b; McCann, 1990; Safran, 1990). From this theoretical perspective, dysphoria and depression are expected to influence the processing of all interpersonal information, including interpersonal information directed toward self and others. Therefore, in research examining processing biases, it may be important to include conditions that are interpersonally relevant, as well as conditions that are not interpersonally relevant, to determine whether processing biases are circumscribed or pervasive. In the current study, we evaluated biases in the processing of the same information in self-referent, other-referent, and control conditions to determine the conditions under which dysphoria and depression influence information processing.

Finally, discrepancy in previous research findings may reflect the wide range of tasks used to assess processing biases. Research has typically assessed response latencies and recall patterns for positive and negative personality adjectives (e.g., Bargh & Tota, 1988; Gotlib & McCann, 1984; Kuiper & Derry, 1982; Kuiper & MacDonald, 1982). Although this research has produced interesting findings, these stimuli do not tap the broader self-other interpersonal context in which depression often takes place (Segal, 1988). In the current research, we introduced a new methodology for examining biases in the processing of interpersonally relevant information. Specifically, we examined the degree to which dysphoric and nondysphoric subjects perceived positive versus negative expressions as interpersonally informative and the speed with which they identified these expressions under three conditions: (a) when responses were directed toward the self, (b) when responses were directed toward a generalized other, and (c) when responses were directed neither toward the self nor toward others. In each condition, subjects were tachistoscopically presented with a series of stimuli consisting of two pictures of the same target. In one picture, the target displayed a neutral expression; in the other picture, the target displayed a positive or negative expression. Stimuli were presented for 300 ms. Subjects were instructed to identify the picture of the target that was most informative about how the target felt about the subject (self-referent condition) or about another person (other-referent condition). In the control condition, subjects identified the picture of the target that displayed the highest degree of emotion. Subjects were instructed to respond as quickly as possible, and

response latencies and target selection were recorded. Response latencies provided an indication of the ease with which subjects made decisions and, presumably, the accessibility of constructs during processing (Higgins & King, 1981). Target selection provided an indication of the direction of bias during information processing.

Cognitive models commonly suggest that processing biases are more likely to influence responses when objective information about a stimulus is limited, ambiguous, or both (Higgins & King, 1981; Neisser, 1967). For this reason, brief exposure periods were used in this experiment. This procedure limited extended observation of stimulus characteristics that may have overridden processing biases. The pairing of targets displaying a neutral response with targets displaying a positive or negative response was also used to increase the likelihood of detecting subtle processing biases. When nondysphoric subjects are presented with positive versus negative responses toward the self and then asked to indicate which response is more informative, a powerful processing bias may be required to consistently override the compelling stimulus characteristics of negative responses in preference of positive responses. When the alternative stimulus is neutral, however, biases toward or against particular categories of emotional responses may be more likely to be detected. If nondysphoric subjects consistently identified neutral responses as more informative than negative responses when this contradicts the objective level of information provided by the two responses, this would reveal a bias against the identification of negative self-referent information.

## STUDY 1

In the first study, we predicted that dysphoric subjects in the self-referent condition would perceive positive responses as equally informative, or perhaps even as less informative, than negative responses in revealing how others felt about them. Corresponding predictions were made regarding the speed of processing; dysphoric subjects were expected to identify positive responses to the self no more quickly, or perhaps even more slowly, than negative responses. In contrast, we predicted that nondysphoric subjects would perceive the positive responses of others as more informative than negative responses in revealing how others felt about them. Nondysphoric subjects were expected to identify positive responses to the self significantly more quickly than negative responses.

Dysphoric and nondysphoric subjects were also expected to differ in how they processed positive and negative information directed toward others. Taylor and Brown (1988) concluded that nondysphoric individuals view the world in an overly positive manner only with respect to themselves, whereas this may not be true for

dysphoric subjects. We predicted that dysphoric subjects would perceive positive responses that were directed toward others as more informative than negative responses, and that they would identify positive responses to others significantly more quickly than negative responses. In contrast, nondysphoric subjects were expected to perceive positive and negative responses directed toward others as equally informative and to identify positive and negative responses to others with equal speed. Finally, we expected that the perceived informativeness and processing speed of dysphoric and nondysphoric subjects would not differ when they processed information that was directed neither toward the self nor toward others.

### Method

#### SUBJECTS

Participating in the study were 30 dysphoric (15 males, 15 females) and 30 nondysphoric (15 males, 15 females) undergraduates. Subjects with scores of 0 to 8 on the Beck Depression Inventory (BDI; Beck, Ward, Mendelson, Mock, & Erbaugh, 1961) were classified as nondysphoric, and subjects with scores of 9 or greater were classified as dysphoric. This threshold was originally established to indicate mild depression (Beck, Steer, & Garbin, 1988), although this level of depressive affect is more appropriately captured by the label *dysphoria* (Kendall et al., 1987). Mean BDI scores were 12.74 ( $SD = 3.25$ ) for the dysphoric group and 2.83 ( $SD = 2.03$ ) for the nondysphoric group. Analysis of possible sex differences in level of dysphoria indicated that males and females were similar in their reports of symptoms in both groups,  $F(1, 59) = 0.98, p > .05$ . Males and females in the dysphoric group reported comparable levels of symptoms ( $M_s = 11.87$  and  $13.67$ , respectively). Males and females in the nondysphoric group also reported comparable levels of symptoms ( $M_s = 2.67$  and  $3.00$ , respectively).

#### EXPERIMENTAL TASK

Subjects were simultaneously presented with two pictures of the same target. In one picture, the target displayed a neutral expression; in the other picture, the target displayed either a positive or a negative expression. Stimuli were selected from Ekman's (1976) series of pictures of facial emotions. This series of 110 black-and-white pictures consists of photographs of 14 posers, each displaying six emotional expressions as well as a neutral expression. Ekman reported that subjects correctly identify emotional expressions with 70-100% accuracy.

In the current study, pictures of targets with happy open-mouth expressions, sad open-mouth expressions, and neutral expressions were selected to create two-picture stimulus arrays. Each picture was positioned on one half of a stimulus card, approximately two degrees from

the center. Side of presentation of the emotional face was determined randomly. Seven practice trial cards and two sets of 13 stimulus cards were created in this manner. Presentation of the stimulus cards within each set followed a fixed-random order.

Stimulus cards were presented to subjects via a two-field tachistoscope. Before each trial, subjects were asked to fixate on a central point in their visual field that was marked by the illumination of a centrally positioned single red light for a period of 750 ms. Termination of the fixation light triggered the presentation of the stimulus card for a period of 300 ms and the onset of a reaction time clock. This was immediately followed by the re-presentation of a white visual field. Depressing one of two response keys stopped the reaction time clock. Pilot testing was completed to establish an exposure duration that would ensure a moderate overall level of accuracy of identification. With an exposure duration of 300 ms, the overall level of accuracy of identification was 72.5%.

#### TARGET IDENTIFICATION TASK

Subjects were randomly assigned to one of three experimental conditions. In the self-referent condition, subjects were asked to make forced-choice judgments about the pictures from a self-referent perspective. Self-reference was induced by providing subjects with the following instructions:

In viewing these photographs, please try to imagine as vividly as possible that you are involved in a social interaction with the person in the photograph. Try to imagine that these pictures reflect emotional responses to your behavior-to something you have said or done-in a social interaction with this person. . . . [Y]our task is to identify the face reflecting the strongest emotional response to you-that is, the face that tells you the most about how this person feels about you.

Subjects pressed one of the two response keys to indicate whether they believed the photograph on the right or the photograph on the left was the most informative.

In the other-referent condition, subjects received instructions designed to induce other-reference. They were instructed to view the pictures as if they were emotional responses to a third party. They were also told that their task was to take the role of an objective observer or social scientist and to identify the face reflecting the strongest emotional response to a third party-that is, "the face that tells you the most about how this person feels about someone else." Subjects assigned to the control condition were simply asked to identify the picture displaying the highest degree of emotion.

#### DEPENDENT MEASURES

The first dependent measure was perceived interpersonal informativeness--that is, the number of times that

a positive or a negative response was identified as conveying the most information about how the target felt about the subject (self-referent condition) or someone else (other-referent condition), or the number of times that the response was identified as conveying the highest degree of emotion (control condition). The second dependent measure was response latency—that is, the amount of time required by subjects to identify the target requested in the instructions that they received.

#### MANIPULATION CHECK

On a 7-point scale (ranging from 1 = *Extremely unsuccessful* to 7 = *Extremely successful*), subjects in the self-referent condition and the other-referent condition rated how successful they were in adopting a self-referent or other-referent perspective. They also evaluated on a 7-point scale (ranging from 1 = *Extremely difficult* to 7 = *Extremely easy*) how difficult they found the task.

#### PROCEDURE

Subjects completed the experiment individually. Upon arrival, subjects were told that the experiment investigated the perception of facial emotion, and then they were randomly assigned to one of the three experimental conditions. After completing the BDI, subjects were seated in front of the tachistoscope and provided with appropriate experimental instructions. Two nontachistoscopically presented trials were completed to ensure that subjects fully understood the instructions. This was followed by the tachistoscopic presentation of 7 practice trials and two sets of 13 experimental trials. The two sets of experimental trials were separated by a brief 3-min rest period, during which time the instructions were repeated. After completing the task, subjects in the self- and other-referent conditions completed the manipulation check. Subjects were then fully debriefed.

#### Results

Two 2 x 3 x 2 ANOVAs with two between-subject factors (dysphoria: dysphoric, nondysphoric; condition: self-referent, other-referent, control) and one within subject factor (target affect: positive, negative) were completed with perceived informativeness and log-transformed reaction time as dependent variables. Logarithmic transformation was performed on reaction-time scores because of dependency between the mean and standard deviation.

With respect to perceived informativeness, this analysis produced significant main effects for condition,  $F(2, 54) = 9.93, p < .0002$ , and target affect,  $F(1, 54) = 28.44, p < .0001$ . These effects indicated that subjects perceived both positive and negative expressions as less informative in the self-referent ( $M = .64$ ) than in the other-referent ( $M = .80$ ) or the control ( $M = .84$ ) conditions, and that subjects perceived positive expressions as more informa-

tive ( $M = .84$ ) than negative expressions ( $M = .68$ ). No other lower order effects reached significance. As predicted, a significant Dysphoria x Condition x Target Affect interaction effect emerged for perceived informativeness,  $F(2, 54) = 5.60, p < .006$ .

With respect to reaction time, significant main effects were found for depression,  $F(1, 54) = 7.95, p < .007$ , condition,  $F(2, 54) = 4.44, p < .02$ , and target affect,  $F(1, 54) = 46.50, p < .0001$ . These effects indicated that dysphoric subjects ( $M = 1,069$  ms) responded more slowly than did nondysphoric subjects ( $M = 887$  ms); that all subjects responded more slowly in the self-referent ( $M = 1,146$  ms) than in the other-referent ( $M = 919$  ms) or control ( $M = 868$  ms) conditions; and that all subjects responded more slowly when identifying negative ( $M = 1,067$  ms) than positive ( $M = 889$  ms) expressions. No other lower order effects reached significance. As predicted, a significant Dysphoria x Condition x Target Affect interaction effect emerged for reaction time,  $F(2, 54) = 5.34, p < .008$ . Analyses of nontransformed reaction-time scores produced comparable results.

Each hypothesis was tested by computing specific two-way Dysphoria x Target Affect simple effect ANOVAs within each condition for each dependent variable. When these interaction effects proved significant, planned comparisons were completed.

#### SEU-REFERENT INFORMATION PROCESSING

As predicted, the hypothesis that dysphoric and nondysphoric subjects would process self-referent positive and negative information differently was confirmed by the significant Dysphoria x Target Affect interaction effect within the self-referent condition on the perceived informativeness,  $F(1, 18) = 5.26, p = .03$ , and response latency,  $F(1, 18) = 6.65, p = .02$ , dependent variables. As Tables 1 and 2 show, dysphoric subjects perceived positive and negative responses as nearly equally informative when directed toward the self ( $M_s = .63$  and  $.58$ , respectively),  $t(18) = 0.50, p > .05$ , and they identified positive and negative expressions in this condition with comparable speed ( $M_s = 1,342$  ms and  $1,283$  ms, respectively),  $t(18) = 0.39, p > .05$ . In contrast, nondysphoric subjects in the self-referent condition perceived positive expressions as more informative than negative expressions ( $M_s = .85$  and  $.48$ , respectively),  $t(18) = 3.71, p < .01$ , and they identified positive expressions significantly more quickly than negative expressions in this condition ( $M_s = 791$  ms and  $1,169$  ms, respectively),  $t(18) = 3.95, p < .01$ .

#### OTHER-REFERENT INFORMATION PROCESSING

We also predicted that dysphoric and nondysphoric subjects would differ in how they processed positive and negative responses directed toward others. This prediction was supported by a significant Dysphoria x Target Affect interaction effect within the other-referent condi-



TABLE 1: Perceived Informativeness of Expressions for Dysphoric and Nondysphoric Subjects in the Self-Referent, Other-Referent, and Control Conditions, Study 1

Condition and Group	Target Affect	
	Positive	Negative
Self-referent		
Dysphoric	.63	.58
Nondysphoric	.85a	.45b
Other-referent		
Dysphoric	.87a	.65b
Nondysphoric	.86	.83
Control		
Dysphoric	.91a	.75b
Nondysphoric	.94a	.75b

NOTE: Above numbers indicate mean percentages of positive and negative expressions identified as more informative than neutral responses (e.g., in the self-referent condition, nondysphoric subjects identified 85% of positive expressions as more informative than neutral expressions but only 48% of negative expressions as more informative than neutral expressions). Means within rows with different subscripts differ significantly at .05 or less. All comparisons are within group and condition.

TABLE 2: Response Latencies (in ms) for the Identification of Expressions by Dysphoric and Nondysphoric Subjects in the Self-Referent, Other-Referent, and Control Conditions, Study 1

Condition and Group	Target Affect	
	Positive	Negative
Self-referent		
Dysphoric	1,341.77	1,283.19
Nondysphoric	790.63a	1,169.2b
Other-referent		
Dysphoric	866.79a	1,105.42b
Nondysphoric	782.09a	921.31b
Control		
Dysphoric	854.79a	965.00b
Nondysphoric	699.73a	956.28b

NOTE: Means within rows with different subscripts differ significantly at .05 or less. All comparisons are within group and condition.

tion for perceived informativeness,  $F(1, 18) = 4.46, p < .05$ , and a marginally significant interaction for response latency,  $F(1, 18) = 3.17, p = .09$ . As Tables 1 and 2 indicate, dysphoric subjects perceived positive expressions as significantly more informative than negative responses when they were directed toward others ( $M$ 's = .87 and .65, respectively),  $t(18) = 3.43, p < .01$ , and they identified positive expressions more quickly than negative expressions in this condition ( $M$ s = 867 ms and 1,105 ms, respectively),  $t(18) = 4.97, p < .001$ . In contrast, nondysphoric subjects perceived positive and negative re-

sponses as equally informative when they were directed toward others ( $M$ 's = .86 and .83, respectively),  $t(18) = 0.44, p > .05$ . Nonetheless, nondysphoric subjects identified positive expressions more quickly than negative expressions when they were directed toward others ( $M$ 's = 782 ms and 921 ms, respectively),  $t(18) = 2.41, p < .05$ .

#### PROCESSING INFORMATION IN THE CONTROL CONDITION

We did not expect dysphoric and nondysphoric subjects to differ in their processing of positive and negative responses in the control condition. The Dysphoria x TargetMfect interaction effect within the control condition was not significant for either dependent variable—perceived informativeness:  $F(1, 18) = 0.15, p > .05$ ; response latency:  $F(1, 18) = 2.54, p > .05$ . As Tables 1 and 2 show, both dysphoric and nondysphoric subjects in the control condition perceived positive expressions as more informative than negative expressions (dysphoric subjects:  $M$ s = .91 and .75, respectively; nondysphoric subjects:  $M$ s = .94 and .75, respectively), and they identified positive expressions more quickly than negative expressions in this condition (dysphoric subjects:  $M$ s = 855 ms and 965 ms, respectively; nondysphoric subjects:  $M$ s = 700 ms and 956 ms, respectively).

#### MANIPULATION CHECK

A two-way ANOVA with dysphoria and condition as between-subjects factors did not produce significant main or interaction effects between dysphoria, condition, and target affect for perceived task difficulty or perceived performance. These results indicate that dysphoric and nondysphoric subjects did not differ in the extent to which they believed that adopting a self-referent perspective was difficult ( $M$ s = 4.9 and 4.3, respectively) or in how successful they felt they were in adopting this perspective ( $M$ s = 4.8 and 4.5, respectively). Similarly, dysphoric and nondysphoric subjects did not differ in the extent to which they believed that adopting an other-referent perspective was difficult ( $M$ s = 5.3 and 5.7, respectively) or in how successful they felt they were in adopting this perspective ( $M$ s = 4.7 and 5.3, respectively).

#### Discussion

The results of this study indicate that dysphoric subjects perceived self-referent positive and negative expressions as equally informative, and they identified these expressions with equal speed. When information was directed toward a generalized other, dysphoric subjects perceived positive expressions as significantly more informative than negative expressions, and they identified positive expressions significantly more quickly than negative expressions.

These results suggest that dysphoria may be associated with inhibition in the processing of positive information that is directed toward the self. Because of this inhibition, dysphoric subjects appear to process positive and negative self-referent information with equal efficiency. This finding is consistent with numerous studies documenting an evenhanded attributional style in dysphoric and clinically depressed individuals (Miller, 1976; Miller & Moretti, 1988; Miller & Ross, 1975). The results also show that whereas dysphoric individuals have difficulty processing positive information directed toward the self, these difficulties do not arise when they process positive information that is directed toward others. The inhibition or the reduced accessibility of positive constructs occurs only in relation to the self. This finding is consistent with previous research and models of construct accessibility in depression (Higgins & King, 1981; Pietromonaco & Markus, 1985; Spielman & Bargh, 1990; Sweeney et al., 1982).

In contrast to dysphoric subjects, we found that nondysphoric subjects perceived self-referent positive expressions as significantly more informative than negative expressions and that they identified self-referent positive expressions significantly more quickly than negative expressions. In contrast, when information was directed toward a generalized other, nondysphoric subjects perceived positive and negative expressions as equally informative.

These results provide further support for the view that nondysphoric subjects have a positive cognitive set or orientation to the self that facilitates efficient processing of positive information but inhibits the processing of negative self-referent information (Taylor & Brown, 1988). These findings are also consistent with the widespread conclusion that nondysphoric individuals show self-serving attributional and information processing biases (Miller, 1976; Miller & Moretti, 1988; Miller & Ross, 1975; Taylor & Brown, 1988).

Finally, as predicted, dysphoric and nondysphoric subjects did not differ significantly in their processing of positive and negative information that was not directed toward the self or toward a generalized other. The fact that dysphoric and nondysphoric subjects did not differ in the control conditions further supports the notion that results in the self-referent and other-referent conditions are due to fluctuations in the accessibility of positive and negative constructs rather than differences in the availability of these constructs in memory. More important, the fact that dysphoric subjects demonstrated processing biases only in the interpersonally relevant conditions (self-referent and other-referent), and not in the control condition, further supports the importance of understanding dysphoria and *depressive cognition* within an interpersonal context.

## STUDY 2

Our results provide support for models of depression that assign a unique role to the self and that emphasize the interpersonal context of depression. It is important to note, however, that the use of college populations in research on depression has been strongly criticized (e.g., Coyne & Gotlib, 1983). The relationship between dysphoria and clinical depression is not well understood. Beck (1967) suggested that as depression worsens, self-schemas become increasingly dominated by negative content. Kuiper and his colleagues (Kuiper, Olinger, & MacDonald, 1989) showed that the self-schemas of clinically depressed individuals are more consistently negative in content than are the self-schemas of nondysphoric individuals. From a construct accessibility perspective, increasing levels of depression may further inhibit the processing of positive self-referent information and may even facilitate the processing of negative self-referent information. In contrast to dysphoric subjects, clinically depressed subjects may show a pronounced bias toward more efficient processing of negative than positive self-referent information. This possibility was examined in Study 2, using a sample of clinically depressed subjects.

The increasing severity of negative mood in clinical depression may also increase the pervasiveness of information processing biases. Beck (1967) suggested that this occurs because information processing becomes more completely dominated by intrusive negative schemas: "As these idiosyncratic schemas become more active, they are evoked by a wider range of stimuli which are less logically related to them" (Beck, Rush, Shaw, & Emery, 1979, p. 13). If negative constructs are frequently activated, they are likely to become chronically accessible, thereby increasing the probability that they will be indiscriminately activated during information processing (Higgins & Moretti, 1988). Thus, in clinically depressed individuals, it is possible that processing biases extend beyond the self and influence the processing of other-referent and interpersonally irrelevant information in a similar manner. This possibility was also examined in the second study.

Finally, in Study 2, we included a remitted depressed group of subjects to determine whether the processing biases found in Study 1 are stable vulnerability markers of depression or transient correlates of the disorder that disappear during remission. Research on the persistence of cognitive characteristics of depression during periods of remission has produced mixed results. Teasdale and Dent (1987) found that women who had recovered from a depressive episode continued to show poorer recall of self-referent positive words and recalled more negative self-descriptions when exposed to a negative mood induction than did nondysphoric subjects. Eaves and Rush (1984) also found that remitted depressed subjects con-



tinued to show cognitive features exhibited during periods of depression. Other studies, however, have failed to find such evidence. Dobson and Shaw (1987), for example, did not find a self-referent encoding bias in remitted depressed subjects. Blackburn and Smyth (1985) also failed to find a difference between recovered depressed subjects and nondysphoric subjects in the frequency of negative cognitions they expressed while induced into a mildly negative mood. Similar failures to find evidence of enduring cognitive features of depression have been reported by Fennel and Campbell (1984), Hamilton and Abramson (1983), Lewinsohn, Steinmetz, Larson, and Franklin (1981), Silverman, Silverman, and Eardley (1984), and Wilkinson and Blackburn (1981).

If the processing biases of depression co-occur with the disorder and are not present in remitted depressed individuals, they may play a distal rather than proximal role in depression relapse (Beck, 1991), or they may be of limited importance in understanding the etiology and recurrent course of the illness (Barnett & Gotlib, 1988; Coyne & Gotlib, 1983). Some investigators have suggested that it is premature to conclude that depressive cognitions are simply correlated features of the disorder because of conceptual and methodological limitations of the research completed to date (Beck, 1991; Kuiper, Olinger, & Martin, 1990; Miller & Moretti, 1988; Teasdale & Dent, 1987). Researchers have been encouraged to examine the persistence of cognitive features of depression in situations that are most likely to activate relevant cognitive structures and processes. The methodology employed in the current study may be promising in this regard because it involves the processing of interpersonal information, a domain of functioning that is highly relevant to depression relapse (Barnett & Gotlib, 1988; McCann, 1990).

## Method

### SUBJECTS

A total of 81 subjects participated in the second study. Clinically depressed subjects ( $n = 27$ ) were recruited from both inpatient and outpatient clinical services of the Clarke Institute of Psychiatry, Toronto, Ontario. Patients were individually assessed for depression using the Schedule for Affective Disorders and Schizophrenia-Lifetime Version. (SADS-L; Endicott & Spitzer, 1978). Diagnostic interviews were conducted by a graduate student trained in conducting the interview. Interrater reliability for the diagnosis of depression was established on a subset of cases. Results indicated 100% agreement on the diagnosis of Major Depressive Disorder (MOD) between the interviewer and one of the authors who has been trained on the SADS. The depressed sample included 13 males and 14 females (mean age = 39.81 years) who met the *DSM-m* (American Psy-

chiatric Association, 1980) criteria for MOD and whose BDI scores ranged from 11 to 43 ( $M = 24.07$ ).

Remitted depressed subjects ( $n = 27$ ) were selected from a longitudinal study of psychological factors predicting relapse (Segal, Shaw, & Vella, 1989). All subjects were individually assessed using the SADS-L to establish that a prior episode of clinical depression had occurred within the past year but that subjects had been symptom free for the past 3 months. The remitted sample included 10 males and 17 females (mean age = 41.37 years) whose BDI scores ranged from 0 to 11 ( $M = 5.04$ ). The number of prior episodes of MDD in the remitted group ranged from 1 to 15, and 9 of the 27 subjects relapsed into MOD within 6 months following the study (see Segal et al., 1989).

Nondysphoric subjects were recruited from hospital employees at the Clarke Institute. All subjects were individually screened using the SADS-L to establish that they did not have a history of past psychiatric illness and did not show indications of a psychiatric disturbance at the time of the study. The nondysphoric control group included 4 males and 23 females (mean age = 28.70 years) whose BDI scores ranged from 0 to 6 ( $M = 2.00$ ).

Analysis of possible sex differences in the severity of depressive symptoms revealed a significant main effect for sex,  $F(1, 62) = 6.09, p < .02$ , and a significant sex by group interaction,  $F(2, 62) = 5.62, p < .006$ . Females in the clinically depressed group reported significantly higher levels of depressive symptoms than did males ( $M_s = 28.87$  and  $19.50$ , respectively),  $F(1, 21) = 7.64, p < .01$ . In the nondepressed group, females did not differ from males in the level of depressive symptoms that they reported ( $M = 2.04$  and  $1.50$ , respectively),  $F(1, 21) = .77, p > .05$ . Similarly, females in the remitted group did not differ from males in the level of depressive symptoms that they reported ( $M = 5.19$  and  $5.80$ , respectively),  $F(1, 21) = .03, p > .05$ . The Sex  $\times$  Group  $\times$  Condition interaction effect did not reach significance,  $F(4, 62) = 1.08, p > .05$ , indicating that the pattern of male and female reports of depressive symptoms for each group did not differ among conditions.

### PROCEDURE

As in Study 1, all subjects completed the experiment individually. Subjects were randomly assigned to one of the three experimental conditions upon entering the experiment. They completed the diagnostic interview and the BDI before completing the experiment, following the procedure outlined for Study 1.

### Results

Two  $3 \times 3 \times 2$  ANOVAs with two between-subject factors (depression: clinically depressed, remitted depressed, nondysphoric; condition: self-referent, other-

referent, control) and one-within subject factor (target affect positive, negative) were completed with perceived informativeness and reaction time as dependent variables.

With respect to perceived informativeness, the 3 x 3 x 2 ANOVA produced significant main effects for depression,  $F(2, 72) = 4.35, p < .02$ , and target affect,  $F(1, 72) = 48.90, p < .0001$ , indicating that depressed subjects perceived expressions as less informative than did remitted depressed or nondysphoric subjects ( $M_s = .71, .80$ , and  $.86$ , respectively) and that all subjects perceived positive expressions as more informative than negative expressions ( $M_s = .87$  and  $.71$ , respectively). All other lower order effects did not reach significance. As predicted, a significant Depression x Condition x Target Affect interaction effect emerged for perceived informativeness,  $F(4, 72) = 2.50, p < .05$ .

With respect to reaction time, a significant main effect emerged for depression,  $F(2, 72) = 7.12, p < .002$ , indicating that the response times of depressed subjects were significantly longer than those for nondysphoric subjects ( $M_s = 1,146$  ms and  $837$  ms, respectively),  $t(72) = 2.57, P < .025$ . Remitted depressed subjects also tended to have longer reaction times than nondysphoric subjects ( $M_s = 1,030$  ms and  $837$  ms, respectively),  $t(72) = 1.68, p = .10$ . A significant main effect also emerged for target affect,  $F(2, 72) = 125.74, p < .0001$ , indicating that all subjects identified positive expressions more quickly than negative expressions ( $M_s = 884$  ms and  $1,121$  ms). All remaining lower order interactions did not reach significance. Contrary to our prediction, the three-way Depression x Condition x Target Affect interaction did not reach significance,  $F(4, 72) = 0.93, p > .05$ . It may be that the extremely slow reaction times of clinically depressed and remitted depressed subjects reduced the sensitivity of this dependent variable in detecting processing biases.

Further analyses were completed for the perceived informativeness variable only. Each hypothesis was tested by computing depression by target affect simple effect ANOVAs within each condition. When these interaction effects proved significant, planned comparisons were completed.

#### SELF-REFERENT INFORMATION PROCESSING

Results showed that the perceived informativeness of positive and negative responses differed for clinically depressed, remitted depressed, and nondysphoric controls in the self-referent condition, as indicated by a marginally significant Depression (Clinically Depressed, Remitted Depressed, Nondysphoric) x Target Affect interaction effect,  $F(2, 24) = 2.39, p = .11$ . As Table 3 shows, clinically depressed subjects in the self-referent condition perceived positive and negative responses as equally informative ( $M_s = .67$  and  $.67$ , respectively),  $t(24) = 0.00, p > .05$ . In contrast, nondysphoric subjects in the self-

TABLE 3: Perceived Informativeness of Expressions for Clinically Depressed, Remitted Depressed, and Nondysphoric Subjects in the Self-Referent, Other-Referent, and Control Conditions, Study 2

Condition and Group	Target Affect	
	Positive	Negative
Self-referent		
Clinically depressed	.67	.67
Remitted depressed	.90a	.61b
Nondysphoric	.91a	.76b
Other-referent		
Clinically depressed	.89a	.69b
Remitted depressed	.96a	.67b
Nondysphoric	.91	.85
Control		
Clinically depressed	.77a	.57b
Remitted depressed	.90a	.77b
Nondysphoric	.94a	.78b

NOTE: Above numbers indicate mean percentages of positive and negative expressions identified as more informative than neutral responses (e.g., in the self-referent condition, nondysphoric subjects identified 91% of positive expressions as more informative than neutral expressions but only 76% of negative expressions as more informative than neutral expressions). Means within rows with different subscripts differ significantly at .05 or less. All comparisons are within group and condition.

referent condition perceived positive responses as significantly more informative than negative responses ( $M_s = .91$  and  $.76$ , respectively),  $t(24) = 2.11, p < .05$ . These results replicate the findings of Study 1. Remitted depressed subjects showed a pattern of performance that was similar to that of nondysphoric subjects. They perceived positive self-referent responses as more informative than negative responses ( $M_s = .90$  and  $.61$ , respectively),  $t(24) = 4.05, p < .0005$ .

#### OTHER-REFERENT INFORMATION PROCESSING

A significant depression (clinically depressed, remitted depressed, nondysphoric) by target affect interaction effect also emerged within the other-referent condition,  $F(2, 24) = 3.98, p = .03$ . Clinically depressed subjects, like dysphoric subjects in Study 1, perceived

positive responses as significantly more informative than negative responses when they were directed toward others ( $M_s = .89$  and  $.69$ , respectively),  $t(24) = 2.82, p < .01$ . In contrast, nondysphoric subjects perceived positive and negative responses toward others as equally informative ( $M_s = .91$  and  $.85$ , respectively),  $t(24) = 0.77, p > .05$ , as did nondysphoric subjects in Study 1. The pattern for remitted depressed subjects in the other-referent condition was similar to that of clinically depressed subjects. Remitted depressives perceived positive responses toward others as significantly more informative than negative responses ( $M_s = .96$  and  $.67$ , respectively),  $t(24) = 4.10, p < .0001$ .

*PRJCESSING INFORMATION  
IN THE CONTROL CONDITION*

As predicted, clinically depressed, remitted depressed, and nondysphoric subjects did not significantly differ in how informative they found positive and negative expressions in the control condition,  $F(2, 24) = .52$ ,  $p > .05$ . As Table 3 shows, all subjects perceived positive expressions as more emotionally informative than negative expressions in the control condition. These results replicate the findings of Study 1.

*MANIPULATION CHECK*

A  $3 \times 2$  ANOVA (depression: clinically depressed, remitted depressed, nondysphoric; condition: self-referent, other-referent) revealed that all main and interaction effects involving depression were not significant. These results indicate that the groups did not differ in the extent to which they believed that adopting a self-referent perspective was difficult ( $M_s = 3.0, 3.9, \text{ and } 5.2$ , respectively) or in how successful they felt they were in adopting this perspective ( $M_s = 3.0, 4.0, \text{ and } 4.1$ , respectively). Similarly, clinically depressed, remitted depressed, and nondepressed subjects did not differ in the extent to which they believed that adopting an other-referent perspective was difficult ( $M_s = 4.9, 4.6, \text{ and } 3.9$ , respectively) or in how successful they felt they were in adopting this perspective ( $M_s = 5.0, 4.6, \text{ and } 4.2$ , respectively).

*Discussion*

The results of Study 2 replicate the findings of our first study. Clinically depressed subjects, like dysphoric subjects, perceived positive and negative responses as equally informative when directed toward the self, but they perceived positive responses as significantly more informative than negative responses when directed toward others. In contrast, nondysphoric subjects perceived positive responses as significantly more informative than negative responses when directed toward the self, but they perceived positive and negative responses as equally informative when directed toward others.

In some ways, remitted depressed subjects resembled nondysphoric subjects. Like nondysphoric subjects, remitted depressed subjects perceived positive responses as significantly more informative than negative responses when they were directed to the self. However, unlike nondysphoric subjects, remitted depressed subjects also perceived positive responses as more informative than negative responses when directed toward others.

Finally, clinically depressed, remitted depressed, and nondysphoric subjects did not differ in how informative they found positive and negative expressions when these responses were not directed toward the self nor toward others. As in Study 1, all subjects in this condition per-

ceived positive expressions as more informative than negative expressions.

*GENERAL DISCUSSION*

The results of the current research indicate that dysphoric and clinically depressed subjects process positive and negative interpersonal information in a similar manner: Both groups perceive positive and negative responses as equally informative when they are directed toward the self, yet they perceive positive responses as more informative than negative responses when they are directed toward others. In contrast, nondysphoric subjects perceive positive responses that are directed toward the self as more informative than negative responses, yet they perceive positive and negative responses as equally informative when they are directed toward others.

Our results are consistent with previous research in suggesting that the self within an interpersonal context plays a critical role in depressive information processing. The findings also support the notion that depressive information processing reflects fluctuations in the accessibility rather than availability of positive and negative constructs in memory. It does not appear that depressed subjects have a greater or fewer number of positive constructs available for information processing as compared to nondysphoric subjects. Rather, the pattern of construct accessibility differs for depressed and nondysphoric subjects in self-referent and other-referent processing conditions. In contrast to nondysphoria, both dysphoria and clinical depression is more clearly associated with the absence of a tendency to favor positive over negative self-referent information rather than with the presence of a tendency to favor negative information over positive information. Negative responses were never perceived as more informative than positive responses, even by clinically depressed subjects. These results are consistent with the view that dysphoria and depression are negative psychological situations that involve the absence of positive attributes or outcomes (i.e., loss) rather than the presence of negative attributes or outcomes (i.e., threat; Beck, 1976; Higgins, 1987; Moretti & Higgins, 1990). The relative difficulty of dysphoric and clinically depressed individuals to readily identify positive responses directed toward the self may reflect underlying problems within the self-system such as the presence of self-discrepancies or low levels of self-complexity (Higgins, 1987; Linville, 1985; Moretti, Higgins, & Feldman, 1990; Pyszczynski & Greenberg, 1987). In contrast, nondysphoric individuals readily identify positive responses directed to the self, perhaps reflecting underlying self-representational structures that facilitate the processing of this information.

Our results raise some interesting questions about the processing of interpersonal information during periods of remission from depression. The remitted depressed subjects showed a pervasive tendency to view positive responses as more informative than negative responses regardless of whether they were directed toward the self or toward others. On one hand, this seems to have beneficial and protective effects for psychological well-being (see Taylor & Brown, 1988). On the other hand, clinicians are often concerned that clients are at risk for relapse when they make a quick "flight into health" accompanied by an overly rosy view of the world. It is commonly believed that this type of psychological adjustment is fragile and may easily break down in the face of stress. We know that 33% of our remitted sample relapsed into major depression within 6 months of the study, and it is likely that several more subjects have relapsed since then. It seems naive to conclude that an overly positive bias is effective in maintaining psychological health. It may be that individuals who remit from depression attempt to accentuate positive information, to defend against negative information, or both. When stress becomes overwhelming and when attentional resources are not available to maintain this perspective, remitted depressed individuals may decompensate. An alternative explanation is that because remitted depressive individuals perceive positive responses as more informative than negative responses, regardless of whether they are directed toward the self or toward others, this does not allow for favorable self-other comparisons. This may reduce important opportunities for increasing and/or maintaining self-esteem (Swallow & Kuiper, 1988; McCann, 1990). Studies that follow individuals through periods of depression, remission, and relapse would be informative in this regard.

Despite the fact that the results of these two studies are highly similar and provide compelling evidence that dysphoria and depression are associated with biases in the processing of interpersonally relevant information, there are several limitations we wish to highlight. First, it is important to note that the methodology we developed only estimates how individuals may process interpersonal information in real-life contexts. This task lacks many aspects of real-life interpersonal encounters that temper how individuals experience and respond to interpersonal exchanges. Furthermore, we compared the processing of information directed toward the self versus a generalized other. It is quite likely that different results would be found if one compared how individuals process information directed toward the self versus familiar others (Prentice, 1990). A recent study by Gara and Woolfolk (1993) indicated that clinically depressed individuals described themselves, their parents, and significant others as possessing fewer positive aspects and more

negative aspects than did nondysphoric psychiatric control subjects. Future studies are needed to develop more sensitive measures of interpersonal information processing and to evaluate why interpersonal closeness influences the pervasiveness of processing biases. A related issue is that the processing of interpersonal information by dysphoric and clinically depressed individuals takes place within a social context that contains information about repeated interpersonal experiences. It is possible that the patterns we have labeled as *mases* are in fact a true reflection of the base rates of positive versus negative responses that depressed individuals experience in their day-to-day lives. There is considerable research indicating that this may be the case (e.g., Coyne, 1976a; Hammen & Peters, 1978; Joiner, Alfano, & Metalsky, 1992). Therefore, it is important that these results be understood as a description of patterns of processing interpersonal information rather than distortions in information processing. Further studies are needed to delineate the conditions in which individuals' previous experiences introduce biases and distortions in their processing of new information.

A second limitation of the study is the fact that sex differences were not fully investigated. In the first study, equal numbers of male and female subjects were included, and they reported comparable levels of depression in the dysphoric and nondysphoric groups. In the second study, however, females in the clinically depressed group reported a higher level of symptoms than did males in this group. Recent models of depression in women have emphasized the differential importance of interpersonal relations in defining the self for women versus men (Jordan & Surrey, 1986). If this is indeed the case, one would expect that depressed females may differ from depressed males in how they process positive and negative interpersonal information. Further studies are needed to identify how males and females differ in their processing of interpersonal information.

Finally, we have used the term *accessibility* to refer to the readiness with which constructs are used in the processing of information. Our measures of accessibility were ratings of perceived informativeness and reaction time. Reaction time may be influenced by a number of factors, however, such as decisions to respond in one way or another. For this reason, researchers have moved toward using paradigms that tax attentional demands to limit the influence of controlled decisions on reaction time (Bargh, 1992). These procedures were not used in the current study, and attempts should be made to do so in future work. It is also important to note that our results did not show reaction time to be a sensitive measure in Study 2, because clinically depressed and remitted depressed individuals were generally quite slow in responding. It may be that psychomotor slowness

masks processing biases associated with clinical depression, or a recent history of clinical depression, and reaction time is, therefore, not a sensitive measure in these cases.

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