Processing Positive and Negative Stimuli in Depression

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Processing Positive and Negative Stimuli in Depression

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Abstract

In this dissertation two studies were completed investigating differences in information processing between depressed and nondepressed individuals. Study one evaluated the hypotheses that depressives process positive information less efficiently than negative information and that nondepressives process positive information more efficiently than negative information. Twenty depressed and 20 nondepressed subjects were tachistoscopically presented with a series of stimulus cards each displaying two pictures of the same target individual (one with a neutral expression and one with a happy or sad expression). Subjects were instructed to identify the side of presentation which displayed either 1) the more emotional face (Emotional Condition); or 2) the more neutral face (Neutral Condition). The results of Study one did not reveal the hypothesized information processing differences between nondepressed and depressed individuals.

Study two evaluated the role of self-reference in processing positive and negative stimuli by depressed and nondepressed individuals. Thirty depressed and 30 nondepressed subjects completed the experimental task employed in Study one under one of three conditions.

In the 'Self' condition, subjects were instructed to view the target's emotional expressions as responses to the self and to identify the face that provided the most information about how the target person felt about the subject. In the 'Other' condition subjects were instructed to view the target's emotional expressions as responses to others and to identify the face that provided the most information about how the target felt about an imagined third party. Subjects in the control condition were simply instructed to identify the more emotional face.

In the self-referent condition, depressives most clearly distinguished themselves from nondepressives by less efficient processing of positive information. The depressives' failure to demonstrate enhanced processing of positive relative to negative information led them to appear more 'evenhanded' in processing self-referent information of different valences. In the other-referent condition, nondepressives did not demonstrate a bias toward processing positive information more efficiently than negative information. In contrast, depressives in this condition processed positive information more efficiently than negative

information. The implications of these findings for understanding the depressives' social interactions and cognitive vulnerability to depression are discussed.

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Cognitive Mediators of Information Processing in Depression

Current models of depression emphasize the significance of cognitive processes and argue that these processes precipitate and/or maintain a depressive episode. The most influential of these models is that of Aaron Beck (1967; 1976). Beck's model of depression, derived from case study and clinical observation, is largely responsible for the development of cognitive therapy for the treatment of depression (Beck, Rush, Shaw & Emery, 1979). The central premise of Beck's model is that depression results from the development of cognitive schemata which operate to distort information processing.

A second cognitive account of depression is the reformulated learned helplessness attribution model (Abramson, Seligman & Teasdale, 1978). Although less influential in the clinical sphere then Beck's, the reformulated helplessness theory has generated considerable research. The pivotal assumption of the reformulated attribution model is that causal analysis is central to both the onset and clinical course of depression.

The models of Beck and Abramson et al. will now be reviewed in detail. Following this review, the relation of the supporting evidence to information processing issues will be considered.

Beck's Model of Depression

The concepts of 'cognitive schemata' and 'schema-driven' information processing are central to Beck's model. Schemas are stable, organized cognitive structures that develop early in life and determine how information is processed.

Early life experiences have a direct and powerful impact on the development of schemata by determining accommodative structures to which all subsequent experience will be assimilated. These cognitive structures organize information about the self, the world and the future. Once schemas are developed, the importance of new experiential information is reduced because information is filtered through preexisting cognitive structures. Later experiences are primarily significant in the amount of stress they present to the individual.

Beck clearly identifies pathological cognitive structures as primary in the development of depression. Vulnerability to depression results from the development of negative schemas regarding the self, the world and the future. Negative schemas may be relatively inactive and dormant during asymptomatic

periods; however they are primed and become operative during periods of stress, particularly stress stemming from deprivation or rejection.

Activation of negative schemata results in the displacement of more appropriate cognitive processes and the disruption of processes involved in reality testing and attaining self-objectivity. Beck (1967) has postulated, for example, that the absence of anger in depression occurs because schemas relevant to blaming others are displaced by the activation of self-blame schemas. The extent to which functional processes are disrupted is directly related to the severity of the depressive episode.

The depressives' 'errors' in cognitive functioning are seen as distinct from the occasional inaccuracy and inconsistency of everyday cognitive processes because they represent a <u>systematic bias</u> against the individual. Beck (1967) identifies three classes of cognitive errors that occur in depression: paralogical, stylistic, and semantic. Paralogical errors (drawing erroneous or inappropriate conclusions) include drawing conclusions (a) in the absence of evidence or in the face of contradictory evidence (arbitrary inference);

(b) on the basis of irrelevant details often interpreted out of context (selective abstraction); or (c) from an inadequate or nonrepresentative data base (overgeneralization). Stylistic errors include the systematic magnification or minimization of events or information leading to negative evaluations. Finally, semantic errors are defined as the erroneous or inappropriate labelling of events or outcomes on the basis of affective reactions rather than on the basis of the actual intensity or importance of the event itself.

Empirical Support for Beck's Cognitive Model

Several predictions are derived from Beck's model. First, Beck predicts that depressives are characterized by negative schemas about the self, the world, the past and the future. The content of depressive schemas is focused around themes of personal inadequacy, helplessness, and hopelessness. Once primed, these schemas operate to negatively bias the processing of information. Specifically, these negative distortions are seen as cognitive errors which impair processes related to reality testing and attaining self-objectivity. The degree of negative distortion is

expected to intensify with increasing severity of depression. Finally, Beck proposes a causal relationship between cognition and depression: the greater the cognitive vulnerability the more likely are subsequent depressive episodes. Empirical support for these predictions will now be reviewed.

Negative View of the Self

There is clear evidence that depressives negatively evaluate themselves. Both depressed college students and depressed psychiatric populations manifest lower self-esteem than nondepressed populations (Sacco & Hokanson, 1978). Beck (1967) noted that while only 37% of a nondepressed psychiatric patients reported feelings of self-dislike and self-reproach, this was true for 87% of depressed psychiatric patients. The proclivity to perceive oneself in a negative light is a central symptom in the diagnosis of depression (American Psychiatric Association, Diagnostic and Statistical Manual of Mental Disorders, 1980).

The recent research of Kuiper and his colleagues has been helpful in the delineation of the role of self-schema in depression (see Kuiper, Olinger & MacDonald, 1985). Kuiper distinguishes two parameters

of the self-schema that are important in understanding depression. First, he suggests that the content of the schema influences information processing. The content-specific parameter of the model predicts that depth of processing will be greater for information that is congruent with the content of the self-schema than for incongruent information. Increased depth of processing will produce higher levels of recall. Second, Kuiper proposes that schemas facilitate efficient processing of schema-consistent information. Efficient processing is reflected in lower reaction times for decisions regarding congruent than incongruent information.

Kuiper and his colleagues have completed several studies that support both the content-specificity and efficiency hypotheses of their model. Derry and Kuiper (1981) had clinical depressives and nondepressed controls make a series of self-referent judgments about a list of depressed- and nondepressed-content adjectives. In support of the content-specificity hypothesis, the incidental recall of depressives reflected enhanced memory only for depressed-content adjectives. Nondepressed controls showed enhanced

recall only for nondepressed-content adjectives. This pattern of results was replicated by Kuiper and MacDonald (1982). In this latter study, depressed and nondepressed groups were also found to differ in how efficiently they processed depressed- and nondepressed-content information. Depressives showed significantly longer reaction times for 'no' than 'yes' decisions for depressed content adjectives. In contrast, nondepressives displayed shorter reaction times for 'yes' decisions to nondepressed-content adjectives than for 'yes' decisions for depressed-content adjectives. These results support the hypothesis that schema-congruent information is processed more efficiently than schema-incongruent information by both clinical depressives and nondepressed controls.

Severity of depression appears to be a important determinant of the effects of self-schema on information processing. Kuiper and Derry (1982) found that mild depressives did not show the enhanced recall for depressed-content adjectives that is evident in clinically depressed populations. Rather, mild depressives displayed equivalent recall for both depressed- and nondepressed-content adjectives.

Conversely, nondepressives recalled more nondepressed- than depressed- content words. In addition, mild depressives took longer to make self-referent judgments than nondepressives (Kuiper & MacDonald, 1982). The finding that mild depressives show impaired processing of both positive and negative information suggested a disorganized self-structure.

Beck hypothesized that the depressives' negative view of the self is organized around themes of personal inadequacy. There is a fair amount of support for the contention that depressives negatively evaluate their performance on achievement and interpersonal tasks.

Gotlib and Olson (1983) asked depressed and nondepressed psychiatric patients to rate their satisfaction with their performance on a nonsense-syllable task. Consistent with Beck's model, depressives reported less satisfaction with their performance than nondepressives, even though the performance level of the two groups was not significantly different. These findings are consistent with numerous other reports indicating that when depressives demonstrate comparable task performance to nondepressives they tend to evaluate their performance

more negatively than do nondepressives (Loeb, Beck & Diggory, 1971; Lobitz & Post, 1979; Smolen, 1978; Wollert & Buchwald, 1979; Zarantonello, Johnson & Petzel, 1979).

There are several potential explanations for the depressives' negative appraisal of their performance. One possibility is that depressives differ from nondepressives in their perception of positive and negative feedback. For example, depressives may be more likely than nondepressives to perceive objectively 'positive' feedback as having either a neutral or negative valence. Alternatively, it may be that depressives correctly 'identify' positive and negative feedback but differ in the standards they apply to appraise their overall performance (Hammen & Krantz, 1976; Higgins, Klein & Strauman, 1985; Golin & Terrell, 1977). Thus, even though depressed and nondepressed individuals share similar perceptions as to the valence of feedback, depressives apply more stringent standards in their personal appraisal. Finally, depressives may differ from nondepressives in their personal evaluations because of a differential accessibility of negative relative to positive information from memory.

Increased accessibility of negative relative to positive information may create a appraisal context that leads to lower performance evaluations.

A few studies have attempted to distinguish between these alternative hypotheses. Nelson and Craighead (1977) provided depressed and nondepressed college students with either positive or negative feedback for performance on a nonsense syllable task. While the two groups did not differ in their identification of positive and negative feedback, depressives subsequently recalled being reinforced on fewer trials under the positive reinforcement condition than did nondepressives. In a similar study, Dobson and Shaw (1981) found that although depressed and nondepressed college students did not differ on any measure evaluating the valence of feedback at the time it was received, depressives subsequently underestimated the amount of positive feedback they received under the high positive feedback condition. Further, the depressives' negative bias in recall persisted despite self-correction procedures which forced subjects to compare their ratings of feedback with the actual feedback received.

The findings of Nelson and Craighead and Dobson and Shaw suggest that depressives do not differ from nondepressives in how they identify positive and negative feedback. It is not clear, however, whether depressives' negative recall bias is due to the types of standards they use to evaluate their performance or the relative accessibility of positive and negative information from memory.

Negative self-schemas also pertain to information relevant to one's interpersonal skills. In an early study (Hammen and Krantz, 1976) depressed and nondepressed students evaluated their performance as role-play therapists after receiving positive or negative feedback from the experimenter. Regardless of the quality of feedback received, depressives consistently rated their level of interpersonal skill more negatively than did nondepressives. Depressive psychiatric patients also evaluate themselves as less socially confident and skilled and more socially anxious than nondepressed psychiatric patients (Lunghi, 1977).

Gotlib (1982) had depressed and nondepressed psychiatric patients, and nondepressed psychiatric

controls engage in a brief 15 minute dyad interaction. Videotapes were subsequently rated on a number of social skill and interpersonal style dimensions by blind judges. Subjects also reviewed and evaluated their own performance according to the level of social skill they believed they had demonstrated. Both psychiatric groups administered fewer self-reinforcements and more self-punishments than controls. This pattern of results remained significant when observer-rated estimates of social skill were statistically held constant.

Stone (1981) found that depressed and nondepressed individuals correctly identified the positive and negative feedback they received concerning their social skills in brief dyad interactions. However, depressives underestimated the amount of positive feedback they had previously received when asked to recall this information some time later.

How valid are the depressives' beliefs about themselves? Beck suggests that depressives are unrealistic in their self-appraisals. Krantz and Hammen (1979) have developed a self-report questionnaire to assess cognitive distortions in

depressive thought. The Cognitive Bias Questionnaire (CBQ) presents subjects with a series of brief scenarios and instructs them to select one of four possible responses that most accurately describes what they would think, feel and do in each situation. Each response is categorized in terms of both depression and distortion as follows: nondepressed-nondistorted; nondepressed-distorted; depressed-nondistorted; depressed-distorted. Several studies with both college and clinical populations have found that depressives select significantly more depressed and distorted responses on the CBQ (Blaney, Behar & Head, 1980; Hammen, 1978; Krantz & Hammen, 1979). A recent adaptation of this scale for use with children and adolescents was also successful in discriminating between depressed and nondepressed psychiatric patients (Haley, Fine, Marriage, Moretti & Freeman, 1985).

While intriguing, these results do not provide direct support for Beck's notion of distortion. As Coyne and Gotlib (1983) point out, the CBQ relies on responses to hypothetical events and may say little about how depressives respond to real life events. The research of Coyne and his colleagues suggests that

depressives may be more accurate than nondepressives in their self evaluations. Coyne contends that the depressives' tendency to evaluate themselves negatively accurately reflects their social experience. In Coyne's (1976) words, the depressives' "'distortions' and 'misconceptions' are congruent with the social system in which the depressed person ... finds himself" (pg. 35).

In support of this position, Coyne (1976) has found that subjects who engaged in a phone conversation with a clinically depressed person reported feeling significantly more depressed, anxious, hostile, and less willing to engage in future interactions than subjects who engaged in conversation with a nondepressed target person. These results have been replicated by Rhode (1982), who also found that depressed target persons received less social approval and were responded to with less genuineness, empathy and respect than nondepressed target persons.

Other studies have evaluated the accuracy of depressive evaluations more directly. As previously noted, Nelson and Craighead (1977) found that depressives consistently recalled less positive and

more negative feedback under positive feedback conditions than did nondepressives. Contrary to Beck's predictions, however, depressed students were more accurate in their recall of reinforcement than were nondepressives who underestimated the frequency of negative reinforcement they had received. Depressed psychiatric patients, however, did underestimate the actual amount of positive feedback they received under positive feedback conditions (DeMonbreun & Craighead, 1977), suggesting that the negativity bias may only occur in more severe levels of depression.

Lewinsohn, Steinmetz, Larsen and Franklin (1981) directly evaluated the accuracy of the depressives' social perceptions. Depressed and nondepressed psychiatric patients and nondepressed controls participated in four 45-minute group interactions which were rated on several dimensions of social skill. Subjects also rated themselves on these dimensions immediately following each group session. As predicted, depressed patients initially perceived themselves as less socially skilled than did nondepressed patients and controls. More interestingly, while all groups tended to rate

themselves more positively than they were rated by observers, depressed patients' self-ratings were more consistent with observer-ratings than were those of either of the nondepressed groups. Further, self-ratings of depressives became more desirable with treatment, although they did not change significantly from observer-ratings. Lewinsohn et al. (1981) concluded that depression is characterized more by the absence of an illusory "warm glow" than by the presence of a distorted world view.

What viable explanations can be raised to explain the apparent accuracy of depressive evaluations? One strong possibility, raised by Coyne and Gotlib (1983), is that the depressives' estimates simply match actual objective contingencies more closely than the estimates of nondepressives.

In summary, current research provides strong support for Beck's hypothesis that depression is characterized by a negative view of the self. It is not clear, however, that these perceptions are the result of distortion in information processing. In fact, it has been suggested that depressives may be more accurate than nondepressives in their personal evaluations.

Negative View of the World

According to Beck, depression is accompanied by a negative view of the world in addition to a negative view of the self. Although research evaluating this aspect of Beck's model is limited, some attempts have been made to determine how depressives view their social world. If, as Beck suggests, a negative bias pervades the depressive's view of the world, social responses from others should be perceived negatively and others should be evaluated from a negative perspective.

Hoehn-Hyde, Schlottman and Rush (1982) had depressed psychiatric patients, remitted patients and nondepressed normal controls rate videotaped scenes depicting common social interactions with positive, negative and neutral content. In the "self condition", subjects were instructed to view the videos as if the comments were directed to themselves while in the "other condition" subjects were to view the videos as if the comments were directed to another person. Depressives consistently evaluated social interactions more negatively when directed toward themselves than toward a third party. In contrast, nondepressives

rated interactions more positively when directed toward themselves than toward a third party. These findings suggest that not only do depressives perceive social communication directed to themselves more negatively than do nondepressives, but depressives also feel they are in a unique position in this regard.

Similar conclusions were reached by Martin, Abramson and Alloy (1984). They found that depressives perceived themselves as unable to control outcomes on a objectively noncontingent task while maintaining the belief that such outcomes could be controlled by others. Lunghi (1977) noted that depressives underestimated their own performance but overestimated the performance of others. Finally, Tabachnik, Crocker and Alloy (1982) found that depressed college students rated negative personal adjectives as more true of themselves than positive adjectives, and indicated that this asymmetric profile characterized themselves more than the "average college student". In contrast, nondepressed students consistently enhanced themselves by rating negative personal adjectives as less true of themselves than the "average college student". Kuiper and Cole (1983) have replicated these findings.

The foregoing research does not support Beck's predictions that depressives have a global negative view of the world. Rather, negative perceptions are restricted to the self. To adopt Martin et al.'s (1982) terminology, depressives suffer from a sense of personal rather than universal inadequacy.

Negative View of the Past and Future

Beck proposes that depressives also view the past and the future negatively. Memories are selectively recalled and negatively distorted to be consistent with the depressives' current negative self-perceptions. As depressives look to the future, they project their current self-perceptions and anticipate failure and rejection. This produces an overwhelming feeling of helplessness and hopelessness.

Current research supports the contention that recall of negative events is enhanced during periods of depression. Depressed psychiatric patients, unlike nondepressed patients, show relatively shorter latency periods for recall of unpleasant than pleasant events. Further, latency for recall of negative events decreases with increased severity of depression (Lishman, 1972; Lloyd & Lishman, 1975).

Memoric sensitivity effects have also been produced using mood-induction techniques. Nondepressed subjects exposed to negative mood-induction conditions were found to retrieve pleasant memories more slowly and less frequently than were nondepressed subjects exposed to elation mood-induction conditions (Teasdale & Fogarty, 1979; Teasdale, Taylor & Fogarty, 1980). Similarly, subjects in a sad mood were found to recall more information about a sad character than a happy character in previously presented stories (Bower, Gilligan & Monterio, 1981).

Research evaluating depressive expectations about the future indicates depressives' expectations depend on whether they are asked to speculate about their own future or on the future of others. With regard to the self, depressives hold lower expectations for future success and demonstrate smaller increases in expectancy following success than nondepressives (Garber & Hollon, 1980; Klein & Seligman, 1976; Lobitz & Post, 1979; Loeb, Beck & Diggory, 1971; Miller & Seligman, 1973, 1976; Miller, Seligman & Kurlander, 1975). They also demonstrate lower expectancies for peer affection and future success on social skills tasks following failure (Hammen & Krantz, 1976).

While holding negative expectations for themselves, depressives often hold positive expectancies for others. For example, both depressed students and depressed psychiatric patients expected more success in a dice game when the croupier threw the dice for them than when they threw their own dice. In contrast, nondepressed subjects expected more success when they threw their own dice (Golin, Terrell & Johnson, 1977; Golin, Terrell, Weitz & Drost, 1979). Similarly, Garber and Hollon (1980) found that depressives held higher expectancies for others following their success than they did for themselves following their own success.

The existing evidence indicates that depressives do not expect <u>global</u> failure, but rather <u>personal</u> failure. Such results suggest that the issue of depressive expectations is more complicated than originally proposed by Beck and highlight the importance of the 'self' in understanding depressive information processing.

The Causal Potency of Cognitions

As previously noted, Beck clearly specifies that depressive cognitions precede and are causally related to the development of depression. This prediction has received little empirical support. Lewinsohn et al. (1981) investigated the causality of depression-related cognitions over a period of a year. Contrary to Beck's predictions, expectancies for positive and negative events at time one were not predictive of depression one year later. Furthermore, individuals with a history of depressive illness were no more likely to show evidence of depressive cognitive style than individuals with no history of the disorder. Depression-related cognitions did, however, correlate with level of concurring depression at both time one and time two. In addition, individuals endorsing depression-related cognitions tended to experience longer depressive episodes than those who did not endorse these cognitions.

In considering these data it is important to note that Beck maintained that depressive schemata typically remain inactive during asymptomatic periods. Thus, Beck would not necessarily predict that depressive

cognitive style would differ from that of nondepressive during asymptomatic periods. For this reason, it is extremely difficult to test the predictive validity of Beck's theory.

Learned Helplessness Model of Depression

On the basis of the similarity between symptoms demonstrated by animals in "helplessness" inducing conditions and the major symptoms of human depression, Seligman (1975) proposed a model of depression which featured the individual's perception of response-outcome contingency. Specifically, the learned helplessness model predicts that the belief in noncontingency between one's behaviors and outcomes is sufficient to produce both motivational deficits (retardation of voluntary responses, passivity, social withdrawal, intellectual slowness) and cognitive deficits (inability to detect response-outcome contingency).

For many reasons, this model has received widespread criticism. First, as Buchwald, Coyne and Cole (1978) pointed out, learned helplessness research simply failed to consistently demonstrate that expectations of noncontingency either generalized across situations and time, or consistently was associate with negative affect. This latter finding was problematic for Seligman since the relevance of the model to depression in humans could not be established

unless induced helplessness was accompanied by depressed mood. Second, the model failed to account both for lowered self-esteem as a symptom of depression and for the fact that depressives appeared to assume response-outcome contingency for negative outcomes (Beck, 1967; Rizley, 1978).

Other criticisms include Depue and Monroe's (1978) claim that Seligman failed to address the heterogeneity of depressive disorders. While Seligman proposed that his model was most relevant for reactive depression (disorders which are precipitated by a stressful event) Depue and Monroe argued that neurotic premorbid personality factors were more relevant to the diagnosis of reactive depression. Further, Seligman's almost exclusive use of college populations is based on the unsubstantiated assumption that mild and more severe depressive disorders vary quantitatively rather than qualitatively.

Reformulated Helplessness Model

As a result of these criticisms, Abramson et al. (1978) proposed an attributional reformulation of the original learned helplessness model. One major aspect of the revision to the model is the proposal that negative

mood is predicted only when outcomes are perceived to be both desirable and unattainable through one's actions; or as both aversive and unavoidable through one's actions. The central premise of the reformulation is that the kinds of causal attributions individuals generate to explain their perceived lack of control determines whether they develop symptoms of depression. Three attributional dimensions are outlined. First, lack of control can be attributed to either internal or external causes. Internal attributions produce lowered self-esteem. Second, lack of control can be attributed to recurrent, stable factors or to temporary, unstable factors. Stable attributions produce the expectation of uncontrollability in the future and are accompanied by a sense of hopelessness, motivational and cognitive deficits. This latter prediction of the reformulated model is the one most directly relevant to understanding the clinical course of depressive disorders. Finally, lack of control can be attributed to either global or specific causes. Global attributions produce the expectation of lack of control across a variety of situations. This dimension of the

model is relevant to the issue of generalization of cognitive and motivational deficits across situations.

According to the reformulated model, the expectation that events are uncontrollable is causally related to the development of depression. Specific symptoms of the depressive episode are determined by the type of attributions that are generated to explain the perceived lack of control. Three characteristics are central to determining vulnerability to depression: (a) a tendency to perceive events as uncontrollable; (b) a tendency to set unrealistic and unattainable goals; and (c) a bias towards attributing uncontrollable events to internal, stable and global causes.

The reformulated model does not address the issue of how individual differences in vulnerability develop. Life events are viewed as significant only in so far as they contribute to initial helplessness inducing experiences. Once an individual fails to perceive response-outcome contingency and attributes this to internal, stable and global factors, cognitive deficits will inhibit the perception of objective contingencies in subsequent experiences. The reformulated model does

not speculate on why only some individuals are prone to see important outcomes as beyond their control or due to internal, stable and global causes.

Empirical Support for the Reformulated Helplessness Model

Several predictions are derived from the reformulated helplessness model. First, this model predicts that depressives are not as proficient as nondepressives in detecting response-outcome contingency. Second, depressives are expected to attribute negative events to internal, stable and global causes. Abramson et al. (1978) have termed this characteristic manner of causal analysis as "depressive attributional style". In contrast, nondepressives are expected to attribute negative events to external, unstable and specific causes.

The reformulated model does not make predictions about the type of causal attributions depressives generate to explain positive events. There is good reason to believe, however, that depressives and nondepressives differ in their attributions for positive events as well. It is now well established that there is a tendency for people to take more causal

responsibility for success than for failure (Zuckerman, 1979). Miller and Ross (1975) have termed this the self-serving attributional bias. The attribution of positive events to oneself could reasonably be expected to reduce vulnerability to depression. Depressives may aggravate their disorder by their failure to attribute positive events to internal, stable and global causes.

The reformulated model specifies that failure to perceive response-outcome contingency and depressive attributional style cause depression. Thus, evidence of these "vulnerability markers" should 1) be associated with depression level, and 2) predict the onset and course of a depressive episode. Evidence for these predictions will now be reviewed. In the first section, evidence that depressives show deficits in judgments of contingency will be reviewed. Studies comparing the causal attributions of depressed and nondepressed individuals will be organized into three categories: 1) attributions for hypothetical events; 2) attributions for stressful life experiences; and 3) attributions for performance on experimental tasks.

Judgments of Contingency

Estimates of control in nondepressed populations depend on the valence of the event under consideration: control is judged to be significantly higher for positive than negative events (Langer, 1975). Recent studies probing associative deficits predicted by the reformulated attribution model indicate that depressives may differ from nondepressives in their estimates of control, at least under some conditions.

In one of the first studies to address this question, Golin et al. (1977) found that nondepressives provided higher estimates of control following positive than negative feedback. Depressives failed to show this self-serving bias. When asked to provide estimates of control for a target person, however, depressives showed a "other-serving" bias comparable to the self-serving bias of nondepressives. That depressives failed to generalize their pattern of self-disserving estimates of control to others suggests they perceived the task as personally rather than universally uncontrollable. Clinically depressed patients, on the other hand, do appear to generalize their self-disserving pattern of estimates of control to others (Golin, et al., 1979).

Alloy and Abramson (1979) compared the response-outcome contingency estimates of depressed and nondepressed individuals in a series of four studies. When contingency existed between subjects' responses and their outcomes on the experimental task, estimates of both depressed and nondepressed subjects closely approximated objective contingencies. However, when subjects engaged in objectively uncontrollable experimental tasks, the two groups provided divergent estimates. Nondepressives overestimated control for success and underestimated control for failure. In contrast, depressives provided relatively accurate estimates of control under both conditions.

This limited body of research indicates that depressives do perceive events as less controllable than do nondepressives, but only under conditions of noncontingency. Even more problematic to the reformulated model is the fact that when depressives perceive events as less controllable than nondepressives, they appear more accurate in their evaluation than do nondepressives.

Attributions for Hypothetical Events

A number of studies have compared the causal attributions that depressed and nondepressed individuals offer for hypothetical events. The most popular instrument used in this research is the Attributional Style Questionnaire (ASQ) developed by Seligman, Abramson, Semmel and von Baeyer (1979). The ASQ presents individuals with 12 hypothetical interpersonal or achievement-oriented situations which yield either positive or negative outcomes. For example, a respondent is asked to imagine that "you meet a friend who compliments you on your appearance" (positive interpersonal item), or that "you can't get all the work done that others expect of you" (negative achievement item). For each situation, subjects are requested to identify the cause most responsible for the occurrence of the event. Having done this, they are asked to use 7-point Likert scales to assess three dimensions of the cause: 1) its internality (Is the cause of ... due to something about you or something about the other person or circumstances?); 2) its stability (In the future when ... will this cause again be present?); 3) its globality (Is the cause something

that just affects ... or does it also influence other areas of your life?). These measures yield three attributional indices (internality, stability, globality) for both positive and negative outcomes.

The ASQ in College Populations

Most ASQ studies have used college populations. In the first of these studies, Seligman et al. (1979) found that self-rated depression on the Beck Depression Scale (BDI) (Beck, 1967) correlated positively with the internality, stablity and globality of attributions for negative outcomes, and with the externality, instability and specificity of attributions for positive outcomes. Feather (1983) has recently replicated this pattern of results. Other ASQ studies have not provided as clear a picture of the relation between attributional patterns and depression. Golin, Sweeney and Schaeffer (1981) only partially replicated the earlier findings of Seligman and his colleagues. They did find that self-reported depression correlated positively with the internality, stability and globality of attributions for negative events, but in the case of positive outcomes, only the internality measure showed the predicted relation to depression.

Moreover, Golin et al note that their results generally were less robust than those of Seligman et al. (1979). Cutrona, Russell and Jones (1985) also reported a weak relationship between responses on the ASQ and depression. In their sample of over one thousand students, they found that responses on the ASQ accounted for only 4% of the variance in depression scores. The results of Blaney et al., (1980) are similarly mixed. Consistent with the earlier research, depression was positively correlated with the stability and globality of attributions for negative outcomes, but, in contrast to earlier research, the internality of attributions for negative outcomes was not associated with depression.

Peterson, Schwartz and Seligman (1981) used the ASQ as well as 12 negative events selected from the Life Events Questionnaire (Marx, Garrity & Bower, 1975) to study the relation between depression and characterological and behavioral self-blame (Janoff-Bulman, 1979). Characterological blame implicates enduring, global characteristics of the self, whereas behavioral blame focuses on unstable and specific characteristics. The results indicated that

scores on the BDI correlated negatively with the degree of behavioral self-blame for negative events, but positively with the degree of characterological self-blame for such outcomes. The responses to neither the behavioral nor the characterological attributional probes were associated with depression in the context of positive outcomes.

Janoff-Bulman's (1979) study assessed the causal attributions of depressed and nondepressed students for four negative hypothetical situations. The two groups did not differ in behavioral self-blame but depressives did assume more characterological self-blame. In other words, depressives were more likely than nondepressives to blame stable and global aspects of their core "self" for negative events.

The ASQ in Clinical Populations

Studies using the ASQ in clinical populations have yielded mixed results. Raps, Peterson, Reinhard, Abramson and Seligman (1982) reported that depressed psychiatric patients attributed negative outcomes to internal and stable factors more readily than either nondepressed psychiatric patients or nondepressed controls. Depressives also considered external and

unstable factors to be more responsible for positive outcomes than did nondepressed controls, although not more than nondepressed psychiatric controls.

Eaves and Rush (1984) noted that the attributions of clinically depressed patients were more internal, stable and global for negative events than were the attributions of nondepressed controls. Interestingly, this relationship held even for those patients whose symptoms were in remission. The attributions of depressives and nondepressives for positive events did not differ significantly. Hamilton and Abramson (1983), on the other hand, found that depressives provided fewer self-serving attributions for positive ASQ events than did nondepressed psychiatric patients, but found no differences between the two groups in their attributions for negative events. An additional finding of interest in this study was that the depressed group exhibited stronger self-serving attributions when assessed approximately two weeks later. The transitory nature of attributional patterns raises questions about the role that attributions play in chronic depression. Further skepticism is raised by Miller, Klee and Norman's (1982) failure to find any

differences between depressed and nondepressed patients on the ASQ.

Attributions for Stressful Life Experiences

Relatively few studies have examined the nature of depressive attributions for nonlaboratory events. Those that do exist provide moderate support for the hypothesis that depressives explain stressful experiences less self-servingly than do nondepressives. In one study, Barthe and Hammen (1981) elicited students' mood ratings and causal attributions for self-rated success or failure on their midterm exam. As predicted, students characterized by depressed mood were more likely to attribute failure to lack of ability than were nondepressed students. However, the mood ratings and attributions of successful students were not related.

The attenuated self-servingness of depressives was also demonstrated in Harvey's (1981) study of causal attributions for recalled positive and negative personal events. Although depressives did not differ from nondepressives in their attributions for recalled positive events, they did perceive negative events as more internally caused and controllable. Subsequent analysis indicated that the depressive/nondepressive

difference emerged because the causal attributions of depressives did not differ across positive and negative outcomes. These results are consistent with those noted by Raps et al (1982) and suggest that the depressed individual's perception of causality may be impervious to the valence of the event.

Hammen, Krantz and Cochran (1981) also found a relationship between depression and causal attributions in their investigations of peoples' responses to five recent stressful life experiences. Specifically, they found that the tendency to explain stressful experiences by reference to controllable and global factors was positively correlated with depressed affect. In contrast, Hammen and Cochran (1981) using both interview and questionnaire methods tc probe causal attributions for recent stressful events, found no evidence that the causal attributions of depressives and nondepressives differed in any respect. Similarly, Hammen and deMayo (1982) noted that depression in high school teachers was not related to their causal attributions for stressful experiences, although it was negatively related to their perceptions of control over the occurrence of such events. The latter finding directly contradicts the studies of Harvey (1981) and

Hammen and Cochran (1981) in which depression was found to be positively correlated with perceived control over negative events.

Two studies have evaluated the causal attributions of clinically depressed individuals for stressful life experiences. Gong-Guy and Hammen (1980) found that clinically depressed patients blamed internal factors more for their most recent stressful experience than did nondepressed psychiatric patients. Yet, as previously noted, these same two groups of patients did not differ in their responses to the ASQ. At the very least, this result raises doubts about the cross-situational consistency of the causal ascriptions and the construct validity of the ASQ.

Attributions for Task Performance

The hypothesis that depressives and nondepressives differ in their attributions for their performance on achievement and interpersonally relevant experimental tasks has received considerable attention. Such research typically creates success and failure conditions through manipulation of performance feedback (noncontingent performance feedback) and instructs subjects to answer a variety of causal questions about these outcomes.

Attributions for Achievement Tasks. There is reasonably strong evidence to suggest that depressives are less likely to provide self-serving explanations for negative experimental outcomes than nondepressives. The picture with respect to positive outcomes is equivocal.

College Populations. In one of the first investigations in this tradition, Rizley (1978) compared the attributions of depressed and nondepressed students for noncontingent success or failure on a simple number guessing task. Depressives reported more internal attributions for failure than did nondepressives, but the two groups did not differ in their explanations for success. Once again, an inspection of the results indicates that the causal attributions of depressives simply do not differ across positive and negative outcomes. Unlike nondepressives, they were "evenhanded" in their explanations of success and failure. In a similar experiment, Kuiper (1978) also found that depressives made more internal attributions for failure than nondepressives, but did not differ from nondepressed controls in their causal perceptions regarding success. The tendency for depressives to attribute failure on achievement-related

tasks to internal factors such as lack of ability is also evident in the results of Oliver and Williams (1979) and Zenmore and Johansen (1980). Here too, there was no evidence that depressives are less self-serving than nondepressives in their causal attributions for success.

Clinical Populations. Two studies have examined the nature of clinically depressed peoples' causal attributions for task performance. Abramson, Garber, Edwards and Seligman (1978) compared the attributions of depressed psychiatric patients, nondepressed schizophrenics and a nondepressed, normal control group for success or failure on skill and chance tasks. In contrast to the research that employed nonclinical populations, no differences were found among the various groups on either attributional internality or perceived control. Gotlib and Olson (1983) argued that Abramson et al.'s failure to find group differences may have been due to the fact that experimental manipulation of outcomes did not produce differences in subjects' perceptions of the outcomes. To check this possibility, they compared the attributions of depressed and nondepressed psychiatric inpatients and

nondepressed nonpsychiatric controls for self-judged success and failure experiences. The results indicated that subjects who perceived their performance to be a success were more likely to attribute this outcome to internal factors than were subjects who perceived their performance to be a failure. Conversely, subjects who perceived their performance to be a failure were more likely to attribute this outcome to external factors than were subjects who perceived their performance to be a success. The effect of outcome valence was not qualified by psychiatric status; all subjects manifested self-serving biases in their causal ascriptions.

Attributions for Interpersonally Relevant Tasks

In one of the relatively few studies to focus on interpersonal tasks, Rizley (1978, experiment 2) found that depressives were more likely to report feelings of control over interpersonal relations than were nondepressives when their influence was negative. Depressives did not differ from nondepressives, however, in the internality of their attributions or in their self-ascribed responsibility for the negative effects. Further, when feedback indicated that their

interpersonal influence was positive, depressed and nondepressed individuals did not differ in their ratings of control or causal attributions.

An intriguing study by Sharp and Tennen (1983) also demonstrated a weakened self-serving bias in depressives. Depressed and nondepressed subjects in this study were provided with failure feedback following completion of an empathy task. Nondepressives blamed external factors, such as the confederate and the task, more than did depressives. Finally, Zuroff (1981) provided mixed results with respect to the link between depression and self-servingness. Depressed students endorsed more internal attributions for task failure than did nondepressives, but they also endorsed more internal attributions for successful outcomes than did nondepressives.

Causal Attributions as Determinants of Depression

As previously noted, a central assumption of the reformulated attribution model is that the judgments of contingency and attributions of depressives not only differ from those of nondepressives but are also causally related to the onset of depression. As this

review indicates, evidence on the link between depressive affect and causal attributions is mixed. The most robust finding is that depressives make fewer self-serving (more internal, global and stable) attributions for negative outcomes than do nondepressives. One interpretation of this finding is that the tendency to attribute negative outcomes to internal, stable, global causes renders people susceptible to depression. One study using the ASQ is suggestive in this regard (Metalsky, Abramson, Seligman, Semmel & Peterson, 1982). In this study it was found that both internality and stability of attributions for negative events were predictive of mood following receipt of a low grade on a midterm exam. Unfortunately, the Metalsky et al. findings have not been replicated by other studies that have addressed this question.

Using a cross-lagged panel correlation analysis, Golin et al. (1981) found that while the stability and globality of attributions for negative events were predictive of depression one month later, the internality of attributions for such events did not predict later depression. Moreover, although the

stability and globality attribution dimensions were significant predictors, they accounted for a limited amount of the variance in depression. Peterson et al. (1981) reported that depression was associated with characterological self-blame in responses on the ASQ, but that the degree of self-blame was not predictive of depression at six and twelve month follow-ups. Similarly, Lewinsohn et al.'s (1981) longitudinal study of a community population indicated that causal attributions for hypothetical events predicted neither the development of depression in nondepressed subjects nor the course of the disorder in depressed ones.

Four studies have explored the ability of the ASQ to predict the onset of postpartum depression. The results of these studies are contradictory. Cutrona (1983) found that prenatal ASQ scores predicted postpartum depression among women who were not depressed during pregnancy. Similar results were reported by O'Hara, Rehm and Campbell (1982), although the contribution of ASQ responses as a predictor variable in this analysis was small, accounting for only 2.3% of the variance. In contrast, Manly, McMahon, Bradley and Davidson (1982) found that

responses on the ASQ did not predict postpartum depression. A recent study by O'Hara, Neunaber and Zekoski (1984) also noted that responses on the ASQ were not predictive of postpartum depression.

Another approach to assessing the causal potency of attributions is to observe the effects of attempts to modify causal attributions on experienced affect. Intervention studies of this nature have provided some evidence that manipulating the attributions of depressives can reduce previously demonstrated behavioral deficits (Dweck, 1975; Klein, Fencil-Morse & Seligman, 1976) but few studies have evaluated the consequences of these manipulations on depressed affect. One study which did examine this issue was reported by Miller and Norman (1981). These researchers wished to see if the negative affect produced by helplessness training would be diminished by a subsequent success experience for which subjects were encouraged to make internal attributions. Intervention was successful for both clinical and remitted depressives. These results are promising, but to date no researchers have evaluated the impact that an emphasis on external attributions has on depressed

mood following negative outcomes. This type of research is particularly pertinent to the issue of attributional potency since it appears that depressives differ most from nondepressives in their causal attributions for negative events.

To summarize, the evidence offers only limited support for the hypothesis that attributions play a causal role in the development of depression.

The Role of Cognition in Depression: Reviewing the Evidence

A few methodological comments are in order before discussing the relevance of the foregoing research to the phenomenon of depression. First, as this review documents, a wide range of experimental tasks have been used to assess hypotheses about information processing in depression. For example, to evaluate the hypothesis that negative distortion is a primary characteristic of depressive information processing, researchers have instructed subjects to speculate about their responses to hypothetical events, assess their social skills, and recall the amount of positive and negative feedback they received on experimental tasks. Investigations of the causal attributions of depressives have been similarly diverse, including requests to assess causal factors for hypothetical events, real life events, and experimenter-controlled tasks. Considering the diversity across these measures, it is not surprising that few consistent results have emerged.

The range of subject populations used in the reviewed studies also impedes the achievement of empirical consistency. Attempts to demonstrate effects

in both clinical and nonclinical depressives have not always been successful. This lack of consistency is difficult to interpret since we do not have a clear understanding of how clinical and nonclinical depressives differ either quantitatively or qualitatively.

With these methodological consideration in mind, the implications of the reviewed studies for understanding information processing in depression will be summarized. For the purpose of this summary, results have been organized into the following categories: 1) self-perception, 2) perception of self versus others, and 3) the causal role of cognitions in depression.

Self-Perception

The contention that depressives perceive themselves more negatively than nondepressives is well supported. Depressives ascribe negative attributes to themselves and evaluate their performance as evidence of both personal inadequacy and social ineptitude. They are unique in their expectations for failure and distinguish themselves from nondepressives by assuming more personal responsibility for negative outcomes.

The two groups do not differ in their attributions for positive outcomes; both prefer internal to external attributions. The picture of the depressive that emerges is that of an individual who takes considerable responsibility for outcomes, whether they are positive or negative. It is by assuming personal responsibility in the latter circumstance that the depressive distinguishes him or herself most clearly from the nondepressive.

What additional features of information processes might be related to the depressives' tendency to attribute negative qualities and events to themselves? Miller and Ross (1975) proposed that individuals are more likely to accept responsibility for expected than unexpected outcomes. Accordingly, it might be speculated that negative outcomes may constitute an expected, unsurprising result for depressives leading them to look toward internal and possibly stable factors.

The research of Kuiper and his colleagues suggests a related possibility. As previously noted, this research supported the contention that information that is congruent with the negative content of the

depressives' self- schema is processed more efficiently and is more accessible for recall than is incongruent information. Perhaps the accessibility and ease of processing negative information contributes to the depressives' perception of it as expected and due to internal and stable causes.

Perception of Self versus Other

According to Beck's model, depressive information processing is characterized by a negative bias against the self, the world and the future. Not only is the self viewed negatively, but the depressive evaluates the world negatively. The implication here is that depressives attribute to others the same negative qualities they assume for themselves.

In general, this proposal receives little empirical support. Indeed, depressives perceive themselves as unique in experiencing depressive thoughts and feelings. Conversely, nondepressives estimate that others suffer from more depressive experiences than themselves. Further, depressives attribute their own failure to personal inadequacy but perceive the failure of others as due to external factors. Nondepressives, on the other hand, show more

of a self-serving bias in causal analysis. Their own failure is attributed to external factors while the failure of others is attributed to personal qualities.

Current models would seem unable to accommodate the depressives' distinct style of processing information for the self versus others.

The Causal Role of Cognitions in Depression

Both Beck and the reformulated helplessness model postulate a causal relation between cognitive processes and depression. Negative cognitive content is indeed a concomitant of depression, and may even predict the length of the depressive episode (Lewinsohn et al., 1981), however support for the hypothesis that these cognitive characteristics precipitate the onset of depression is limited. Of nine reviewed studies, five failed to find evidence that cognitive characteristics predicted the onset of depression. Three of the four remaining studies found only conditional support for the role of cognitions in the precipitation of depression. Specifically, only a subset of cognitive factors was found to predict depression (Rholes, Riskind & Neville, 1985), or the causal relation was found only for a subset of the sample (Cutrona, 1983),

or the predictive value of cognitive factors was limited (O'Hara et al., 1982). The value of the remaining study (Metalsky et al., 1982) in supporting a causal relation between cognition and depression is compromised by the researchers' use of depressed mood rather than a stable depressed state as the predicted outcome variable.

The failure of current research to support a causal relation between cognition and depression raises serious doubts as to the fundamental assumptions about etiology that are made by contemporary cognitive models of depression. If the causal role of cognition in depression cannot be established, there is reason to consider alternative accounts for the presence of distinctive cognitive features in depression. One possibility is that the direction of causality is from depressive affect to cognition rather than the opposite as proposed by the Beck and Abramson et al. models. Evidence bearing on the relation between affect and information processing will now be considered.

The Mood Congruency Effect in Information Processing

Affect has been historically recognized as a significant factor in information processing. Early clinical reports implied that affect primes selective attention to mood-congruent aspects of experience as well as selective recall from memory (Bleuler, 1951; Rappaport, 1942). Contemporary research has helped clarify the role of affect on attention, memory, attitudes and behavior (Bower, 1981; Clark & Isen, 1982).

The studies that have examined the effects of mood on attention have produced mixed results. In an early study, Postman and Brown (1952) provided subjects with either success or failure feedback for performance on a perceptual task. Subjects who received success feedback demonstrated significantly lower thresholds for success-toned words than for matched neutral words while subjects who received failure feedback demonstrated lower thresholds for failure-toned words. Similarly, Mischel, Ebbesen and Zeiss (1973) found that subjects who succeeded on an experimental task preferred to attend to, and supposedly think about, positive than negative information about themselves.

Gerrig and Bower (1982) failed to replicate the Mischel et al. findings. In this study, subjects were first hypnotically induced to feel either happy or angry and then presented with either mood-congruent or incongruent information. Contrary to predictions, mood-congruent target words were not selected more frequently than mood-incongruent target words or neutral distracter words on a recognition task. In a second experiment, Gerrig and Bower (1982) evaluated recognition thresholds for mood-congruent and incongruent information in hypnotically-induced happy or angry subjects. Again, recognition thresholds for mood-congruent and incongruent information were not significantly different. Despite various methodological problems in this study, including their failure to complete manipulation checks on mood-induction procedures, these results raise suspicion about the relation between mood and attention.

There is considerable support for the contention that affective states influence recall from memory. Weingartner, Miller and Murphy (1977) evaluated the importance of affect on encoding and recall of word

associations in a small group of patients with the diagnosis of bipolar affective disorder. Recall of information was enhanced when mood at acquisition matched mood at recall. Similar results have been found using hypnotic mood-induction techniques. Bower, Monteiro and Gilligan (1978) exposed college students to both happy and sad hypnotic mood-induction conditions. During each mood state subjects were required to learn a list of unrelated words. Again, recall was facilitated when subjects acquired and recalled information in the same mood state. Bower (1981) and Fogarty and Hemsley (1983) have also found that mood selectively biased recall of real-life events and recall of memories from childhood.

Exposure to positive or negative performance feedback also seems to prime memory for recall of mood-congruent information. Mischel, Ebbesen and Zeiss (1976) observed that subjects provided with positive feedback were less able to identify information about their negative qualities than about their positive qualities. Exposure to success on a computer game was also found to "prime" recall of positive vs. negative personality trait information (Isen, Shalker, Clark &

Karp, 1978, study two). Taken together, these findings provide strong support for the hypothesis that affect facilitates recall of mood-congruent information.

Based on these findings, Bower (1981) has developed an "associative network theory" of emotion. In this model, each distinct emotion is connected with a pattern of autonomic arousal, expressive behavior and situational associations. When arousal rises above threshold, activation of an "emotion unit" occurs, precipitating the arousal of a typical pattern of autonomic activity and behavioral expression. Arousal of this pattern of associated information facilitates the recall of mood congruent information.

The research of Isen and her colleagues suggests that affect plays an important role in determining attitudes and behavior. Several studies found that exposure to positive experiences increased the positivity of subsequent evaluations of unrelated events and the probability of prosocial behavior (Isen, 1970; Isen & Levin, 1972). Isen suggests that attitudinal and behavioral effects are mediated by the accessibility of mood-congruent information. This "cognitive loop system" increases the likelihood that affective states will persist.

It is important to note that Isen's model is primarily based on studies evaluating the effects of positive mood. She believes that the effects of negative mood may not be as predictable because most individuals are motivated to maintain positive rather than negative moods. Another possibility is that negative information is encoded less efficiently and is therefore less accessible. As previously noted, the relative accessibility of positive and negative information may differ between individuals.

Mood-Congruent Information Processing in Depression

The significance of mood-congruency for understanding information processing in depression has received limited attention. Contemporary models of affect and cognition tend to view cognition as a necessary prerequisite of emotion. This position is well defined by Lazarus (1984). Briefly, Lazarus contends that all emotional reactions are preceded by cognitive appraisal, even though evidence of cognitive mediation may not be apparent. Zajonc (1980, 1984) has vigorously challenged this position on several grounds. First, he points out that by declaring that cognition always precedes emotion (even though evidence of

cognitive appraisal may be absent) one preempts research on this matter. In support of his proposal that affect can occur without prior cognitive mediation, Zajonc notes several studies demonstrating the induction of affective preference through repeated exposure of various stimuli at below recognition thresholds (Garcia & Rusiniak, 1980; Kurnst-Wilson & Zajonc, 1980; Wilson, 1979). In addition, he draws on Izard's (1983) review of the ontogentic primacy of emotion. In this review, Izard notes that at some point during individual development, cognitive appraisal does not precede emotional responses.

This alternative conceptualization of the relation between affect and cognition may have implications for understanding depression. The depressives' chronic state of negative affect may facilitate efficient processing of negative (mood congruent) relative to positive (mood incongruent) information and consequently increase the accessibility of negative relative to positive information. Efficient processing and increased accessibility of negative relative to positive information may contribute to the depressives' negative self-perceptions, expectations and tendency to

attribute negative events to internal, stable factors. In other words, the depressives' attribution of negative qualities to the self may emerge because of an increased accessibility of negative information. Futhermore, both increased accessibility of negative relative to positive information and the formation of negative cognitions about the self could serve to prolong the depressive episode. The present two studies examined these issues.

Study One

Study 1 examines the mood-congruency effect in processing of information by depressed and nondepressed individuals. The general hypothesis guiding this research is that information that is congruent with an individual's affective state should be processed more efficiently than information that is incongruent. This working hypothesis leads to specific predictions concerning the speed and accuracy with which depressives and nondepressives process positive and negative information:

Hypothesis I: Since positive information is more congruent with the typical mood state of nondepressives than depressives, nondepressives will process positive information more efficiently than depressives.

Hypothesis II: Since negative information is more congruent with the typical mood state of depressives than nondepressives, depressives will process negative information more efficiently than nondepressives.

Hypothesis III: Since positive information is more congruent with the typical mood state of nondepressives than is negative information, nondepressives will process positive information more efficiently than negative information.

Hypothesis IV: Since negative information is more congruent with the typical mood state of the depressive than is positive information, depressives will process positive information more efficiently than negative information.

Transient mood states will also be assessed to determine whether the mood congruency predictions outlined above are appropriate for understanding the effects of both transient and stable moods on information processing.

Processing of congruent and incongruent information will be evaluated under two conditions of stimulus intensity to determine whether stimulus demands mediate processing of positive and negative information. In general, the mood congruency effects are expected to be more pronounced under high- than low-intensity conditions. Reaction time and response accuracy will be employed as measures of efficiency of information processing.

Study 1 will also examine mood congruency effects in memory for positive and negative information. Craik and Lockhart (1972) proposed that greater efficiency of processing should lead to greater "depth" of encoding and hence facilitate recall from memory. The general hypothesis guiding this portion of the current research is that increased efficiency of information processing due to the mood congruency effect will produce enhanced memory for information. The following predictions are derived from this working hypothesis:

Hypothesis V: Since positive information is more congruent with the typical mood state of the nondepressive than the depressive, nondepressives will demonstrate superior recognition memory for positive information than depressives.

Hypothesis VI: Since negative information is more congruent with the typical mood state of the depressive than the nondepressive, depressives will demonstrate superior recognition memory for negative information than nondepressives.

Hypothesis VII: Since positive information is more congruent with the typical mood state of the nondepressives than is negative information, nondepressives will demonstrate superior recognition memory for positive than negative information.

Hypothesis VIII: Since negative information is more congruent with the typical mood state of depressives than is positive information, depressives will demonstrate superior recognition memory for negative than positive information.

Finally, ratings of the type and intensity of affect displayed in experimental stimuli will be assessed to determine whether depressives and nondepressives evaluate targets differently.

Study I: Method

Subjects

Forty right-handed[1] undergraduates at York University volunteered to serve as subjects in an experiment on the perception of emotion. All subjects received $3.00 for their participation in the study. Hand preference was evaluated using the shortened version of Annett's (Briggs & Nebes, 1975) handedness questionnaire. Subjects were categorized as depressed or nondepressed on the basis of their responses to the Beck Depression Inventory (BDI) (Beck, 1972). Twenty subjects (10 males and 10 females) with scores equal to or greater than 9 were classified as depressed and twenty subjects (9 males and 11 females) with scores equal to or less than 8 were classified as nondepressed.[2]

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[1] Considerable research has documented the role of the right cerebral hemisphere in processing emotional information (see Bradshaw & Nettleton, 1981). There is also clear evidence that the organization of hemispheric functions is less predictable for left handers. Following a review of the literature regarding handedness and hemispheric functioning, Hicks & Kinsbourne concluded "virtually any lateralized dimension in right handers appears more symmetrical in left handers" (p. 539). Since the performance of left handers in Study 1 was not predictable, they were excluded from the study.

[2] A total of 53 subjects actually completed the experiment before data for 20 depressed and 20 nondepressed subjects was available.

Measures

Handedness Questionnaire. The modified version of Annett's (1967) handedness questionnaire was used to assess degree of right-hand preference (Briggs & Nebes, 1975). This scale has been found to be a reliable and valid test of hand preference (Loo & Schneider, 1979).

Beck Depression Inventory. The revised BDI (Beck et al., 1979) asks subjects to assess the presence and severity of 21 depressive symptoms during the past week. These symptoms represent the major affective, cognitive, behavioral and somatic symptoms of depression. The psychometric properties of the BDI have been extensively evaluated. Both the original form of the BDI (Beck, Ward, Mendelson, Mock & Erbaugh, 1961) and the revised edition possess high internal consistency across distinct subject populations and varying modes of administration (Beck & Steer, 1984). Test-retest reliability of the BDI in a college population has been reported to be .78 over a period of one week (Oliver & Burkham, 1979); .75 over a period of one month and .74 over a period of three months (Miller & Seligman, 1973).

Several studies have assessed the correspondence between BDI scores and psychiatric evaluation and diagnosis. In a college population, Bumberry, Oliver and McClure (1978) found BDI scores correlated significantly with blind psychiatric ratings of the severity of depressive symptoms (r = .77). Oliver and Simmons (1984) evaluated the sensitivity and specificity of the BDI for detecting DSM III major affective disorder in an unselected adult population. Using a BDI cutoff score of 10 for depression, sensitivity was 100% and specificity 86.3%. The rate of false negatives was 0% and false positives reached 13.7%. Oliver and Simmons concluded that although DSM III diagnoses and BDI scores are not substitutes for each other, the BDI is a sensitive screening device for use in a general population.

The use of the BDI to assess and classify depressive disorders in college populations is not without criticism (Coyne & Gotlib, 1983; Sacco & Hokanson, 1978). Hatzenbuehler, Parpal and Matthews (1983) found that although the overall BDI test-retest reliability coefficient for their college sample over a one week period was acceptable (r=.60), repeated

administration of the BDI produced a significant decline in high scores. Similar results have been reported by Atkeson, Calhoun, Resick, and Ellis (1982). Hammen (1980) attributed these results do the failure of the BDI to discriminate stable from transient states of depression. Hatzenbuehler et al. (1983, study two), however, found that the decline in high scores was not caused by the dissipation of negative mood. They speculated that reduction in scores was mediated by changes in expectancies or increased knowledge about BDI symptoms due to prior exposure to the test. These results support Sacco's (1981) recommendation that researchers assess depression level immediately prior to conducting the experiment.

Multiple Affect Adjective Checklist (MAACL). This scale consists of 132 adjectives from which three subscales have been derived: depression, anxiety and hostility. Each subscale has been found to possess adequate test-retest and split-half reliability (Zuckerman, Lubin, Vogel & Valerius, 1964) and the sensitivity of the MAACL to transitory mood states has been demonstrated in both college and clinical populations (Buchwald, Strack & Coyne, 1981; Gotlib &

McCann, 1984). Previous research has found, however, that the three subscales are highly intercorrelated suggesting that either the mood states they were designed to evaluate are not distinct or the scale fails to reliably distinguish between mood states (Gotlib, 1984).

Stimulus Material

Stimulus material was selected from Ekman's (1976) series of pictures of facial emotion. This series of 110 black and white pictures consists of photographs of 14 posers displaying six emotional expressions (happiness, fear, sadness, anger, disgust, and surprise), as well as a "neutral" expression. To assess the reliability of these pictures, Ekman had subjects rate the type and intensity of emotion displayed in each photograph. At least 70% of all raters judged each photo as showing the intended emotion. Fifty-nine pictures were correctly identified by over 90% of raters; 40 by 81-89% of raters; and 11 by less than 81% (70-80%) of raters (Ekman, 1976).

Fifty-two pictures displaying happy (n=18), sad (n=17), and neutral (n=17) emotional expressions were selected for use in the study. Both open- and

closed-mouth expressions were included. Percentage of correct identification for these specific pictures of facial affect are as follows: 92-100% for happy expressions (92-100% for open-mouth expressions; 97-100% for closed-mouth expressions), 71-100% for sad expressions (74-90% for open-mouth expressions; 71-100% for closed-mouth expressions) and 59-78% for neutral expressions (Ekman, 1976).

Each picture was reproduced as a 2.3 X 3.4 cm. photograph for mounting on a 10 X 15 cm. stimulus card. Stimulus cards presented two pictures of the same poser: one with a neutral expression and one with an emotional expression (happy or sad). Each picture was positioned on one-half of the card, approximately two degrees from the central point of the card (see Appendix A). Two sets of 26 stimulus cards were created in this manner. Each poser appeared on two of the cards from each stimulus set: once with a combination of a neutral and happy expression and once with a combination of a neutral and sad expression. Within each stimulus set, 13 cards displayed neutral/happy combinations (9 neutral/happy open-mouth; 4 neutral/happy closed-mouth) and 13 displayed

neutral/sad combinations (4 neutral/sad open-mouth; 9 neutral/sad closed-mouth). Nine additional trial cards were created from the remaining pictures of the same posers.

Side of presentation of the emotional face on each card in the first stimulus set was determined randomly. Side of presentation of the emotional face was reversed for the second set of cards. Presentation of stimulus cards within each set followed a fixed-random order.

Twenty-eight additional pictures displaying posers with expressions of anger or surprise were selected as distraction items and for use in a recognition task. Percentage of correct identification for these specific pictures of facial affect are as follows: 74-100% for expressions of surprise; 70-100% for expressions of anger (Ekman, 1976). These pictures, in addition to all previously selected pictures (i.e., happy, sad and neutral pictures) were reproduced into 2.3 X 3.4 cm. photographs. Each photograph was centrally positioned and mounted on a 10 X 15 cm. card to form a deck of 65 recognition cards. Presentation of cards followed a fixed-random order.

Apparatus

Subjects were seated in front of a two-field tachistoscope (Cambridge Tachistoscope, Behavioral Research and Development, portable model) adjusted in height to ensure proper viewing. Prior to each trial subjects were reminded to fixate on a central point in the visual field. The onset of each trial was also preceded by the illumination of a single red light (3 mm.) centrally-positioned in the visual field for a period of 750 msec.. The illumination of this central fixation point served both as an additional reminder for subjects to direct their attention to this central point, and to indicate the onset of each trial. Termination of the fixation light triggered the presentation of the stimulus card at an exposure duration of 300 msec.[3] and the onset of reaction time clock (Standard Electric Time Company, Type S-1). This was immediately followed by representation of the white visual field without the illumination of the fixation light. Depressing one of two response keys operated to

[3] A moderate exposure duration was selected to encourage 'automatic' processing of information (Bargh, 1984) on the basis of affective cues. Mood congruency effects may not be discernable at either considerably longer or shorter exposure durations since responses under such conditions will be more strongly determined by stimulus characteristics.

stop the reaction time clock and to illuminate one of two response lights visible only to the experimenter. Each trial was separated by approximately 5 seconds during which the experimenter recorded both the subject's response and reaction time.

Experimental Tasks

Tachistoscopic Identification Task. To evaluate possible response bias in depressed or nondepressed subjects against identification of a perceived emotional target, two experimental conditions were designed, both requiring forced-choice responses. In the first condition (Emotional Condition), subjects were provided with instructions directing them to select the more 'emotional' face from the two photographs. Subjects in the 'Neutral' condition were provided with comparable instructions but directed to identify the neutral, less emotional face (see Appendices B and C).

The ability of subjects to identify 'emotional' and 'neutral' faces under less demanding conditions is supported by the results of a pilot study which slide projected cards for an unrestricted amount of time.

The subjects in this pilot study were twenty-three volunteers from Simon Fraser University and the stimulus series consisted of the previously described cards. Two groups of subjects completed the experiment. The first group (n=17) was instructed to identify the more 'emotional' face while the second group was instructed to identify the more 'neutral' face (n=6). Subjects also evaluated the emotional quality of each selected face on a 7-point scale ranging from extremely negative (1), to extremely positive (7).*

Accuracy of identification in the 'emotional' condition ranged from 86 to 100%, with a mean of 95%. Twelve emotional faces were correctly identified by all subjects, 17 by 94% of subjects, and 3 by 88% of subjects. Accuracy for specific categories of affect were as follows: 94% for happy open-mouth expressions; 93% for happy closed-mouth expressions; 99% for sad open-mouth expressions; 96% for sad closed-mouth expressions. Accuracy of identification in the 'neutral' condition was 100%.

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* Averill (1975) contends that the positive-negative continuum is the most common dimension applied to evaluate affective experiences.

Mean ratings[5] for faces with happy and sad expressions by subjects in the emotional group were as follows: 5.17 for happy open-mouth expressions; 4.14 for happy closed-mouth expressions; 1.37 for sad open-mouth expressions; 1.74 for sad closed-mouth expressions. The mean rating for neutral faces by subjects in the neutral group was 3.05.

The results of this pilot study indicate that subjects can successfully distinguish emotional and neutral expressions from these stimulus combinations. Further, the ratings of selected faces are consistent with Ekman's (1976) categorization of the type of emotion displayed in each stimulus face.

Determination of Exposure Duration. Pilot testing indicated that an exposure duration of 300 msec. ensured a moderate overall level of accuracy. Accuracy of identification at an exposure duration of 200 msec. was 65% for happy expressions and 64% for sad expressions. Substantial increases in accuracy were noted at an exposure duration of 300 msec.. Accuracy of identification was 79.5% for happy expressions (94% for open-mouth expressions; 65% for closed-mouth

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[5] Mean ratings were calculated for accurate identifications only.

expressions), 68% for sad expressions (70% for open-mouth expressions; 66% for closed-mouth expressions).[6] These results are similar to those reported by Reuter-Lorenz, Givis and Moscovitch (1983). In this experiment, a 250 msec. exposure duration was used to tachistoscopically present test material that was similar to that employed in the current experiment. Accuracy levels for identification of the more emotional face were as follows: 84.5% for happy open-mouth faces, 68.9% for closed-mouth happy faces, and 68.8% for sad faces.

Recognition Task. As previously described, a test of recognition memory was created through the addition of new distraction items to the original stimulus set. Pictures of the same poser but with different emotional expressions were selected so that recognition could be attributed to memory for type of affect rather than memory for faces per se. Expressions of surprise and anger were selected on the basis of the hypothesis that they were similar in valence to expressions of happiness and sadness respectively, thus maximizing the

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[6] Results based on pilot testing of 3 (exposure duration of 200 msec.) and 5 subjects (exposure duration of 300 msec.).

degree of distraction they would present in the recognition task. To evaluate this hypothesis, 19 Simon Fraser Undergraduate volunteers evaluated the emotional quality of each face on a 7-point scale ranging from extremely negative (1), to extremely positive (7). Expressions of surprise and of anger received mean ratings of 3.17 and 1.62 respectively.

Subjects were provided with the following instructions when presented with this incidental test of recognition memory:

> This deck contains 65 cards, each presenting a photograph of a face. There are several photographs of the same individual with different emotional expressions. For each photograph, try to recall if it was presented to you during the experiment. That is - try to recall if you have seen this particular person with this expression. If you believe you have, circle OLD. However, if you believe you have been presented with this particular person but with a different emotional expression or that you have not been presented with this person circle NEW. Then rate each photograph on the degree of positive or negative emotion you feel it displays. Circle 1 if you feel the face displays very negative emotional tone; circle 4 if you feel the face displays neutral emotional tone; and circle 7 if you believe the face displays very positive emotional tone. Please remember to make a decision (OLD versus NEW) and rating for each photograph.

Procedure

Subjects were randomly assigned to one of two experimental conditions (Emotional or Neutral Condition). Each session began with subjects reading an information sheet detailing the nature of their participation in the experiment (Appendix D) and completing an appropriate consent form. Subjects were instructed to complete the BDI on the basis of their current and recent feeling during the past week. The MAACL (Today Form) and Annett's Handedness Questionnaire were completed following standard instructions.

Once subjects had completed preliminary measures, they were seated in front of the tachistoscope and provided with appropriate experimental instructions. Subjects completed the two blocks of 26 trials, separated by a brief (approximately 3 min.) rest period.

Following this subjects were administered a 10-15 minute test of hemisphericity which required them to answer a series of 20 questions.[7] Finally, subjects completed an incidental test of recognition memory as

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[7] Analysis and results of this measure and of visual field effects in the perception of emotion will not be presented in this document.

previously described. All subjects were fully debriefed and paid for their participation.

Study I: Results

Subject Characteristics

A two-way analysis of variance with depression level (depressed; nondepressed) and condition (Emotional; Neutral) as between-subject factors confirmed that depressives experienced greater depressed mood ($F(1,36)=13.68$, $p=.0008$), anxiety ($F(1,36)=15.90$, $p=.003$) and hostility ($F(1,36)=6.37$, $p=.02$) than nondepressives.[8] Significant depression x condition interactions emerged, however, for both anxiety and depression dependent variables (see Table 1). Subsequent analyses applying the Scheffe (1953) correction indicated that in the Neutral condition depressives reported significantly greater depression ($F(1,36)=15.25$, $p=.05$) and anxiety ($F(1,36)=20.38$, $p=.025$) than nondepressives. In the emotional condition, however, the reports of depressives and nondepressives on these subscales were not significantly different ($F(1,36)=1.61$, $p>.05$) and $F(1,36)=1.27$, $p>.05$ for depression and anxiety respectively).

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[8] Consistent with the use of the BDI as a classification variable, depressives scored significantly higher than nondepressives on this measure ($F(1,36)=57.06$, $p=.0001$).

Table 1

Group Means on the Beck Depression Inventory and Multiple Affect Adjective Checklist Subscales

Condition & Group	Beck Depression Inventory	Multiple Affect Adjective Checklist		
		Depression	Anxiety	Hostility
Emotional				
Nondepressed	3.80	12.10	5.80	9.60
SD	2.62	6.61	3.61	4.92
Depressed	15.80	16.00	7.80	9.60
SD	8.42	8.27	4.16	5.34
Neutral				
Nondepressed	2.30	6.70	3.40	4.40
SD	2.05	3.47	2.17	3.06
Depressed	13.40	18.70	11.40	9.90
SD	3.41	8.06	5.27	4.65

Consistent with previous research (Gotlib, 1984; Zuckerman, Lubin & Robins, 1965), scores on the BDI and MAACL subscales were significantly intercorrelated (see Table 2).

Table 2
Matrix of Correlations* between the Beck Depression Inventory and Multiple Affect Adjective Checklist

	BDI	Depression	Anxiety
BDI			
Depression	.65		
Anxiety	.58	.90	
Hostility	.54	.81	.72

*All values for $r(38)$ significant at $p<.001$.

Speed and Accuracy of Information Processing

Reaction Time: Treatment of the Data. Puff (1982) contends that long reaction times should be eliminated from data only when there is reason to believe that they reflect subject 'error' in task performance rather than processing time per se. While there is no consensus as to the point at which reaction times should be viewed as errors, he suggests that excluded reaction times not exceed 1% of data. Inspection of the distribution of scores in the current data set indicated that elimination of the top .05% of data points effectively eliminated outliers. This was supported by a reduction in measures of skewness (from 13.72 to 1.88) and kurtosis (from 284.94 to 5.74).

Logarithmic transformation was performed on reaction time scores due to dependency between mean and standard deviation scores ($r(38)=0.64$, $p=.001$). This procedure successfully reduced dependency between the mean and standard deviation, although the relationship remained significant ($r(38)=0.40$, $p=.001$). Transformation was successful, however, in further normalizing the distribution as reflected in reduced values for skewness (0.20) and kurtosis (-0.03). Analysis of nontransformed and transformed scores produced similar results (see Appendix E).

Data Analysis. Analysis of log transformed reaction times for accurate responses and response accuracy was completed using a 2 X 2 X 2 X 2 analysis of variance (Anova)[9] with two between-subject factors (depression level: depressed, nondepressed; condition: Emotional, Neutral) and two nested within-subject factors (affect: positive, negative; intensity: high, low). As summarized in Table 3 and 4, this procedure produced several significant main and interaction effects for both reaction time and accuracy dependent variables. From each analysis the significant

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[9] Analyses were completed using the Statistical Analysis System (SAS, 1982) Anova Program.

interaction effect of most relevance to the hypotheses was identified. Specifically, these were a significant depression x affect x intensity interaction from the analysis of reaction time scores and a significant condition x depression x affect interaction from the analysis of accuracy scores.

Table 3

Analysis of Variance of Log Transformed Reaction Time Scores

Source	SS	df	F	p ≤
Depression (D)	0.02	1	0.02	ns
Condition (C)	0.01	1	0.01	ns
DXC	0.04	1	0.03	ns
Subj(DXC)	37.75	36		
Affect (A)	0.66	1	15.45	.0004
DXA	.01	1	0.30	ns
CXA	.00	1	0.05	ns
DXCXA	.00	1	0.00	ns
SubjXA(DXC)	1.54	36		
Intensity (I)	1.31	1	45.11	.0001
DXI	0.03	1	1.04	ns
CXI	0.00	1	0.00	ns
DXCXI	0.05	1	1.81	ns
SubjXI(DXC)	1.05	36		
AXI	0.51	1	16.35	.0003
DXAXI	0.16	1	5.29	.03
CXAXI	0.12	1	3.88	.06
DXCXAXI	0.05	1	1.61	ns
SubjXAXI(DXC)	1.11	36		

Table 4

Analysis of Variance of Accuracy Scores

Source	SS	df	F	p<
Depression (D)	0.25	1	0.95	ns
Condition (C)	0.27	1	1.03	ns
DXC	0.00	1	0.02	ns
Subj(DXC)	9.60	36		
Affect (A)	2.53	1	20.22	.0001
DXA	0.36	1	2.90	.10
CXA	0.00	1	0.04	ns
DXCXA	0.57	1	4.54	.04
SubjXA(DXC)	4.50	36		
Intensity (I)	5.56	1	68.55	.0001
DXI	0.51	1	6.25	.02
CXI	0.01	1	0.13	ns
DXCXI	0.19	1	2.36	ns
SubjXI(DXC)	2.92	36		
AXI	0.85	1	9.50	.004
DXAXI	0.12	1	1.36	ns
CXAXI	0.06	1	0.74	ns
DXCXAXI	0.03	1	0.36	ns
SubjXAXI(DXC)	3.21	36		

Mean scores corresponding to these significant interaction are displayed in Tables 5 and 6. Simple effects were then computed[10] and Dunn's (1961) correction for multiple planned comparisons was applied to evaluate each prediction. Support for each hypothesis will now be reviewed.

[10] Pooling of appropriate error terms (Howell, 1982) and computation of Satterthwaite (1946) degrees of freedom was completed when necessary for calculation of all simple effects.

Table 5

Mean Reaction Time in msec. for Depressed and Nondepressed Subjects by Affect and Intensity

Stimulus	Nondepressed Mean	Nondepressed SD	Depressed Mean	Depressed SD
Positive Target				
High Intensity	787.00	240.00	763.66	215.08
Low Intensity	905.61	292.59	937.79	359.27
Negative Target				
High Intensity	878.41	329.10	907.64	362.84
Low Intensity	959.03	373.15	875.60	255.30

Table 6

Mean Accuracy of Depressed and Nondepressed Subjects in the Emotional and Neutral Conditions for Positive and Negative Targets

	Positive Target		Negative Target	
	Mean	SD	Mean	SD
Condition and Group				
Emotional				
Nondepressed	0.77	0.21	0.64	0.18
Depressed	0.80	0.22	0.69	0.15
Neutral				
Nondepressed	0.68	0.28	0.65	0.21
Depressed	0.82	0.17	0.58	0.15

Review of Hypotheses

Hypothesis I. Since positive information is more congruent with the typical mood state of nondepressives than depressives, nondepressives will process positive information more efficiently than depressives.

To evaluate this hypothesis, the speed and accuracy with which nondepressives and depressives processed positive information was compared (see Tables 5 and 6). Contrary to the prediction, simple effects analysis revealed that nondepressives processed positive

information neither more quickly ($F(1,43)=0.17$, $p>.05$ and $F(1,43)=0.02$, $p>.05$ for high- and low-intensity respectively) nor more accurately ($F(1,64)=0.08$, $p>.05$ and $F(1,64)=1.03$, $p>.05$ for the Emotional and Neutral conditions respectively) than depressives.

Hypothesis II. Since negative information is more congruent with the typical mood state of depressives than nondepressive, depressives will process negative information more efficiently than nondepressives.

The pattern of results demonstrated by depressives and nondepressives for processing negative information was not consistent with this hypothesis. Again, simple effects analysis indicated that depressives processed negative information neither more quickly ($F(1,43)=0.16$, $p>.05$ and $F(1,43)=0.27$, $p>.05$ for high- and low-intensity respectively) nor more accurately ($F(1,64)=0.26$, $p>.05$ and $F(1,64)=0.42$, $p>.05$ for the Emotional and Neutral condition respectively) than nondepressives.

Hypothesis III. Since positive mood is more congruent with the typical mood state of nondepressives than is negative mood, nondepressives will process positive information more efficiently than negative information.

Consistent with this hypothesis, nondepressives demonstrated a tendency for processing positive information more quickly than negative information, particularly under high-intensity conditions (see Table 5). However, simple effects analysis indicated this trend was not significant ($F(1,70)=2.82$, $p>.05$ and $F(1,70)=0.29$, $p>.05$ for high- and low-intensity respectively).

As predicted, in the Emotional condition nondepressives were 13% more accurate in identifying positive than negative targets (see Table 6) although this was not significant ($F(1,36)=1.37$, $p>.05$). In the Neutral condition, the accuracy of nondepressives for identifying positive and negative targets was not significantly different ($F(1,36)=0.05$, $p>.05$).

Hypothesis IV. Since negative mood is more congruent with the typical mood state of nondepressives than is positive mood, depressives will process negative information more efficiently than positive information.

As summarized in Tables 5 and 6, the pattern of results demonstrated by depressives in the processing of positive and negative information was not consistent with this prediction. Analysis of simple effects

indicated that under high-intensity conditions depressives processed negative information significantly more slowly than positive information ($F(1,70)=6.64$, $p=.05$). Under low-intensity conditions speed of processing positive and negative information was not significantly different ($F(1,70)=0.76$, $p>.05$).

With respect to accuracy of processing, depressives in the Emotional condition identified positive targets with 11% greater accuracy than negative targets, however this failed to reach significance ($F(1,36)=0.91$, $p>.05$). Nondepressives in the Neutral condition showed a marginally significant trend toward greater accuracy (24%) in identifying positive than negative information ($F(1,36)=4.60$, $p=.10$).

Ancillary Analysis

In light of the failure to confirm consistent differences in mood on the MAACL between depressed and nondepressed subjects in the Emotional and Neutral conditions, correlations between the anxiety and depression subscales of the MAACL and measures of processing efficiency (reaction time and accuracy) were computed to further evaluate the mood-congruency

hypothesis. As Table 7 summarizes, the pattern of results produced from this analysis was also inconsistent with predictions derived from the mood-congruency hypothesis. Anxiety and depression were positively correlated at marginal and acceptable levels of significance with reaction time for processing both positive and negative information. Similarly, anxiety and depression correlated positively, although not significantly with accuracy in processing positive information. These results suggest that negative mood is associated with a general reduction in speed of processing both positive and negative information and an increased accuracy in processing positive information. Such findings further highlight the failure of the current study to support the mood-congruency hypothesis in information processing.

Table 7

Correlations between Reaction Time and Accuracy of Information Processing and MAACL Anxiety and Depression Scores

	Positive Target		Negative Target	
	High Intensity	Low Intensity	High Intensity	Low Intensity
Reaction Time				
Anxiety	0.21	0.27*	0.24	0.13
Depression	0.24	0.36**	0.29*	0.23
Accuracy				
Anxiety	0.16	0.29*	-0.05	0.08
Depression	0.26*	0.33**	-0.01	0.22

All correlations for $r(38)$
* p=.10
** p=.05

Additional Findings

Stimulus Demands. Not surprisingly, processing efficiency is greatly influenced by stimulus characteristics inherent in information. In the current study, both the affective quality and intensity of information significantly influenced reaction time and accuracy (see Table 3 and 4). Positive information was processed more quickly and accurately than negative

information and high-intensity information was processed more quickly and accurately than low-intensity information.

Significant affect x intensity interactions also emerged for both reaction time and accuracy measures. Simple effects analysis indicated that under high-intensity conditions positive information was processed more quickly ($F(1,70)=9.24$, $p=.05$) and accurately ($F(1,70)=7.40$, $p=.05$) than negative information. Under low-intensity conditions processing of positive and negative information was not significantly different ($F(1,70)=0.08$, $p>.05$ and $F(1,70)=0.51$, $p>.05$ for reaction time and accuracy respectively).

Recognition Memory

Four predictions were made regarding mood-congruency effects on recognition memory. Briefly, these were:

1. Nondepressives will demonstrate superior recognition memory for positive information than nondepressives.
2. Depressives will demonstrate superior recognition memory for negative information than nondepressives.
3. Nondepressives will demonstrate superior recognition memory for positive than negative information.

4. Depressives will demonstrate superior recognition memory for negative than positive information.

To evaluate these predictions, recognition accuracy scores were subjected to a 2 X 2 X 7 ANOVA with two between-subjects factors (depression level: depressed, nondepressed; condition: emotional, neutral) and one within-subject factor (stimulus type: high-intensity positive and negative, low-intensity positive and negative, neutral, surprise and angry). Contrary to predictions, this analysis failed to produce a significant main effect for depression ($F(1,36)=0.01$, $p>.05$). The main effect for condition ($F(1,36)=0.44$, $p>.05$) and the depression x condition interaction effect ($F(1,36)=1.30$, $p>.05$) were also nonsignificant. Analysis did indicate, however, that recognition accuracy varied significantly across stimulus categories ($F(6,216)=3.42$, $p=.003$).

As Table 8 indicates, accuracy of recognition memory was quite poor across all targets.
With the exception of high-intensity positive targets, there was a general trend towards better recognition memory for positive than neutral or negative targets. The results of subsequent pairwise comparisons applying

Table 8

Mean Accuracy* for Recognition Memory for Depressed and Nondepressed Subjects in the Emotional and Neutral Conditions

	Nondepressed		Depressed		
	Emotional Mean	Neutral Mean	Emotional Mean	Neutral Mean	Overall Mean
Stimulus					
High Positive	0.64	0.42	0.57	0.51	0.54
Low Positive	0.67	0.66	0.73	0.73	0.70
High Negative	0.60	0.48	0.40	0.50	0.49
Low Negative	0.63	0.57	0.45	0.60	0.56
Neutral	0.57	0.52	0.54	0.53	0.54
Surprise	0.58	0.64	0.67	0.65	0.63
Anger	0.58	0.47	0.60	0.59	0.56

* in percent accurate identifications

the Tukey (in Howell, 1982) test are summarized in Table 9.

It will be recalled that the predictions regarding the effects of mood-congruency on recognition memory were based on the assumption that increased depth of processing would produce better recognition memory. To specifically evaluate whether depth of processing was

Table 9

Summary of All Pairwise Comparisons
for Recognition Accuracy of Targets

Target	q
High intensity positive vs:	
low intensity positive.....	4.29*
high intensity negative....	1.34
low intensity negative.....	0.53
neutral.....	0.00
surprise.....	2.41
anger.....	0.53
Positive Low Intensity vs:	
high intensity negative....	5.63**
low intensity negative.....	3.75
neutral.....	4.29*
surprise.....	1.88
anger.....	3.75
High intensity negative vs:	
low intensity negative.....	1.88
neutral.....	1.34
surprise.....	3.75
anger.....	1.88
Low intensity negative vs:	
neutral.....	0.53
surprise.....	1.88
anger.....	0.00
Neutral vs:	
surprise.....	2.41
anger.....	0.53
Surprise vs. anger.....	1.88

All values of q for comparisons between 7 means with df=216.
* p=.10
** p=.05

related to accuracy of recognition memory, separate correlations for target categories were computed between dependent measures on the tachistoscopic

identification task (reaction time and accuracy) and accuracy of recognition memory. This analysis failed to indicate a significant relationship between either speed or accuracy of information processing and accuracy of recognition memory. (see Table 10). The exception is a significant inverse relationship between reaction time and recognition accuracy for positive targets under high-intensity conditions.

Table 10

Correlations between Efficiency of Information Processing (Reaction Time and Accuracy) and Accuracy of Recognition Memory

Reaction Time and Recognition Accuracy	r
High-intensity positive affect	-0.33*
Low-intensity positive affect	0.09
High-intensity negative affect	0.07
Low-intensity negative affect	0.08
Target Accuracy and Recognition Accuracy	
High-intensity positive affect	0.09
Low-intensity positive affect	0.18
High-intensity negative affect	0.01
Low-intensity negative affect	0.20

All correlations for r(38).
* p=.05

Stimulus Ratings

To determine whether depressives and nondepressives shared similar evaluations of targets, stimulus ratings were subjected to a 2 X 2 X 7 ANOVA with two between-subject factors (depression level: depressed, nondepressed; condition: emotional, neutral) and one within-subject factor (stimulus type: high-intensity positive and negative, low-intensity positive and negative, neutral, surprise and angry). This analysis indicated that depressives and nondepressives did not significantly differ in their evaluations of targets ($F(1,36)=1.95$, $p>.05$). The main effect for condition ($F(1,36)=0.16$, $p>.05$) and the depression x condition interaction effect ($F(1,36)=1.08$, $p>.05$) were also nonsignificant. Analysis did indicate, however, that ratings varied significantly across stimulus categories ($F(6,216)=175.29$, $p=.0001$).

Consistent with results of the pilot study, positive targets were rated as displaying more positive affect than were negative or neutral targets. In addition, positive targets were evaluated more positively than targets displaying expressions of anger. Targets displaying expressions of surprise received lower

ratings than positive targets but higher ratings than neutral or negative targets (see Table 11). The results of subsequent pairwise comparisons applying the Tukey (in Howell, 1982) test are summarized in Table 12.

Table 11

Mean Ratings* of Targets by Depressed and Nondepressed Subjects in the Emotional and Neutral Condition

	Nondepressed		Depressed		
	Emotional Mean	Neutral Mean	Emotional Mean	Neutral Mean	Overall Mean
Stimulus					
High Positive	6.66	6.70	6.36	6.13	6.46
Low Positive	5.67	5.60	5.47	5.37	5.53
High Negative	1.98	2.40	2.12	1.95	2.11
Low Negative	2.19	2.34	2.49	2.17	2.34
Neutral	3.83	3.89	3.64	3.62	3.74
Surprise	4.24	4.31	4.10	4.59	4.31
Angry	1.89	1.95	2.04	1.95	1.96

* higher scores indicate more positive ratings

Table 12

Summary of All Pairwise Comparisons of Target Ratings

Target	q
High intensity positive vs:	
low intensity positive.....	1.56
high intensity negative....	7.30**
low intensity negative.....	6.91**
neutral.....	6.34**
surprise.....	3.61
anger.....	7.55**
Positive Low Intensity vs:	
high intensity negative....	5.74**
low intensity negative.....	5.35**
neutral.....	3.00
surprise.....	2.04
anger.....	5.99**
High intensity negative vs:	
low intensity negative.....	0.37
neutral.....	2.73
surprise.....	3.69
anger.....	0.24
Low intensity negative vs:	
neutral.....	2.35
surprise.....	3.31
anger.....	2.01
Neutral vs:	
surprise.....	0.95
anger.....	2.99
Surprise vs. anger.....	3.94

All values of q for comparisons between 7 means with df=216.
* p=.05
** p=.01

Discussion

The present study was designed to evaluate a mood-congruence explanation of depressive information processing. Four hypotheses were evaluated with respect to efficiency of information processing. Contrary to hypotheses I and II: (a) nondepressives did not process positive information more efficiently than depressives; and (b) depressives did not process negative information more efficiently than nondepressives. Hence, the current study did not establish that depressives differed from nondepressives in efficiency of processing positive and negative information.

Hypothesis III predicted that nondepressives would process positive information more efficiently than negative information. The pattern of results which emerged for nondepressives provided weak support for this prediction. Hypothesis IV predicted that depressives would process negative information more efficiently than positive information. In sharp contrast to this prediction, results indicated that depressives processed negative information significantly more slowly and less accurately than

positive information. Thus, contrary to the mood-congruency hypothesis, both depressives and nondepressives demonstrated greater efficiency in processing positive than negative information. Moreover, this bias in relative efficiency was strongest for depressives.

Four corresponding hypotheses regarding the effects of mood-congruency on recognition memory were also evaluated. Again, results failed to support the hypotheses: (a) nondepressives did not demonstrate better recognition memory for positive information than depressives; and (b) depressives did not demonstrate better recognition memory for negative information than nondepressives. Similarly, neither nondepressives nor depressives were found to differ significantly in recognition memory for positive and negative information. In light of the fact that mood-congruency effects in efficiency of information processing were not established, these results are not surprising. However, subsequent analyses also failed to establish a significant relationship between depth of information processing and recognition memory.

The current study also evaluated how depressives and nondepressives evaluated the affective quality of stimuli. Consistent with previous research, depressives and nondepressives were not significantly different in their evaluations of the type and intensity of affect displayed in targets.

In contrast with previous research, the current results fail to demonstrate a mood-congruency effect information processing. Rather, the present findings are consistent with considerable research indicating that individuals tend to process positive information more efficiently than negative information (Matlin & Stang, 1978). There are several methodological differences between the present study and past research which may account for the current failure to establish mood-congruency effects in information processing. First, past research has evaluated the effects of induced positive and negative mood on information processing in nondepressives. The current research examined how depressives and nondepressives process information differently. It may be that induced mood states which are transient and represent a <u>shift</u> in affect influence information processing differently

than noninduced mood states or enduring and stable moods found in depression.

Second, while mood congruency effects on memory have been reliably demonstrated, studies evaluating the effects of mood on attention to positive and negative information have produced equivocal results. It may be that many dependent measures used in attention research (e.g, recognition thresholds; speed of processing) are so strongly influenced by the salience of stimuli (intensity) that mood-congruence effects are "masked". Our finding that the influence of affect on information processing was most clearly evident under high-intensity conditions suggests that performance on this task is a function of both stimulus characteristics and processing biases.

Previous studies differ from the current research in one final respect. Namely, studies that report evidence of mood-congruence generally were designed in such a manner that self-referencing was invoked during information processing. For example in Postman and Brown's (1952) study, mood-congruence in recognition threshold was evaluated for positive and negative

information subjects had received about their earlier performance. Mischel et al. (1973) found support for the mood-congruence hypothesis when evaluating attention to positive or negative information about the self following either success or failure. Similarly, Isen et al. (1978) noted that success on a computer game acted as a "prime" for recall of positive rather than negative information about personality traits. Finally, Bower (1981) found mood selectively biased the recall of real-life events and memories from childhood; information clearly relevant to the self. A distinct quality of each of these studies is that self-referent processing is encouraged, either explicitly through the nature of the information being processed or implicitly by "priming" the self with positive or negative feedback about performance.

The role of the self is less clear in studies that have failed to demonstrate the effects of mood on information processing. In the Gotlib and McCann's (1984) second study, for example, mood-congruency effects failed to emerge in performance on a Stroop task (i.e., naming the colour of ink of positive and negative words). Performance on this task, however,

seems less likely to invoke self-referencing than performance on tasks evaluating attention to and memory for positive and negative information about personality characteristics (Isen et al., 1978; Mischel et al., 1973). Similarly, task performance in the current experiment did not explicitly invoke self-referencing. Self-referencing may have occurred, however, either through identification with targets or the perception of targets as responses to the self. Indeed, the performance of depressives and nondepressives may have been differentially influenced by the degree to which self-referencing was invoked by positive and negative information.

Kuiper and Rogers (1979) describe the self as a "powerful agent during the encoding of personal information" (p.511). Previously reviewed research evaluating the role of the self in depressive information processing supports the hypothesis that the depressive's negative self-schema facilitates the processing of negative rather than positive information. An alternative account is that the introduction of the self during information processing operates as an 'active set' (Shiffrin & Schneider,

1977) that alters the 'accessibility' or readiness with which positive and negative constructs are utilized during information processing (Higgins & King, 1981; McCann & Higgins, in press).

Study 2

Study 2 examines the importance of self-reference in depressive information processing. The general hypothesis guiding this research is that under conditions designed to invoke self-referencing, information that is congruent with the self will be processed more efficiently than information that is incongruent. Four specific predictions will be evaluated:

Hypothesis I: Since positive information in more congruent with the self-representation of the nondepressive than the depressive, under self-referent conditions nondepressives will process positive information more efficiently than depressives.

Hypothesis II: Since negative information is more congruent with the self-representation of the depressive than the nondepressive, under self-referent conditions depressives will process negative information more efficiently than nondepressives.

Hypothesis III: Since positive information is more congruent with the self-representation of the nondepressive than is negative information, under self-referent conditions nondepressives will process positive information more efficiently than negative information.

Hypothesis IV: Since negative information is more congruent with the self-representation of the depressive than is positive information, under self-referent conditions depressives will process negative information more efficiently than positive information.

Relatively little attention has been directed towards understanding how depressives process information for the self versus others. Several researchers (Bower and Gilligan, 1979; Kuiper, 1982; Kuiper & Rogers, 1979) have proposed that processing information about others is facilitated by the existence of an organized cognitive structure or schema for that person. Previously reviewed research suggests that depressives, unlike nondepressives, perceive others more positively than themselves.

The second goal of Study 2, therefore, is to evaluate the importance of self- versus other-reference in depressive information processing. The general hypothesis guiding this research is that information that is congruent with self- or other-representations will be processed more efficiently than information that is incongruent. Four specific predictions will be evaluated:

Hypothesis V: Since positive information is more congruent with the self- than other-representation of the nondepressive, nondepressives will process positive

information more efficiently under self- than other-referent conditions.

Hypothesis VI: Since negative information is more congruent with the self- than other-representation of the nondepressive, nondepressives will process negative information less efficiently under self- than other-referent conditions.

Hypothesis VII: Since positive information is less congruent with the self- than other-representation of the depressive, depressives will process positive information less efficiently under self- than other-referent conditions.

Hypothesis VIII: Since negative information is more congruent with the self- than other-representation of the depressive, depressives will process negative information more efficiently under self- than other-referent conditions.

Information processing will be evaluated under two conditions of intensity to determine whether the effects of stimulus demands differ across conditions. In general, the effects of self- and other-reference are expected to be more pronounced under high- than low-intensity conditions. As in Study 1, both reaction time and response accuracy will be utilized as measures of information processing efficiency.

Study II: Method

Subjects

Sixty right-handed undergraduates at York University volunteered to serve as subjects in an experiment on the perception of emotion. Subjects received $3.00 for participation in the study. As in experiment one, hand preference was evaluated with the shortened version of Annett's (Briggs & Nebes, 1975) handedness questionnaire and subjects were categorized as depressed or nondepressed on the basis of their responses on the BDI (Beck, 1972). Thirty subjects (15 males and 15 females) with scores equal to or greater than 9 were classified as depressed and thirty subjects (15 males and 15 females) with scores equal to or less than 8 were classified as nondepressed.[11]

Experimental Tasks

Tachistoscopic Identification Task. A two-channel tachistoscope was used to present stimulus material for 300 msec. periods. Stimulus material and apparatus was identical to that described in study one.

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[11] Left-handed subjects were excluded from the study. A total of 78 subjects actually completed the experiment before data for 30 depressed and 30 nondepressed subjects was available.

To evaluate the importance of self- versus other-referent processing, three experimental conditions were designed, each requiring forced-choice responding. In the control condition, subjects were directed to to select the more 'emotional' face from the two photographs following the same instructions used in the Emotional Condition of Study 1 (Appendix F). Subjects assigned to the 'Self' condition were provided with similar instructions, but were directed to view the pictures as emotional responses to themselves. Their task was to select the face which told them the most about how the person might feel about them. Specifically, self-referencing was encouraged with the following instructions[12] :

> In viewing these photographs please try to imagine as vividly as you can that you are involved in a social interaction with the person in the photograph. Try to imagine as realistically as possible that these pictures reflect emotional responses to your behavior (something you've said or done) in a social interaction with this person. It is extremely important that you view these pictures as emotional responses to yourself. Your task will be identify the face reflecting the strongest emotional response to you; i.e., the face that tells you the most about how this person feels about you.

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[12] See Appendix G for complete instructions.

> This is a task you have probably engaged in on several occasions. For example, if you are at a party and you meet someone for the first time, you are likely to closely watch this person's facial expressions to get an idea of how they feel about you. Or, if you are giving a presentation in front of a group you are likely to closely watch others' expressions to get an idea of how they feel about you.

Subjects assigned to the 'Other' condition received comparable instructions directing them to view the pictures as emotional responses of the individual in the picture to a third person. In this context, their task was to identify the face reflecting the strongest emotional response to this third party.[13]

Manipulation Check. Subjects in the Self and Other conditions completed two questions evaluating how successfully they were able to imagine and respond to stimuli as directed to themselves or to others. The first question asked subjects to rate how successful they were at imagining and evaluating the faces in the appropriate context on a 7-point scale ranging from extremely unsuccessful (1) to extremely successful (7). The degree of difficulty of this task was assessed in the second question on a 7-point scale ranging from extremely difficult (1) to extremely easy (7).

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[13] See Appendix H for complete instructions.

Procedure

Subjects were randomly assigned to one of the three experimental conditions (Control, Self, Other). Each session began with subjects reading an information sheet detailing the nature of their participation in the experiment (see Appendices I and J) and completing an appropriate consent form. Subjects were instructed to complete the BDI on the basis of their current and recent feeling during the past week. The MAACL (Today Form) and Annett's Handedness Questionnaire were completed following standard instructions.

Once subjects had completed preliminary measures, they were seated in front of the tachistoscope and provided with appropriate experimental instructions. Subjects completed the two blocks of 26 trials, separated by a brief (approximately 3 min.) rest period.

Following this subjects in the Self and Other conditions evaluated how successfully they had followed experimental instructions. All subjects were fully debriefed and paid for their participation.

Study II: Results

Subject Characteristics

A two-way analysis of variance with depression level (depressed; nondepressed) and condition (Control, Self, Other) as between-subject factors confirmed that depressives experienced greater depressed mood ($F(1,54)=38.91$, $p=.0001$), anxiety ($F(1,54)=37.04$, $p=.0001$) and hostility ($F(1,54)=19.77$, $p=.0001$) than nondepressives[14] (see Table 13). Depression x condition interaction effects were nonsignificant ($F(2,54)=2.34$, $p>.05$ for depression; $F(2,54)=0.90$, $p>.05$ for anxiety; and $F(2,54)=0.70$, $p>.05$ for hostility).

As in Study 1, scores on the BDI and MAACL subscales were highly intercorrelated (see Table 14).

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[14] Consistent with the use of the BDI as a classification variable, depressives scored significantly higher than nondepressives on this measure (F 1,54)=177.29, $p=.0001$).

Table 13
Group Means on the Beck Depression Inventory and Multiple Affect Adjective Checklist

Condition & Group	Beck Depression Inventory	Multiple Affect Adjective Checklist		
		Depression	Anxiety	Hostility
Control				
Nondepressed	3.00	8.70	3.90	4.30
SD	1.62	4.95	2.78	2.80
Depressed	13.70	14.30	8.30	9.40
SD	3.62	4.01	2.69	3.70
Self				
Nondepressed	2.90	9.90	5.90	6.80
SD	1.93	6.48	2.99	4.11
Depressed	11.43	17.22	9.60	9.41
SD	3.40	5.69	3.18	3.60
Other				
Nondepressed	2.60	7.80	4.50	5.90
SD	2.54	4.74	2.85	3.06
Depressed	13.10	20.30	10.70	10.60
SD	2.74	3.53	2.80	3.11

Table 14
Matrix of Correlations* between the Beck Depression Inventory and Multiple Affect Adjective Checklist

	BDI	Depression	Anxiety
BDI			
Depression	.58		
Anxiety	.63	.85	
Hostility	.51	.71	.66

* All values for $r(58)$ significant at $p=.0001$.

Speed and Accuracy of Information Processing

Reaction Time: Treatment of Data. As in Study 1, inspection of the distribution of scores in the current data set indicated that elimination of the top .05% of data points effectively eliminated outliers. This was supported by a reduction in measures of skewness (from 2.86 to 2.10) and kurtosis (from 12.75 to 5.55).

Logarithmic transformation was performed on reaction time values due to dependency between mean and standard deviation scores ($r(58)=0.57$, $p=.0001$). This procedure successfully reduced dependency although the relationship between mean and standard deviation scores remained significant ($r(58)=0.34$, $p=.001$). However, transformation was successful in further normalizing the distribution as reflected in reduced values for skewness (.51) and kurtosis (-0.01). Analysis of nontransformed and transformed scores produced generally consistent results (see Appendix K).

Data Analysis. Preliminary analysis of log transformed reaction scores for accurate responses and response accuracy was completed using a 2 X 3 X 2 X 2 analysis of variance (ANOVA) with two between-subject

factors (Depression level: depressed, nondepressed; condition: Control, Self, Other) and two nested within-subject factors (Affect: positive, negative; Intensity: high, low). This procedure produced several significant main and interaction effects for both reaction time and accuracy dependent variables (see Appendices L and M).

Review of mean scores (see Appendices N through Q) corresponding to the significant condition x depression x affect x intensity interactions that emerged in the analysis of both reaction time and response accuracy indicated that the influence of affect on information processing in all conditions was most clearly evident under high-intensity conditions. Thus, to evaluate the hypotheses more directly, analyses of reaction time (log transformed scores for accurate responses) and response accuracy for performance in the high-intensity condition only was completed using a 2 X 3 X 2 analysis of variance with two-between subject factors (Depression level: depressed, nondepressed; Condition: Control, Self, Other) and one within-subject factor(Affect: positive, negative)

Table 15
Analysis of Variance of Log Transformed Reaction Time Scores

Source	SS	df	F	p ≤
Depression (D)	1.48	1	7.24	.01
Condition (C)	2.03	2	4.96	.01
DXC	0.64	2	1.57	ns
Subj(DXC)	11.05	54		
Affect (A)	1.13	1	41.43	.0001
DXA	0.13	1	4.87	.03
CXA	0.00	2	0.03	ns
DXCXA	0.25	2	4.60	.01
SubjXA(DXC)	1.48	54		

Table 16
Analysis of Variance of Accuracy Scores

Source	SS	df	F	p ≤
Depression (D)	0.09	1	1.89	ns
Condition (C)	0.89	2	9.71	.0002
DXC	0.02	2	0.29	ns
Subj(DXC)	2.48	54		
Affect (A)	0.84	1	29.65	.0001
DXA	0.02	1	0.78	ns
CXA	0.03	2	0.65	ns
DXCXA	0.32	2	5.71	.01
SubjXA(DXC)	1.53	54		

From these analyses the significant interaction effects of most relevance to the hypotheses were identified (see Table 15 and 16). Specifically, these were significant condition x depression x affect interaction effects which emerged in the analysis of both reaction

time and response accuracy. Mean scores corresponding to these significant interactions are displayed in Tables 17 through 20.

Table 17
Mean Reaction Time in msec. for Nondepressed Subjects by Condition and Affect

	Condition		
Stimulus	Control	Self	Other
Positive Affect	699.73	790.63	782.09
SD	109.11	237.14	201.88
Negative Affect	995.28	1205.92	921.31
SD	421.03	638.31	349.23

Table 18
Mean Reaction Time in msec. for Depressed Subjects by Condition and Affect

	Condition		
Stimulus	Control	Self	Other
Positive Affect	876.96	1556.42	864.98
SD	237.49	761.81	338.12
Negative Affect	1003.42	1547.08	1146.86
SD	393.66	596.10	552.77

[15] Pooling of appropriate error terms (Howell, 1982) and computation of Satterthwaite (1946) degrees of

Table 19
Mean Accuracy* for Nondepressed Subjects
by Condition and Affect

Stimulus	Condition: Control	Self	Other
Positive Affect	.94	.85	.86
SD	.10	.17	.19
Negative Affect	.75	.48	.83
SD	.18	.24	.11

Table 20
Mean Accuracy* for Depressed Subjects
by Condition and Affect

Stimulus	Condition: Control	Self	Other
Positive Affect	.91	.64	.87
SD	.15	.32	.14
Negative Affect	.75	.59	.65
SD	.23	.15	.21

Simple effects were computed[15] to evaluate each prediction. Support for each hypothesis will now be reviewed.

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freedom was completed when necessary for calculation of all simple effects.

Review of Hypotheses

A. Self-Referent Information Processing

Hypothesis I. Since positive information is more congruent with the self-representation of the nondepressive than the depressive, under self-referent conditions nondepressives will process positive information more efficiently than depressives.

This prediction was evaluated by comparing the speed and accuracy with which nondepressives and depressives processed positive information under self-referent conditions. As predicted, simple effects analysis confirmed that nondepressives processed positive information more quickly (766 msec.; $F(1,68)=15.55$, $p=.001$) and accurately (21%; $F(1,102)=6.23$, $p=.01$) than depressives.

Hypothesis II. Since negative information is more congruent with the self-representation of the depressive than the nondepressive, under self-referent conditions depressives will process negative information more efficiently than nondepressives.

Contrary to this prediction, under self-referent conditions depressives processed negative information more slowly (350 msec.) than nondepressives although this trend was not significant ($F(1,68)=2.86$, $p>.05$). The pattern of results that emerged for accuracy of information processing was consistent with the

hypothesis: depressives were marginally more accurate (10%) than nondepressives in processing negative information under self-referent conditions, however this pattern also failed to reach significance ($F(1,102)=1.44$, $p>.05$).

Hypothesis III. Since positive information is more congruent with the self-representation of the nondepressive than is negative information, under self-referent conditions nondepressives will process positive information more efficiently than negative information.

To evaluate this prediction, the efficiency with which nondepressives processed positive and negative information under self-referent conditions was compared. Consistent with the hypothesis, simple effects analysis indicated positive information was processed significantly more quickly (416 msec.; $F(1,68)=5.44$, $p=.05$) and more accurately (35%; $F(1,102)=18.12$, $p=.001$) than negative information.

Hypothesis IV. Since negative information is more congruent with the self-representation of the depressive than positive information, under self-referent conditions depressives will process negative information more efficiently than positive information.

Contrary to the hypothesis, analysis of simple effects revealed that under self-referent conditions

depressives did not differ in speed ($F(1,68)=0.01$, $p>.05$) or accuracy ($F(1,102)=0.31$, $p>.05$) of processing for positive versus negative information.

B. Self- versus Other-Referent Information Processing

Hypothesis V. Since positive information is more congruent with the self- than other-representation of the nondepressive, nondepressives will process negative information more efficiently under self-referent than other-referent conditions.

This prediction was evaluated by comparing the efficiency with which nondepressives processed positive information in the self- and other-referent conditions. Contrary to predictions, analysis of simple effects indicated speed ($F(1,68)=0.00$, $p>.05$) and accuracy ($F(1,102)=0.02$, $p>.05$) of processing positive information did not differ significantly between the two conditions.

Hypothesis VI. Since negative information is less congruent with the self- than other-representation of the nondepressive, nondepressives will process negative information less efficiently under self- than other-referent conditions.

As predicted, nondepressives processed negative information more slowly (285 msec.) in the self- than other-referent condition although this failed to reach significance ($F(1,68)=1.85$, $p>.05$). Nondepressives

also demonstrated significantly lower accuracy (35%) for processing negative information under self- than other-referent conditions ($F(1,102)=16.51$, $p=.001$).

Hypothesis VII. Since positive information is less congruent with the self- than other-representation of the depressive, depressives will process positive information less efficiently under self- than other-referent conditions.

To evaluate this hypothesis, the efficiency with which depressives processed positive information under self- and other-referent conditions was compared. As predicted, depressives processed positive information significantly more slowly (692 msec.; $F(1,68)=12.06$, $p=.001$) and less accurately (23%; $F(1,102)=7.24$, $p=.01$) under self-referent than other-referent conditions.

Hypothesis VIII. Since negative information is more congruent with the self- than other-representation of the depressive, depressives will process negative information more efficiently under self- than other-referent conditions.

Contrary to the hypothesis, depressives processed negative information somewhat more slowly (400 msec.) and less accurately (6%) under self- than other-referent conditions. Analysis of simple effects revealed this trend in speed of processing was marginally significant ($F(1,68)=3.60$, $p=.10$) while the

accuracy of processing negative information under the two conditions was not significantly different ($F(1,102)=0.54$, $p>.05$).

Additional Findings

Processing Information in the Self-Referent versus Control Condition. The pattern of results which emerged for nondepressives and depressives indicate that they responded differently under control versus self-referent conditions. For nondepressives, speed and accuracy of processing positive information did not differ significantly between the self-referent and control conditions ($F(1,68)= 0.40$, $p>.05$ and $F(1,102)=1.06$, $p>.05$ for reaction time and accuracy respectively). Nondepressives' speed of processing negative information also did not differ significantly between the two conditions ($F(1,68)=1.27$, $p>.05$), but nondepressives did process negative information significantly less accurately in the self-referent than control condition ($F(1,102)=9.59$, $p=.01$).

In contrast, depressives processed positive information significantly more slowly ($F(1,68)=10.91$, $p=.01$) and less accurately ($F(1,102)=9.87$, $p=.01$) in

the self-referent than control condition. Negative information was also processed significantly more slowly ($F(1,68)=6.78$, $p=.05$), although not less accurately ($F(3.59$, $p>.05$) in the self-referent than control condition.

Processing Information in the Other-Referent versus Control Condition. For nondepressives, positive information was processed somewhat more slowly and less accurately in the other-referent than control condition, although simple effects analysis indicated these differences were not significant ($F(1,68)=0.39$, $p>.05$ and $F(1,102)=0.81$, $p>.05$ for reaction time and accuracy respectively). In contrast, nondepressives processed negative information slightly more quickly and more accurately in the other-referent than control condition. Again, however, analysis of simple effects indicated this was not significant ($F(1,68)=0.05$, $p>.05$ and $F(1,102)=0.94$, $p>.05$ for reaction time and accuracy respectively).

Depressives were not significantly different in how quickly or accurately they processed positive information in the other-referent and control

conditions ($F(1,68)=0.03$, $p>.05$ and $F(1,102)=0.50$, $p>.05$ for reaction time and accuracy respectively). Unlike nondepressives, depressives also were not significantly different in efficiency of processing negative information in the other-referent and control conditions ($F(1,68)=0.50$, $p>.05$ and $F(1,102)=0.02$, $p>.05$ for reaction time and accuracy respectively).

Processing Information in the Other-Referent Condition. Additional simple effects analyses were completed to further evaluate nondepressive and depressive processing of information in the other-referent condition. Nondepressives in the other-referent condition failed to show a bias towards processing positive information more efficiently than negative information ($(1,68)=0.95$, $p>.05$ and $F(1,102)=0.10$, $p>.05$ for reaction time and accuracy respectively). In contrast, depressives in the other-referent condition processed positive information somewhat more quickly ($F(1,68)=2.74$, $p>.05$) and accurately ($F(1,102)=6.33$, $p=.10$) than negative information.

Performance Evaluation

Table 21 presents the mean scores for performance evaluation and task difficulty. A two-way analysis of variance with depression and condition as between-subject factors did not produce significant main or interaction effects for either dependent measure (Performance evaluation: $F(1,54)=0.01$, $p>.05$ for depression, $F(2,54)=0.01$, $p>.05$ for condition, and $F(2,56)=0.02$, $p>.05$ for depression x condition; Task difficulty: ($F(1,54)=0.05$, $p>.05$ for depression, $F(1,54)=0.00$, $p>.05$ for condition, and $F(1,54)=0.06$, $p>.05$ for depression x condition).

Table 21

Mean Rating of Performance and Task Difficulty by Depressed and Nondepressed Subjects

Group and Condition	Performance Evaluation*	Task Difficulty**
Nondepressed		
Self Condition	4.5	4.3
Other Condition	5.3	5.7
Depressed		
Self Condition	4.8	4.9
Other Condition	4.7	5.3

* higher scores indicate greater success
** higher scores indicate less difficulty

Discusssion

Study 2 was designed to evaluate the importance of self- and other- reference in depressive information processing. Results indicated that depressives differ from nondepressives in several respects when processing social information. These findings will now be summarized in terms of their significance for understanding how depressives process social information that is directed at themselves and others.

Self-Referent Information Processing

Four hypotheses were evaluated with respect to efficiency of information processing under self-referent conditions. As predicted, nondepressives processed positive information more quickly and more accurately than did depressives in this condition. However, nondepressives did not differ significantly from depressives in the efficiency with which they processed negative information.

It was hypothesized that under self-referent conditions, nondepressives would process positive information more efficiently than negative information. Results strongly supported this prediction:

nondepressives processed positive information an average of 400 msec. more quickly and 35% more accurately than negative information. In contrast, depressives failed to demonstrate significantly different efficiency in processing positive and negative information.

The current finding that nondepressives process positive information more efficiently than negative information is consistent with previous research documenting self-serving biases in processing information directed toward the self (Miller, 1976; Miller & Ross, 1975). Depressives most clearly distinguished themselves from nondepressives by less efficient processing of positive information rather than by more efficient processing of negative information. The failure to demonstrate enhanced processing of positive relative to negative information leads the depressive to appear more 'even-handed' in processing information of different valences.

Kuiper and his colleagues (Kuiper & Derry, 1982; Kuiper & MacDonald, 1982) have previously documented that mild depressives process positive and negative

information with equal efficiency. They propose that the depressives' 'evenhandedness' in information processing stems from a disorganized self-schema that represents both positive and negative content equally. "Whereas the person may have already begun to experience some depressive symptoms, the mild nature of these symptoms may prohibit their precise identification and assimilation" (Kuiper, Olinger & MacDonald, 1985). In contrast, the more complete integration of negative information into the self-schema of the clinical depressive leads to enhanced processing of negative relative to positive information.

The results of Study 2 are consistent with this analysis in that they document 1) that mild depressives process positive and negative information with equal efficiency and 2) that the major difference between mild depressives and nondepressives occurs with the processing of positive information rather than negative information. Depressives do not process negative information more efficiently than nondepressives, rather they process positive information less efficiently. These findings seem more consistent with

an alternative model of information processing in depression advanced by Higgins and his colleagues (Higgins & King, 1981; McCann & Higgins, in press). This model proposes that changes in efficiency of information processing are mediated by two factors: 1) the 'availability' of constructs in memory that are relevant to processing information; and 2) the 'accessibility' or readiness with which each construct is utilized during information processing.

The results of Study 1 suggest that depressives and nondepressives do not differ in the availability of constructs for processing positive and negative information: under conditions that were not clearly self-relevant, both depressives and nondepressives processed positive information more efficiently than negative information. However, the findings of Study 2 suggest that under self-referent conditions the accessibility of constructs for processing information may vary for depressives and nondepressives. It may be that for mild depressives, self-reference operates as an 'active set' (Shiffrin & Schneider, 1977) that inhibits the accessibility of previously assimilated ('available') positive-content constructs, hence

reducing the efficiency with which positive information is processed. The introduction of self-reference for nondepressives may not be associated with inhibition in accessibility of positive content constructs.

Self versus Other-Referent Information Processing

Four hypotheses were evaluated with respect to efficiency of processing positive and negative information under self- versus other-referent conditions. Contrary to the first prediction, nondepressives failed to demonstrate significantly greater efficiency for processing positive information in self- than other-referent condition. However, results generally supported Hypothesis VI: nondepressives processed negative information somewhat more slowly and significantly less accurately in the self- than other-referent condition.

The finding that nondepressives processed negative information less efficiently under self- than other-referent conditions is consistent with previous findings indicating nondepressives see others more negatively than themselves (Tabachnik et al., 1983). The current results suggest this may be the consequence

of regarding negative qualities as less true of themselves than others; rather than regarding positive qualities as more true of themselves than others. It is the efficiency with which nondepressives process negative information in the other-referent condition that leads them to appear 'even-handed' in processing information about others.

These results suggest that other-reference conditions may also influence the accessibility of positive and negative constructs differently for depressives and nondepressives. For nondepressives, the introduction of other-reference conditions may operate as an active set that increases the accessibility of negative content constructs, hence increasing the efficiency with which negative information is processed. In contrast, under other-reference conditions depressives may show greater accessibility of positive relative to negative constructs for processing information.

The self-enhancing consequences of implicating the self more readily in response to positive than negative information have been well-documented (see Miller &

Moretti, 1985; Miller & Porter, 1985). This type of bias is likely to lead to a more positive than negative evaluation of oneself. Moreover, when compared to others, the self may appear even more positive because others are readily implicated in response to negative information whereas the self is not.

Hypotheses VII and VIII evaluated self- versus other-referent processing in depressives. Consistent with the first prediction, depressives processed positive information significantly more slowly and less accurately under self- than other-referent conditions. Contrary to the last prediction, however, depressives did not process negative information more efficiently under self- than other-referent conditions.

The finding that depressives processed positive information less efficiently under self- than other-referent conditions is consistent with previous research documenting the depressives' more positive evaluations of others over themselves (Tabachnik et al., 1982). Contrary to this research, however, the current findings suggest that the depressives evaluations may be the consequence of evaluating

positive qualities as more true of others than themselves; rather than evaluating negative qualities as more true of themselves than others. It is the depressives efficiency of processing positive information in the other-referent condition that leads them to demonstrate 'self-disserving' biases (Miller & Moretti, 1985).

The fact that depressives implicate the self equally in response to positive and negative information has neither self-enhancing nor self-derogating consequences. The fact that depressives do implicate others in response to positive information, however, has negative consequences for self-esteem. Again, this finding highlights the importance of social comparison in self-evaluation.

General Discussion

The Importance of Self and Affect in Information Processing

The self has long been recognized as crucial in social information processing (James, 1915; McDougall, 1921). Contemporary research continues to assert the importance of the self in this regard: "We suggest that the self-structure is not only different from other structures, but that it can be viewed as the central structure and the first structure through which all information flows" (Markus & Sentis, 1980, p.65). At the same time, there is good reason to believe that affect plays a significant role in the encoding, representation and interpretation of social information. Zajonc (1980) stated "affect dominates social interaction and is the major currency in which social interaction is transacted" (p. 155).

How might these two components of social information processing be reconciled? The current research failed to find evidence of mood-congruent information processing as a function of individual differences in mood. In contrast, invoking self- or other-reference had a significant impact on the efficiency with which

depressives and nondepressives processed positive and negative information. This might be interpreted as a demonstration of the primary importance of the self over affect in information processing. However, the fact that self-reference effects on information processing demonstrated in Study 2 were clearly mood-congruent cannot be ignored: nondepressives processed positive information more efficiently than negative information while depressives failed to do so. These findings suggest that the influence of affect may be limited to circumstances in which the self is invoked, either directly or indirectly, during information processing. Alternatively, all information invested with affect may become relevant to the self (Markus & Sentis, 1982). The understanding of the relation between self and affect merits further attention as it is critical to explicating the role of the self in social information processing.

Depression and Social Interactions

Coyne and his colleagues contend that "one cannot provide an adequate description of the cognitive processes of depressed persons without some reference to the information typically available to them" (Strack

& Coyne, 1983, p.798). What might be the social consequences of the nondepressives' and depressives' style of information processing? Results suggest nondepressives would be more likely to attend and respond to the positive than negative social behaviors of others. This bias would seem to facilitate a positive course of social interaction by encouraging prosocial behavior on the part of others. Hence, interactions between nondepressives are likely to be mutually rewarding and therefore sought after rather than avoided.

For depressives, on the other hand, reduced efficiency in processing positive self-relevant social information may cause them to be less inclined to reward the positive responses of others. Indeed, research documenting the depressives' lack of social skills and poor social responsiveness (Libet & Lewinsohn, 1973; Lewinsohn, 1974) may be tapping the consequences of the depressives' failure to adequately process positive social responses from others. This quality of the depressives' style of social interaction may be perceived by others as 'rejecting' and in turn lead to feelings of frustration, discomfort, and anger on the part of others.

Depressives are also likely to experience social interactions as frustrating. The depressive will fail to identify and process the positive social reactions that they perceive themselves as unable to attract. Yet they will perceive positive interactions as freely exchanged during interactions among others. Hence, depressives may increasingly avoid and withdraw from social interactions and this behavior may be reciprocated by others.

Vulnerability to Depression

The depressives' style of social information processing has important implications for understanding vulnerability to depression. To the extent that positive-content constructs are relatively inaccessible during information processing, depressives will fail to identify and process positive self-relevant information. This will be perpetuated not only because of the possible behavioral consequences on social interaction style but also because the relative accessibility of constructs during information processing is determined by the recency and frequency of their activation (Higgins & King, 1981; McCann & Higgins, in press). Hence, the less recent and less

frequent the activation of positive-content constructs, the less likely they will be accessible in future information processing.

Beck (1984) has recently pointed out the importance of recognizing and treating the depressives' inattention to and poor processing of positive information. In referring to the impact of therapy on this process, Beck (1984) stated: "Pharmacotherapy or cognitive therapy affect the information processing in such a way as to 'lift the blockade' and, thus, facilitate the admission and integration of positive self-referential information" (p.1113).

While current models offer little for understanding how individual differences in accessibility might develop, one clear prediction from an information processing perspective is that earlier development will be associated with poorer prognosis. For this reason, a developmental model of depression from a social-cognitive perspective would be valuable. In addition, the identification and treatment of depressive disorders in younger populations is critical.

Limitations of the Current Research and Future Directions

The present research is limited by a number of factors. First, depressives in these studies were college students evaluated as depressed on the basis of self-report inventories. As previously reviewed, the current understanding of the relation between mild and more severe depressive disorders is limited. Thus, the demonstration of these effects in clinical populations is critical to generalizing the conclusions and implications advanced for mild depressives. Replication of this study with a clinical population is currently underway for this reason (Moretti, Segal, McCann & Shaw, in progress).

Second, the current research did not examine sex differences in the relation between depression and information processing. Epidemiologic surveys have consistently revealed a higher prevalence of depression among women (see Frerichs, Aneshensel & Clark, 1981; Weismann & Klerman, 1977). It is possible that the relation between depression and information processing differs for males and females. Further research investigating this issue may provide some insight into the origin of this gender difference.

The final limitation of the current research involves the nature of the measures utilized in assessing social information processing. That subjects' reaction time and accuracy of processing information under brief exposure conditions truly reflects how social information is processed under more ecologically valid conditions is not known. Brief exposure conditions were selected to encourage 'top-down', 'automatic' processing of information (Bargh, 1984; Shiffrin & Schneider, 1977). Under normal social conditions, however, subjects may have more information available to them or they may act on their environment to increase the amount of available information. The current research also evaluated how depressives and nondepressives processed social information emitted from unfamiliar others. Although this procedure allows for more direct assessment of information processing biases due strictly to the subject rather than to characteristics of the interaction target, it fails to account for the fact that social interactions occur in the context of a interactive relation between two individuals (Darley & Fazio, 1980). Further research employing direct

observation of depressives and their social interaction partners is necessaty to evaluate the validity of implications drawn from this research for understanding depressive social interactions.

References

Abramson, L. Y., Garber, J., Edwards, N. B. & Seligman, M. E. P. (1978). Expectancy changes in depression and schizophrenia. Journal of Abnormal Psychology, 87, 102-109.

Abramson, L. Y., Seligman, M. E. P. & Teasdale, J. D. (1978). Learned helplessness in humans: Critique and reformulation. Journal of Abnormal Psychology, 87, 49-74.

Alloy, L. B. & Abramson, L. Y. (1979). Judgments of contingency in depressed and nondepressed students: Sadder but wiser? Journal of Experimental Psychology:General, 108, 441-485.

American Psychiatric Association (1980). Diagnostic and Statistical Manual of Mental Disorders (DSM III)., Third edition. Washington, D. C.: American Psychiatric Association.

Annett, M. (1967). The binomial distribution of right, mixed and left handedness. Quarterly Journal of Experimental Psychology, 19, 327-333.

Atkeson, B. M., Calhoun, K. S., Resick, P. & Ellis, E. M. (1982). Victims of rape: Repeated assessment of depressive symptoms. Journal of Consulting and Clinical Psychology, 50, 96-102.

Averill, J. R. (1975). A semantic atlas of emotional concepts. JSAS Catalog of Selected Documents in Psychology, 5, 330, Ms. No. 421.

Bargh, J. A. (1984). Automatic and conscious processing of social information. In R. S. Wyer and T. K. Srull (Eds.), Handbook of Social Cognition, Vol. III. Hillsdale, New Jersey: Lawrence Erlbaum Associates.

Barthe, D. G. & Hammen, C. L. (1981). The attributional model of depression: A naturalistic extension. Personality and Social Psychology Bulletin, 7, 53-58.

Beck, A. T. (1967). Depression: Clinical, experimental and theoretical aspects. New York: Harper & Row.

Beck, A. T. (1972). Depression: Causes and treatment. Philadelphia: University of Pennsylvania Press, 1972.

Beck, A. T. (1976). Cognitive therapy and the emotional disorders. New York: Guilford.

Beck, A. T. (1984). Cognition and therapy. Archives of General Psychiatry, 41, 1112-1114.

Beck, A. T. & Steer, R. A. (1984). Internal consistency of the original and revised Beck Depression Inventory. Journal of Clinical Psychology, 40, 1365-1367.

Beck, A. T., Rush, A. J., Shaw, B. F. & Emery, G. (1979). Cognitive Therapy of Depression. New York: Guilford.

Beck, A. T., Ward, C. H., Mendelson, M., Mock, J. & Erbaugh, J. (1961). An inventory for measuring depression. Archives of General Psychiatry, 4, 561-571.

Blaney, P. H., Behar, V. & Head, R. (1980). Two measures of depressive cognition: Their association with depression and with each other. Journal of Abnormal Psychology, 89, 678-682.

Bleuler, E. (1951). Autistic thinking. In D. Rapaport (Ed.), Organization and the pathology of thought: Selected sources. New York: Columbia University Press.

Bower, G. H. (1981). Mood and memory. American Psychologist, 36, 129-148.

Bower, G. H. & Gilligan, S. G. (1979). Remembering information related to one's self. Journal of Research in Personality, 13, 420-432.

Bower, G. H., Gilligan, S. G. & Monteiro, K. P. (1981). Selectivity of learning caused by affective states. Journal of Experimental Psychology: General, 110, 451-473.

Bower, G. H., Monteiro, K. P. & Gilligan, S. G. (1978). Emotional mood as a context for learning and recall. Journal of Verbal Learning and Verbal Behaviour, 17, 573-583.

Bradshaw, J. L. & Nettleton, N. C. (1981). The nature of hemispheric specialization in man. The Brain and Behavioural Sciences, 4, 51-91.

Briggs, G. G. & Nebes, R. D. (1975). Patterns of hand preference in a student population. Cortex, 11, 230-238.

Buchwald, A. M., Coyne, J. C. & Cole, C. S. (1978). A critical evaluation of the learned helplessness model of depression. Journal of Abnormal Psychology, 87, 180-193.

Buchwald, A. M., Strack, S. & Coyne, J. C. (1981). Demand characteristics and the Velten mood induction procedure. Journal of Consulting and Clinical Psychology, 49, 478-479.

Bumberry, W., Oliver, J. M. & McClure, J. N. (1978). Validation of the Beck Depression Inventory in a university population using psychiatric estimates as the criterion. Journal of Consulting and Clinical Psychology, 46, 150-155.

Clark, M. S. & Isen, A. M. (1982). Toward understanding the relation between feeling states and behavior. In A. Hastorf and A. M. Isen (Eds.), Cognitive Social Psychology. New York: American Elsevier.

Coyne, J. C. (1976). Toward an interactional description of depression. Psychiatry, 39, 28-40.

Coyne, J. C. & Gotlib, I. H. (1983). The role of cognitions in depression: A critical appraisal. Psychological Bulletin, 94, 472-505.

Craik, F. I. M. & Lockhart, R. S. (1972). Levels of processing: A framework for memory research. Journal of Verbal Learning and Verbal Behavior, 11, 671-684.

Cutrona, C. E. (1983). Causal attributions and perinatal depression. Journal of Abnormal Psychology, 92, 161-172.

Cutrona, C. E., Russell, D. & Jones, R. D. (1985). Cross-situational consistency in causal attributions: Does attributional style exist? Journal of Personality and Social Psychology, 47, 1043-1058.

Darley, J. M. & Fazio, R. H. (1980). Expectancy confirmation processes arising in the social interaction sequence. American Psychologist, 35, 867-881.

Depue, R. A. & Monroe, S. M. (1978). Learned helplessness in the perspective of the depressive disorders: Conceptual and definitional issues. Journal of Abnormal Psychology, 87, 3-20.

Derry, P. A. & Kuiper, N. A. (1981). Schematic processing and self-reference in clinical depression. Journal of Abnormal Psychology, 90, 286-297.

DeMonbreun, B. G. & Craighead, W. E. (1977). Distortion of perception and recall of positive and neutral feedback in depression. Cognitive Therapy and Research, 1, 311-329.

Dobson, K. S. & Shaw, B. F. (1981). The effects of self-correction on cognitive distortions in depression. Cognitive Therapy and Research, 5, 391-403.

Dunn, O. J. (1961). Multiple comparisons among means. Journal of the American Statistical Association, 56, 52-64.

Dweck, C. S. (1975). The role of expectations and attributions in the alleviation of learned helplessness. Journal of Personality and Social Psychology, 31, 674-685.

Eaves, G. & Rush, J. A. (1984). Cognitive patterns in symptomatic and remitted unipolar major depression. Journal of Abnormal Psychology, 93, 31-40.

Ekman, P. (1976). Pictures of facial affect, Palo Alto, California: Consulting Psychologists Press Inc..

Feather, N. T. (1983). Some correlates of attributional style: Depressive symptoms, self-esteem, and Protestant ethic values. Personality and Social Psychology Bulletin, 9, 125-135.

Fogarty, S. J. & Hemsley, D. R. (1983). Depression and the accessibility of memories: A longitudinal study. British Journal of Psychiatry, 142, 232-237.

Frerichs, R. R., Aneshensel, C. S. & Clark, V. A. (1981). Prevalence of depression in Los Angeles County. American Journal of Epidemiology, 113, 691-699.

Garber, J. & Hollon, S. D. (1980). Universal versus personal helplessness: Belief in uncontrollability or incompetence? Journal of Abnormal Psychology, 89, 56-66.

Garcia, J. & Rusiniak, K. W. (1980). What the nose learns from the mouth. In D. Muller-Schwarze & R. M. Siverstein (Eds.), Chemical signals. New York: Plenum Press.

Gerrig, R. J. & Bower, G. H. (1982). Emotional influences on word recognition. Journal of the Psychonomic Society, 19, 197-200.

Golin, S. & Terrell, F. (1977). Motivational and associative aspects of mild depression in skill and chance tasks. Journal of Abnormal Psychology, 86, 389-401.

Golin, S., Sweeney, P. D. & Shaeffer, D. E. (1981). The causality of causal attributions in depression: A cross-lagged panel correlation analysis. Journal of Abnormal Psychology, 90, 14-22.

Golin, S., Terrell, F. & Johnson, B. (1977). Depression and the illusion of control. Journal of Abnormal Psychology, 86, 440-442.

Golin, S., Terrell, F., Weitz, J. & Drost, P. (1979). The illusion of control among depressed patients. Journal of Abnormal Psychology, 88, 454-457.

Gong-Guy, E. & Hammen, C. L. (1980). Causal perceptions of stressful events in depressed and nondepressed outpatients. Journal of Abnormal Psychology, 89, 662-669.

Gotlib, I. H. (1982). Self-reinforcement and depression in interpersonal interaction: The role of performance level. Journal of Abnormal Psychology, 90, 521-530.

Gotlib, I. H. (1984). Depression and general psychopathology in university students. Journal of Abnormal Psychology, 93, 19-30.

Gotlib, I. H. & McCann, C. D. (1984). Construct accessibility and depression: An examination of cognitive and affective factors. Journal of Personality and Social Psychology, 47, 427-439.

Gotlib, I. H. & Olson, J. M. (1983). Depression, psychopathology and self-serving attributions. British Journal of Clinical Psychology, 22, 309-310.

Haley, G. M. T., Fine, S., Marriage, K., Moretti, M. & Freeman, R. J. (1985). Cognitive bias and depression in psychiatrically disturbed children and adolescents. Journal of Consulting and Clinical Psychology, 53, 535-537.

Hamilton, E. W. & Abramson, L. Y. (1983). Cognitive patterns and major depressive disorder: A longitudinal study in a hospital setting. Journal of Abnormal Psychology, 92, 173-184.

Hammen, C. L. (1978). Depression, distortion and life stress in college students. Cognitive Therapy and Research, 2, 189-192.

Hammen, C. L. (1980). Depression in college students: Beyond the Beck Depression Inventory. Journal of Consulting and Clinical Psychology, 48, 126-128.

Hammen, C. L. & Cochran, S. D. (1981). Cognitive correlates of life stress and depression in college students. Journal of Abnormal Psychology, 90, 23-27.

Hammen, C. L. & deMayo, R. (1982). Cognitive correlates of teacher stress and depressive symptoms: Implications for attributional models of depression. Journal of Abnormal Psychology, 91, 96-101.

Hammen, C. L. & Krantz, S. (1976). Effect of success and failure on depressive cognitions. Journal of Abnormal Psychology, 85, 577-586.

Hammen, C. L., Krantz, S. & Cochran, S. (1981). Relationships between depression and causal attributions about stressful life events. Cognitive Therapy and Research, 5, 351-358.

Harvey, D. M. (1981). Depression and attributional style: Interpretations of important personal events. Journal of Abnormal Psychology, 90, 134-142.

Hatzenbuehler, L. C., Parpal, M. & Matthews, L. (1983). Classifying college students as depressed or nondepressed using the Beck Depression Inventory: An empirical analysis. Journal of Consulting and Clinical Psychology, 51, 360-366.

Hicks, R. E. & Kinsbourne, M. (1978). Human handedness. In M. Kinsbourne (Ed.), Asymmetrical Functions of the Brain. London: Cambridge University Press.

Higgins, E. T. & King, G. (1981). Accessibility of social constructs: Information processing consequences of individual and contextual variability. In N. Cantor & J. Kihlstrom (Ed.), Personality, cognition and social interaction. Hillsdale, New Jersey: Lawrence Erlbaum Associates.

Higgins, E. T., Klein, R. & Strauman, T. (1985). Self-concept discrepancy theory: A psychological model for distinguishing among different aspects of depression and anxiety. Social Cognition, 3, 51-76.

Hoehn-Hyde, D., Schlottman, R. S. & Rush, A. J. (1982). Perception of social interactions in depressed psychiatric patients. Journal of Consulting and Clinical Psychology, 50, 209-212.

Howell, D. C. (1982). Statistical methods for psychology. Boston, Massachusetts: Duxbury Press.

Isen, A. M. (1970). Success, failure, attention and reaction to others: The warm glow of success. Journal of Personality and Social Psychology, 15, 294-301.

Isen, A. M. & Levin, P. F. (1972). On helping: Cookies and kindness. Journal of Personality and Social Psychology, 21, 384-388.

Isen, A. M., Shalker, T. E., Clark, M. & Karp, L. (1978). Affect, accessibility of material in memory, and behavior: A cognitive loop? Journal of Personality and Social Psychology, 36, 1-12.

Izard, C. E. (1983). The primacy of emotions in human development and in emotion-cognition relationships. In C. E. Izard, J. Kagan & R. B. Zajonc (Eds.), Emotions, cognition and behavior. New York: Cambridge University Press.

James, W. (1915). Psychology: A Briefer Course. New York: Holt.

Janoff-Bulman, R. (1979). Characterological versus behavioral self-blame: Inquiries into depression and rape. Journal of Personality and Social Psychology, 37, 1798-1809.

Klein, D. C. & Seligman, M. E. P. (1976). Reversal of performance deficits and perceptual deficits in learned helplessness and depression. Journal of Abnormal Psychology, 85, 11-26.

Klein, D. C., Fencil-Morse, E. & Seligman, M. E. P. (1976). Learned helplessness, depression, and the attribution of failure. Journal of Personality and Social Psychology, 33, 508-516.

Krantz, S. & Hammen, C. (1979). Assessment of cognitive bias in depression. Journal of Abnormal Psychology, 88, 611-619.

Kuiper, N. A. (1978). Depression and causal attributions for success and failure. Journal of Personality and Social Psychology, 36, 236-246.

Kuiper, N. A. (1982). Processing personal information about well-known others and the self: The use of efficient cognitive schemata. Canadian Journal of Behavioral Science, 14, 1-12.

Kuiper, N. A. & Cole, J. (1983). Knowledge about depression: Effects of depression and vulnerability levels on self and other perceptions. Canadian Journal of Behavioral Science, 15, 142-149.

Kuiper, N. A. & Derry, P. (1982). Depressed and nondepressed content self-reference in mild depressives. Journal of Personality, 50, 67-80.

Kuiper, N. A. & MacDonald, M. R. (1982). Self and other perception in mild depression. Social Cognition, 3, 223-239.

Kuiper, N. A. & Rogers, T. B. (1979). Encoding of personal information: Self-other differences. Journal of Personality and Social Psychology, 37, 499-514.

Kuiper, N. A., Olinger, L. J. & MacDonald, M. R. (1985). Depressive schemata and the processing of personal and social information. In L. B. Alloy (Ed.)., Cognitive processes in depression. New York: Guilford Press.

Kurnst-Wilson, W. R. & Zajonc, R. B. (1980). Affective discrimination of stimuli that cannot be recognized. Science, 207, 557-558.

Langer, E. (1975). The illusion of control. Journal of Personality and Social Psychology, 32, 311-328.

Lazarus, R. S. (1984). On the primacy of cognition. American Psychologist, 39, 124-129.

Lewinsohn, P. M. (1974). A behavioral approach to depression. In R. J. Friedman & M. M. Katz (Eds.), The psychology of depression: Contemporary theory and research. New York: John Wiley and Sons.

Lewinsohn, P. M., Steinmetz, J. L., Larsen, D. W. & Franklin, J. (1981). Depression-related cognitions: Antecedent or consequence? Journal of Abnormal Psychology, 90, 213-219.

Libet, J. M. & Lewinsohn, P. M. (1973). Concept of social skill with special reference to the behavior of depressed persons. Journal of Consulting and Clinical Psychology, 40, 304-312.

Lishman, W. P. (1972). Selective factors in memory. Part 2: Affective disorders. Psychological Medicine, 2, 248-253.

Lloyd, G. G. & Lishman, W. R. (1975). Effect of depression on the speed of recall of pleasant and unpleasant experiences. Psychological Medicine, 5, 173-180.

Lobitz, W. C. & Post, R. D. (1979). Parameters of self-reinforcement and depression. Journal of Abnormal Psychology, 88, 33-41.

Loeb, A., Beck, A. T. & Diggory, J. (1971). Differential effects of success and failure on depressed and nondepressed patients. Journal of Nervous and Mental Disease, 152, 106-114.

Loo, R. & Schneider, R. (1979). An evaluation of the Briggs-Nebes modified version of Annett's handedness inventory. Cortex, 15, 683-686.

Lunghi, M. E. (1977). The stability of mood and social perception measures in a sample of depressive in-patients. British Journal of Psychiatry, 170, 598-604.

Manly, P. C., McMahon, R. J., Bradley, C. F. & Davidson, P. O. (1982). Depressive attributional style and depression following childbirth. Journal of Abnormal Psychology, 91, 245-254.

Markus, H. & Sentis, K. (1982). The self in social information processing. In J. Suls (Ed.), Psychological perspectives on the self. Vol. I.. Hillsdale, New Jersey: Lawrence Erlbaum Associates.

Martin, D. J., Abramson, L. Y. & Alloy, L. B. (1984). Illusion of control for self and others in depressed and nondepressed students. Journal of Personality and Social Psychology, 46, 125-136.

Marx, M. B., Garrity, T. F. & Bower, F. R. (1975). The influence of recent life experience on the health of college freshman. Journal of Psychosomatic Research, 19, 87-98.

Matlin, M. & Stang, D. (1982). The pollyanna principle: Selectivity in language, memory and thought. Cambridge, Massachusetts: Schenkman Publishing.

McCann, C. D. & Higgins, E. T. (in press). Individual differences in communication: Social cognitive determinants and consequences. In H. E. Synder and J. L. Applegate (Eds.), Understanding interpersonal communication: Social cognition and strategic processes in children and adults. Beverly Hills, California: Sage.

McDougall, W. (1921). An Introduction to Social Psychology. Boston: Luce.

Metalsky, G. I., Abramson, L. Y., Seligman, M. E. P., Semmel, A. & Peterson, C. (1982). Attributional styles and life events in the classroom: Vulnerability and invulnerability to depressive mood reactions. Journal of Personality and Social Psychology, 43, 612-617.

Miller, D. T. (1976). Ego involvement and attributions for success and failure. Journal of Personality and Social Psychology, 34, 901-906.

Miller, D. T. & Moretti, M. M. (1985). The causal attributions of depressives: Self-serving or self-disserving? In L. Alloy (Ed.), Cognitive Processes in Depression. New York: Guilford Press.

Miller, D. T. & Porter, C. A. (1985). Errors and biases in the attribution process. In L. Abramson (Ed.), Attributional Processes and Clinical Psychology. New York: Guilford Press.

Miller, D. T. & Ross, M. (1975). Self-serving bias in the attribution of causality: Fact or fiction? Psychological Bulletin, 82, 213-225.

Miller, I. W. & Norman, W. H. (1981). Effects of attributions for success on the alleviation of learned helplessness and depression. Journal of Abnormal Psychology, 90, 113-124.

Miller, I. W., Klee, S. H. & Norman, W. H. (1982). Depressed and nondepressed inpatients' cognitions of hypothetical events, experimental tasks and stressful life events. Journal of Abnormal Psychology, 91, 78-81.

Miller, W. R. & Seligman, M. E. P. (1973). Depression and the perception of reinforcement. Journal of Abnormal Psychology, 82, 62-73.

Miller, W. R. & Seligman, M. E. P. (1976). Learned helplessness, depression and the perception of reinforcement. Behavior Therapy and Research, 14, 7-17.

Miller, W. R., Seligman, M. E. P. & Kurlander, H. M. (1975). Learned helplessness, depression and anxiety. Journal of Nervous and Mental Disease, 161, 347-355.

Mischel, W., Ebbesen, E. & Zeiss, A. (1973). Selective attention to the self: Situational and dispositional determinants. Journal of Personality and Social Psychology, 27, 129-142.

Mischel, W., Ebbesen, E. & Zeiss, A. (1976). Determinants of selective memory about the self. Journal of Counselling and Clinical Psychology, 44, 92-103.

Nelson, R. E. & Craighead, W. E. (1977). Selective recall of positive and negative feedback, self-control behaviors, and depression. Journal of Abnormal Psychology, 36, 379-388.

O'Hara, M. W., Neunaber, D. J. & Zekoski, E. M. (1984). Prospective study of postpartum depression: Prevalence, course, and predictive factors. Journal of Abnormal Psychology, 93, 158-171.

O'Hara, M. W., Rehm, L. P. & Campbell, S. B. (1982). Predicting depressive symptomatology: Cognitive-behavioral models of postpartum depression. Journal of Abnormal Psychology, 91, 457-461.

Oliver, J. M. & Burkham, R. (1979). Depression in university students: Duration, relation to calendar time, prevalence and demographic correlates. Journal of Abnormal Psychology, 88, 667-670.

Oliver, J. M. & Simmons, M. E. (1984). Depression as measured by the DSM III and the Beck Depression Inventory in an unselected adult population. Journal of Consulting and Clinical Psychology, 52, 892-898.

Oliver, J. M. & Williams, G. (1979). The psychology of depression as revealed by attribution of causality in college students. Cognitive Therapy and Research, 3, 355-360.

Peterson, C., Schwartz, S. M. & Seligman, M. E. P. (1981). Self-blame and depressive symptoms. Journal of Personality and Social Psychology, 41, 253-259.

Postman, L. & Brown, D. R. (1952). The perceptual consequences of success and failure. Journal of Abnormal and Social Psychology, 47, 213-221.

Puff, C. R. (1982). Handbook of research in human memory and cognition. New York: Academic Press.

Rapaport, D. (1942). Emotions and Memory. Baltimore: Williams & Wilkins Company.

Raps, C. S., Peterson, C., Reinhard, K. E., Abramson, L. Y. & Seligman, M. E. P. (1982). Attributional style among depressed patients. Journal of Abnormal Psychology, 91, 102-108.

Reuter-Lorenz, P. A., Givis, R. P. & Moscovitch, M. (1983). Hemispheric specialization and the perception of emotion: Evidence from right-handers and from inverted and noninverted left-handers. Neuropsychologia, 21, 687-692.

Rhode, R. G. (1982). The reactions of others to depressives. Dissertation Abstracts International, 42, 4208-B.

Rholes, W. S., Riskind, J. H. & Neville, B. (1985). The relationship of cognitions and hopelessness to depression and anxiety. Social Cognition, 3, 36-50.

Rizley, R. (1978). Depression and distortion in the attribution of causality. Journal of Abnormal Psychology, 87, 32-48.

Sacco, W. P. (1981). Invalid use of the Beck Depression Inventory to identify depressed college-student subjects: A methodological comment. Cognitive Therapy and Research, 5, 143-147.

Sacco, W. P. & Hokanson, J. E. (1978). Performance satisfaction under high and low success conditions. Journal of Clinical Psychology, 34, 907-909.

Satterthwaite, F. E. (1946). An approximate distribution of estimates of variance components. Biometrics Bulletin, 2, 110-114.

Scheffe, H. (1953). A method for judging all contrasts in the analysis of variance. Biometrika, 40, 87-104.

Seligman, M. E. P. (1975). Helplessness: On depression, development and death. San Francisco: W. H. Freeman.

Seligman, M. E. P., Abramson, L. Y., Semmel, A. & von Baeyer, C. (1979). Depressive attributional style. Journal of Abnormal Psychology, 88, 242-247.

Sharp, J. & Tennen, H. (1983). Attributional bias in depression: The role of cue perception. Cognitive Therapy and Research, 7, 325-332.

Shiffrin, R. M. & Schneider, W. (1977). Controlled and automatic human information processing: II. Perceptual learning, automatic attending and a general theory. Psychological Review, 84, 127-190.

Smolen, R. C. (1978). Expectancies, mood, and performance of depressed and nondepressed psychiatric inpatients on chance and skill tasks. Journal of Abnormal Psychology, 87, 91-101.

Stone, A. L. (1981). Cognitive and interpersonal processes in depression. Dissertation Abstracts International, 41, 4692-B.

Strack, S. & Coyne, J. C. (1983). Social confirmation of dysphoria: Shared and private reactions to depression. Journal of Personality and Social Psychology, 44, 798-806.

Tabachnik, N., Crocker, J. & Alloy, L. B. (1983). Depression, social comparison and the false consensus effect. Journal of Personality and Social Psychology, 45, 688-699.

Teasdale, J. D. & Fogarty, S. J. (1979). Differential effects of induced mood on retrieval of pleasant and unpleasant events from episodic memory. Journal of Abnormal Psychology, 88, 248-257.

Teasdale, J. D., Taylor, R. & Fogarty, S. J. (1980). Effects of induced elation-depression on the accessibility of memories of happy and unhappy experiences. Behavior Research and Therapy, 18, 339-346.

Weingartner, H., Miller, H. & Murphy, D. L. (1977). Mood-state-dependent retrieval of verbal associations. Journal of Abnormal Psychology, 86, 276-284.

Weissman, M. M. & Klerman, G. L. (1977). Sex differences and the epidemiology of depression. Archives of General Psychiatry, 34, 98-111.

Wilson, W. R. (1979). Feeling more than we can know: Exposure effects without learning. Journal of Personality and Social Psychology, 37, 811-821.

Wollert, R. W. & Buchwald, A. M. (1979). Subclinical depression and performance expectations, evaluations of performance, and actor performance. Journal of Nervous and Mental Disease, 167, 237-242.

Zajonc, R. B. (1980). Feeling and thinking: Preferences need no inferences. American Psychologist, 35, 151-175.

Zajonc, R. B. (1984). On the primacy of affect. American Psychologist, 39, 117-123.

Zarantonello, M. W., Johnson, J. E. & Petzel, T. P. (1979). The effects of ego involvement and task difficulty on actual and perceived performance of depressed college students. Journal of Clinical Psychology, 5, 273-281.

Zenmore, R. & Johansen, L. S. (1980). Depression, helplessness and failure attributions. Canadian Journal of Behavioral Science, 12, 161-174.

Zuckerman, M. (1979). Attribution and success and failure revisited or: The attributional bias is alive and well in attribution theory. Journal of Personality, 47, 245-287.

Zuckerman, M. Lubin, B. & Robins, S. (1965). Validation of the Multiple Affect Adjective Check List in clinical situations. Journal of Consulting Psychology, 29, 594.

Zuckerman, M., Lubin, B., Vogel, L. & Valerius, E. (1964). Measurement of experimentally induced affects. Journal of Consulting Psychology, 28, 418-425.

Zuroff, D. C. (1981). Depression and attribution: Some new data and a review of old data. Cognitive Therapy and Research, 5, 273-281.

APPENDIX A

Selected Stimuli from Study 1 and 2








APPENDIX B

Study I: Protocol for the Emotional Condition

In this part of the experiment we will be using a tachistoscope to briefly present you with pairs of photographs of the same individual. You should now be able to see a centrally-positioned dot in your visual field. It will be extremely important for you to try and fixate on this point throughout the experiment. To help you do this, I will say 'focus' at the beginning of each trial and a small red light will appear at this central point. Immediately following this you will see two photographs of the same individual with different expressions. (One stimulus card is randomly selected from the practice trial set and handed to the subject to illustrate the task). These pairs of photographs will always display two faces with different emotional expressions. Your task will be to identify the more emotional face. (Subject is asked to refer to the display card and identify the more emotional face. This procedure is repeated such that each subject is presented with a neutral/happy and a neutral/sad practice trial. In the event that the subject is incorrect in their selection, they are asked to explain their choice and provided with the correct response). You are to indicate the side of presentation of this face by pressing one of these two response keys labelled right and left. Please make this decision as quickly as you can. However, you will only be allowed one response per trial so do not respond so quickly as to compromise the accuracy of your performance.

Please remember that it is extremely important to maintain your attention on the centrally-positioned point. Your attention on this point is important since focusing will ensure that you will be able to view both pictures simultaneously. In addition, these pictures were created in such a manner that the images fall on certain parts of your eyes when you fixate on the central point. It is extremely important that this happen, so even if you think you might do better by focusing on the left or the right, we would rather have you do more poorly but focus in the middle.

We will begin with some practice trials to give you an idea of the task. Do you have any questions before we begin? (Following completion of practice trials subjects are again asked if they have any questions before beginning the first block of trials.)

APPENDIX C

Study I: Protocol for the Neutral Condition

In this part of the experiment we will be using a tachistoscope to briefly present you with pairs of photographs of the same individual. You should now be able to see a centrally-positioned dot in your visual field. It will be extremely important for you to try and fixate on this point throughout the experiment. To help you do this, I will say 'focus' at the beginning of each trial and a small red light will appear at this central point. Immediately following this you will see two photographs of the same individual with different expressions. (One stimulus card is randomly selected from the practice trial set and handed to the subject to illustrate the task). These pairs of photographs will always display two faces with different emotional expressions. Your task will be to identify the more neutral, or less emotional face. (Subject is asked to refer to the display card and identify the neutral face. This procedure is repeated such that each subject is presented with a neutral/happy and a neutral/sad practice trial. In the event that the subject is incorrect in their selection, they are asked to explain their choice and provided with the correct response). You are to indicate the side of presentation of this face by pressing one of these two response keys labelled right and left. Please make this decision as quickly as you can. However, you will only be allowed one response per trial so do not respond so quickly as to compromise the accuracy of your performance.

Please remember that it is extremely important to maintain your attention on the centrally-positioned point. Your attention on this point is important since focusing will ensure that you will be able to view both pictures simultaneously. In addition, these pictures were created in such a manner that the images fall on certain parts of your eyes when you fixate on the central point. It is extremely important that this happen, so even if you think you might do better by focusing on the left or the right, we would rather have you do more poorly but focus in the middle.

We will begin with some practice trials to give you an idea of the task. Do you have any questions before we begin? (Following completion of practice trials subjects are again asked if they have any questions before beginning the first block of trials.)

APPENDIX D

Study I: Description of Study

This experiment investigates factors which influence the perception of emotion. You will be asked to complete several tasks. First, you will be instructed to complete two short questionnaires assessing your feelings in the past week and today. In the second part of the experiment you will be presented with a series of cards showing the same person with two different emotional expression. After each exposure, your task will be to indicate whether the more _____ (emotional; neutral) face appeared on the right or left of the stimulus card. Your decision will be indicated by pressing one of two available response keys. In the final part of the experiment you will be asked to interpret a series of proverbs and to evaluate several photographs. This experiment will take approximately one hour to complete and you will receive renumeration of $3.00 for your participation. You will also be fully debriefed following the experiment and provided with details on obtaining the final results of the experiment.

You are free to withdraw and to discontinue your participation at any time during the course of this experiment. You are also free to refrain from answering any questions you are asked. Your name, or any other form of identification will not be recorded on any of the experimental material so that you anonymity may be completely assured.

APPENDIX E

Study I: Analysis of Variance of Nontransformed Reaction Time Scores

Source	SS	df	F	p<
Depression (D)	29545.69	1	0.04	ns
Condition (C)	780.23	2	0.00	ns
DXC	80913.41	2	0.10	ns
Subj(DXC)	29831649.11	54		
Affect (A)	592409.95	1	10.25	.003
DXA	44690.86	1	0.77	ns
CXA	17832.38	2	0.31	ns
DXCXA	0.00	2	0.00	ns
SubjXA(DXC)	2079661.97	54		
Intensity (I)	1188633.14	1	38.04	.0001
DXI	41652.99	1	1.15	ns
CXI	1079.53	2	0.03	ns
DXCXI	93534.11	2	2.58	ns
SubjXI(DXC)	1307014.68	54		
AXI	371488.97	1	6.98	.01
DXAXI	231949.19	1	4.63	.04
CXAXI	114317.41	2	2.15	ns
DXCXAXI	25467.77	2	0.48	ns
SubjXAXI(DXC)	1916485.66	54		

APPENDIX F

Study II: Protocol for the Control Condition

In this part of the experiment we will be using a tachistoscope to briefly present you with pairs of photographs of the same individual. You should now be able to see a centrally-positioned dot in your visual field. It will be extremely important for you to try and fixate on this point throughout the experiment. To help you do this, I will say "focus" at the beginning of each trial and a small red light will appear at this central point. Immediately following this you will see two photographs of the same individual with different expressions. (Subject is presented with one stimulus card randomly selected from the practice trial set to illustrate the task.) These pairs of photographs will always display two faces with different emotional expressions. Your task will be to identify the more emotional face. (Subject is asked to refer to the display card and identify the more emotional face. A second trial card is randomly selected such that each subject is presented with one neutral/positive trial and one neutral/negative trial. In the event that the subject selects a neutral rather than emotional face, he or she asked to explain their choice and then given the correct response.) You are to indicate the side of presentation of this face by pressing one of these two response keys labelled right and left. Please make this decision as quickly as you can. However, you will only be allowed one response per trial so do not respond so quickly as to compromise the accuracy of your performance.

Please remember that it is extremely important to maintain your attention on the centrally-positioned point. Your attention on this point is important since focusing will ensure that you will be able to view both pictures simultaneously. In addition, these pictures were created in such a manner that the images fall on certain parts of your eyes when you fixate on the central point. It is extremely important that this happen, so even if you think you might do better by focusing on the left or the right, we would rather have you do more poorly but focus in the middle.

We will begin with some practice trials to give you an idea of the task. Do you have any questions before we begin? (Following completion of practice trials subjects are again asked if they have any questions before beginning the first block of trials. Following the first block of trials, subjects are reminded to focus on the central fixation point and select the more emotional face.)

APPENDIX G

Study II: Protocol for the Self Condition

In this part of the experiment we will be using a tachistoscope to briefly present you with pairs of photographs of the same individual. You should now be able to see a centrally-positioned dot in your visual field. It will be extremely important for you to try and fixate on this point throughout the experiment. To help you do this, I will say "focus" at the beginning of each trial and a small red light will appear at this central point. Immediately following this you will see two photographs of the same individual with two different expressions. These pairs of photographs will always display two faces with different (Subject is presented with one stimulus card randomly selected from the practice trial set to illustrate the task.) In viewing these photographs please try to imagine as vividly as you can that you are involved in a social interaction with the person in the photograph. Try to imagine as realistically as possible that these pictures reflect emotional responses to your behavior (something you've said or done) in a social interaction with this person. It is extremely important that you view these pictures as emotional responses to you. Your task will be identify the face reflecting the strongest emotional response to you; i.e., the face that tells you the most about how this person feels about you. This is a task you have probably engaged in on several occasions. For example, if you are at a party and you meet someone for the first time, you are likely to closely watch this persons facial expressions to get an idea of how they feel about you. Or, if you are giving a presentation in front of a group you are likely to closely watch others' expressions to get an idea of how they feel about you. (Subject is asked to refer to the display card and identify the more "responsive" face. A second trial card is randomly selected such that each subject is presented with one neutral/positive trial and one neutral/negative trial. In the event that the subject selects a neutral rather than emotional face, he or she is asked to explain their choice and then given the correct response.)

You are to indicate the side of presentation of this face by pressing one of these two response keys labelled right and left. Please make this decision as quickly as you can. However, you will only be allowed one response per trial so do not respond so quickly as to compromise the accuracy of your performance.

So to summarize, you have three things to remember. First, it is extremely important to maintain your attention on the centrally-positioned point. Your attention on this point is important since focusing will ensure that you will be able to view both pictures simultaneously. In addition, these stimuli were created in such a manner that the images fall on certain parts of your eyes when you fixate on the central point. It is extremely important that this happen, so even if you think you might do better by focusing on the left or the right, we would rather have you do more poorly but focus in the middle. Second, these are emotional responses to <u>you</u> and your task is to pick out the one that tells you the most about how this person feels about you. Finally, you are to respond as quickly as you can but you only get to respond once per trial.

We will begin with some practice trials to give you an idea of the task. Do you have any questions before we begin? (Following completion of practice trials subjects are again asked if they have any questions before beginning the first block of trials. Following the first set of trials, subjects are reminded to focus on the central fixation point and to view the faces as responses to the self).

APPENDIX H

Study II: Protocol for the Other Condition

In this part of the experiment we will be using a tachistoscope to briefly present you with pairs of photographs of the same individual. You should now be able to see a centrally-positioned dot in your visual field. It will be extremely important for you to try and fixate on this point throughout the experiment. To help you do this, I will say "focus" at the beginning of each trial and a small red light will appear at this central point. Immediately following this you will see two photographs of the same individual with different expressions. These pairs of photographs will always display two faces with different emotional expressions. (Subject is presented with one stimulus card randomly selected from the practice trial set to illustrate the task.) In viewing these photographs please try to imagine as vividly as you can that you are observing a social interaction between the individual in the photograph and a third person. Try to realistically imagine that these photographs display emotional responses of the individual in the picture to the behavior of this third person (something the person has said or done). It is extremely important that you view these pictures as emotional responses to a third person. Your task will be to assume the role of an objective observer and identify the face reflecting the strongest emotional response to this other person's behavior; i.e., the face that tells you the most about how this individual in the photograph feels about the behavior of the third person. This is a task you have probably engaged in on several occasions. For example, if you are at a party and you watch two people meet for the first time, you can usually tell how they feel about each other by closely watching their facial expressions. Or, if someone is giving a presentation in front of a group, you can usually get an idea of how others feel about them by closely watching their facial expressions. (Subject is asked to refer to the display card and identify the more "responsive" face. A second trial card is randomly selected such that each subject is presented with one neutral/positive trial and one neutral/negative trial. In the event that the subject

selects a neutral rather than emotional face, he or she is asked to explain their choice and then given the correct answer.)

You are to indicate the side of presentation of this face by pressing one of these two response keys labelled right and left. Please make this decision as quickly as you can. However, you will only be allowed one response per trial so do not respond so quickly as to compromise the accuracy of your performance.

Please remember that you are to view these pictures as if they are responses of the individual in the picture to the behavior of a third person with whom they are interacting. This factor is critical to your performance.

So to summarize, you have three things to remember. First, it is extremely important to maintain your attention on the centrally-positioned point. Your attention on this point is important since focusing will ensure that you will be able to view both pictures simultaneously. In addition, these pictures were created in such a manner that the images fall on certain parts of your eyes when you fixate on the central point. It is extremely important that this happen, so even if you think you might do better by focusing on the left or the right, we would rather have you do more poorly but focus in the middle. Second, these are emotional responses to <u>someone else</u> and your task is to assume the role of an objective observer or social scientist and pick out the one that tells you the most about how this person feels about someone else. Finally, you are to respond as quickly as you can but you only get to respond once per trial.

We will begin with some practice trials to give you an idea of the task. Do you have any questions before we begin? (Following completion of practice trials subjects are again asked if they have any questions before beginning the first block of trials. Following the first block of trials, subjects are reminded to focus on the central fixation point and to 'other-reference'.)

APPENDIX I

Study II: Description of Study - Self Condition

This experiment investigates factors which influence the perception of emotion. You will be asked to complete two questionnaires evaluating your feelings. Following this you will view a series of photos of other individuals. You will be instructed to view and evaluate these photos as if they were responses to your behavior in a social situation. Finally, you will be asked to complete a questionnaire evaluating your perceptions and expectations of others. This experiment will take approximately 30-45 minutes of your time and you will receive $3.00 for your participation. You will also be fully debriefed following the experiment and provided with details on obtaining the final results of the experiment.

You are free to withdraw and to discontinue your participation at any time during the course of this experiment. You are also free to refrain from answering any questions you are asked. Your name, or any other form of identification will not be recorded on any of the experimental material so that your anonymity may be completely assured.

APPENDIX J

Study II: Description of Study - Other Condition

This experiment investigates factors which influence the perception of emotion. You will be asked to complete two questionnaires evaluating your feelings. Following this you will view a series of photos of other individuals. You will be instructed to view and evaluate these photos as if they were responses to the behavior of another individual (i.e., a third party) in a social situation. Finally, you will be asked to complete a questionnaire evaluating your perceptions and expectations of others. This experiment will take approximately 30-45 minutes of your time and you will receive $3.00 for your participation. You will also be fully debriefed following the experiment and provided with details on obtaining the final results of the experiment.

You are free to withdraw and to discontinue your participation at any time during the course of this experiment. You are also free to refrain from answering any questions you are asked. Your name, or any other form of identification will not be recorded on any of the experimental material so that your anonymity may be completely assured.

APPENDIX K

Study II: Analysis of Variance of Nontransformed Reaction Time Scores

Source	SS	df	F	p≤
Depression (D)	16241692.51	1	8.51	.005
Condition (C)	14253038.53	2	3.73	.03
DXC	12979395.56	2	3.40	.04
Subj(DXC)	103062796.62	54		
Affect (A)	4717916.84	1	14.53	.0004
DXA	0.00	1	0.00	ns
CXA	726845.63	2	1.12	ns
DXCXA	0.00	2	0.00	ns
SubjXA(DXC)	17536673.48	54		
Intensity (I)	2214526.43	1	31.35	.0001
DXI	32135.01	1	0.45	ns
CXI	127749.52	2	0.90	.08
DXCXI	195217.21	2	1.38	ns
SubjXI(DXC)	3813984.92	54		
AXI	153442.78	1	1.10	ns
DXAXI	236307.08	1	1.69	ns
CXAXI	765478.72	2	2.74	.07
DXCXAXI	1704450.07	2	6.10	.004
SubjXAXI(DXC)	7541357.60	54		

APPENDIX L

Study II: Analysis of Variance of Log Transformed Reaction Time Scores

Source	SS	df	F	p<
Depression (D)	10.51	1	7.47	.008
Condition (C)	7.60	2	2.70	.08
DXC	6.82	2	2.42	.10
Subj(DXC)	75.95	54		
Affect (A)	3.39	1	28.96	.0001
DXA	0.02	1	0.15	ns
CXA	0.32	2	1.38	ns
DXCXA	0.00	2	0.00	ns
SubjXA(DXC)	6.32	54		
Intensity (I)	2.00	1	38.04	.0001
DXI	0.01	1	0.12	ns
CXI	0.28	2	2.69	.08
DXCXI	0.11	2	1.06	ns
SubjXI(DXC)	2.85	54		
AXI	0.48	1	12.49	.0009
DXAXI	0.18	1	4.63	.04
CXAXI	0.50	2	6.40	.003
DXCXAXI	1.00	2	12.34	.0001
SubjXAXI(DXC)	2.09	54		

APPENDIX M

Study II: Analysis of Variance of Accuracy Scores

Source	SS	df	F	p≤
Depression (D)	0.31	1	1.25	ns
Condition (C)	4.53	2	9.09	.0004
DXC	0.22	2	0.40	ns
Subj(DXC)	13.45	54		
Affect (A)	4.32	1	23.44	.0001
DXA	0.21	1	1.12	ns
CXA	0.23	2	0.62	ns
DXCXA	0.98	2	2.66	.08
SubjXA(DXC)	9.95	54		
Intensity (I)	1.39	1	18.01	.0001
DXI	0.03	1	0.33	ns
CXI	0.51	2	3.27	.05
DXCXI	0.08	2	0.53	ns
SubjXI(DXC)	4.17	54		
AXI	0.54	1	9.81	.003
DXAXI	0.01	1	0.15	ns
CXAXI	0.08	2	0.71	ns
DXCXAXI	0.43	2	3.99	.02
SubjXAXI(DXC)	2.94	54		

APPENDIX N

Study III:

Mean Reaction Time in msec. for Nondepressed Subjects by Condition, Affect and Intensity

Stimulus	Condition: Control Mean (SD)	Condition: Self Mean (SD)	Condition: Other Mean (SD)
Positive Affect			
High Intensity	699.73	790.63	782.09
	109.11	237.14	201.88
Low Intensity	889.03	919.31	903.85
	182.86	317.50	360.20
Negative Affect			
High Intensity	995.28	1205.92	921.31
	421.03	638.31	349.23
Low Intensity	1056.20	984.65	929.63
	298.32	409.25	382.58

APPENDIX O

Study II:

Mean Reaction Time in msec. for Depressed Subjects by Condition, Affect and Intensity

Stimulus	Condition: Control Mean (SD)	Condition: Self Mean (SD)	Condition: Other Mean (SD)
Positive Affect			
High Intensity	876.96	1556.42	864.98
SD	237.49	761.81	338.12
Low Intensity	1097.83	1517.72	1060.87
SD	306.19	595.78	411.91
Negative Affect			
High Intensity	1003.42	1547.08	1146.86
SD	393.66	596.10	552.77
Low Intensity	1118.89	1693.53	1043.27
SD	425.92	629.67	474.03

APPENDIX P

Study II:

Mean Accuracy* for Nondepressed Subjects
by Condition, Affect and Intensity

Stimulus	Condition: Control Mean (SD)	Condition: Self Mean (SD)	Condition: Other Mean (SD)
Positive Affect			
High Intensity	.94	.85	.86
SD	.10	.17	.19
Low Intensity	.75	.73	.73
SD	.17	.18	.19
Negative Affect			
High Intensity	.75	.48	.83
SD	.18	.24	.11
Low Intensity	.68	.56	.66
SD	.09	.15	.07

APPENDIX Q

Study II:

Mean Accuracy* for Depressed Subjects
by Condition, Affect and Intensity

Stimulus	Condition: Control Mean (SD)	Self Mean (SD)	Other Mean (SD)
Positive Affect			
High Intensity	.91	.64	.87
SD	.15	.32	.14
Low Intensity	.74	.60	.73
SD	.22	.32	.11
Negative Affect			
High Intensity	.75	.59	.65
SD	.23	.15	.21
Low Intensity	.68	.56	.67
SD	.09	.20	.14