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Depressive Realism From the Perspective of Cognitive-Experiential Self-Theory

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To explain why the depressive realism effect has been found in trivial, artificial laboratory but not in more realistic or emotionally engaging situations, the authors hypothesized that depressed people overcompensate for a tendency toward maladaptive experiential (intuitive) processing by exercising excessive rational control in trivial situations. In more consequential situations, they are unable to control their maladaptive experiential processing because it is excessive, or their rational control is insufficient, or both. As predicted, a subclinically depressed group (n = 39) made more optimal decisions than a nondepressed control group (n = 36) under trivial conditions, and the groups converged under more consequential conditions, with the depressed group responding less and the control group more optimally. Also, the depressed group reported engaging in less rational processing and in more maladaptive experiential processing in everyday life than did the control group.

The characterization of depressive thinking as negatively distorted makes sense from intuitive, theoretical, and clinical-empirical standpoints (see Beck, 1976; Bowlby, 1969; Ellis, 1962; Moretti & Shaw, 1989; Peterson, Seligman, & Maier, 1993; Weary & Edwards, 1994), so it was surprising when Alloy and Abramson (1979) reported that subclinically depressed college students[1] were more accurate than nondepressed controls. This finding generated enormous interest in what has become known as the *depressive realism phenomenon* (see reviews in Ackerman & DeRubeis, 1991; K. Dobson & Franche, 1989; Haaga & Beck, 1995; Weary & Edwards, 1994). More recently, it has been demonstrated that the phenomenon does not replicate in contexts that are more realistic or otherwise personally involving than the laboratory situations originally investigated. This raises the question of why the phenomenon occurred at all in the contexts in which it was observed. The purpose of this article is to provide an answer to this question and to examine its implications for an understanding of the cognitive processes associated with depression.

Previous Findings on Depressive Realism

According to learned helplessness theory (Abramson, Seligman, & Teasdale, 1978), depressed people tend to believe unrealistically that they have little or no control over outcomes. To test this hypothesis, Alloy and Abramson (1979) used a contingency paradigm in which depressed and nondepressed college students, as determined by the Beck Depression Inventory (BDI; Beck et al., 1961), estimated how much control they had, by means of button pressing, over the onset of a light. They found, surprisingly, that the depressed students tended to be accurate across conditions that varied in contingency, valence (winning vs. losing money), and frequency of reinforcements, whereas the nondepressed students overestimated their control of positive outcomes and underestimated their control of negative outcomes, thereby exhibiting an "illusion of control" (Alloy & Abramson, 1979, 1982; Benassi & Mahler, 1985; Vazquez, 1987). These results challenged cognitive theories of depression that assume that depressives hold more unrealistic views than others. They also supported the view that positive illusions are common in the nondepressed state (Taylor & Brown, 1988).

The contingency paradigm, as originally used, was criticized for a lack of realism, or the inability to emotionally involve participants (see K. Dobson & Franche, 1989). Follow-up studies, including those that used the contingency paradigm in more realistic or personally involving ways, provided support for the negative-distortion view of depressive information processing (e.g., Benassi & Mahler, 1985; Buchwald, 1977; DeMonbreun & Craighead, 1977; Dennard & Hokanson, 1986; K. S. Dobson, 1989; K. S. Dobson & Shaw, 1981; Gotlib, 1981, 1983; Vazquez, 1987). Nondepression in these studies was directly associated with either optimistic distortions (e.g.,

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[1] Most of the depressive realism research findings reviewed in this article were based on samples classified as mildly to moderately (subclinically) depressed according to guidelines recommended by Kendall et al. (1987) for classifying depression by using the Beck Depression Inventory (BDI; Beck, Ward, Mendelson, Mock, & Erbaugh, 1961). Our use of the term *depressed,* in common with other research, refers only to subclinically or mildly depressed people as determined by the BDI.

Dennard & Hokanson, 1986) or accurate responses (e.g., Dunning & Story, 1991; Gotlib, 1983). The overall picture that has emerged from these findings is of an inverse relation between the demonstration of the depressive realism phenomenon and the realism of the experimental conditions or, relatedly, of the emotional involvement of the participants in the outcomes of their efforts (Ackerman & DeRubeis, 1991; Colvin & Block, 1994; K. Dobson & Franche, 1989; Dunning & Story, 1991).

A Dual-Mode Processing Explanation of the Depressive Realism Effect

In this article, we approach the depressive realism phenomenon from the perspective of cognitive-experiential self-theory (CEST; Epstein, 1983, 1990, 1991, 1994), which assumes that people process information in two parallel interacting systems, rational and experiential. The experiential system operates automatically and preconsciously according to heuristic rules. It is concretive, associationistic, holistic, primarily nonverbal, and closely related to affect; it also learns directly from experience and has a long evolutionary history. The rational system is deliberative, primarily verbal, conscious, and relatively affect-free. It operates according to a person's understanding of socially transmitted rules of reasoning and has a relatively brief evolutionary history. Behavior is assumed to be a joint function of the two systems. Situational factors and individual preferences for relying on one system or the other determine the relative influence of the systems in any given condition (for a more thorough discussion of the operating principles of the systems, see Epstein, 1994).

Although several reviewers of the depressive realism literature have noted the discrepancy between the initial contingency studies and the later, more naturalistic or otherwise engaging studies in eliciting the depressive realism effect (e.g., Ackerman & DeRubeis, 1991; K. Dobson & Franche, 1989), an explanation for the greater accuracy of depressives in nonconsequential circumstances has yet to be provided. Our explanation is based on the idea that the significance of outcomes is an important determinant of the degree to which rational control is effectively exerted over experiential processing.

It has been repeatedly demonstrated in studies of impression formation and persuasion that information construed as trivial tends to be processed less carefully than information regarded as consequential (e.g., Chaiken, Liberman, & Eagly, 1989; Harkness, DeBono, & Borgida, 1985; Kruglanski & Freund, 1983; Petty & Cacioppo, 1986; Tesser & Shaffer, 1990; Tetlock & Kim, 1987). This reaction pattern is particularly strong in people who have confidence in their spontaneous intuitive processing, such as those with high self-esteem (Gleicher & Weary, 1991; Hildebrand-Saints & Weary, 1989). To the extent that the original contingency paradigm is a trivial situation with minimal cost for inaccuracy, one would expect that nondepressed people would rely on self-serving, noneffortful experiential processing, as demonstrated in the illusion of control (e.g., Alloy & Abramson, 1979), rather than on more accurate, but more demanding, rational processing. The finding of depressive accuracy in trivial situations suggests that depressed individuals may react to such conditions by primarily using rational reasoning. We propose that such behavior is a compensatory reaction for a general tendency toward uncontrolled maladaptive experiential processing in more consequential situations.

But why would depressed people have so little confidence in their spontaneous experiential processing? There are at least three reasons. One is that their experiential systems have serious maladaptive elements. Negative beliefs and strong, unfulfilled needs cause them to feel unrealistically pessimistic and to be excessively demanding of support and confirmation, which alienates others (Bargh & Tota, 1988; Brown & Harris, 1978; Coyne, 1976; Coyne, Kessler, Tal, & Turnbull, 1987; Moretti & Shaw, 1989; Strack & Coyne, 1983; Warren & McEachren, 1983). Another is that their maladaptive beliefs and needs are automatically activated and therefore difficult to control (see Wenzlaff, 1993; Wenzlaff, Wegner, & Roper, 1988), particularly in consequential situations. The third reason is that the degree and strength of their rational processing is often insufficient for controlling their maladaptive experiential processing. This can be the case either because their maladaptive experiential processing is excessively strong, their rational processing is excessively weak, or both. In any event, inadequate control can be expected to reduce depressives' confidence in their ability to behave appropriately and not alienate others. In trivial situations, the degree of activation of maladaptive experiential processing is likely to be minimal, so there is no problem in exercising adequate rational control, whereas the opposite is true in more consequential situations. It follows that the emotional or personal significance of a situation is critically important in determining whether subclinically depressed people manifest maladaptive experiential processing, or successfully control, or even overcontrol it.

In contrast to depressed people, nondepressed people, in the fashion of "cognitive misers" (Fiske & Taylor, 1991), are adaptively strategic about exerting mental effort. They tend to process information in trivial situations casually, with self-serving optimistic biases such as the illusion of control, whereas in more meaningful contexts with significant consequences, they exert greater rational control over their experiential processing. They are better equipped to do this than depressed people are for two reasons: Their experiential processing is essentially more adaptive, therefore requiring less control, and, holding the quality of their experiential processing constant, their ability to exert rational control is superior. Positive illusions contribute to their well-being (Epstein & Meier, 1989; Taylor & Brown, 1988), so when little is at stake, nondepressed individuals give themselves the benefit of the doubt by overestimating the probability that good things will happen to them and that they can control outcomes (Dunn & Wilson, 1990; Epstein & Meier, 1989; Langer, 1975). When there is a significant cost for unrealistic behavior, however, they behave more rationally (Chaiken et al., 1989; Dunn & Wilson, 1990; Dunning & Story, 1991; Harkness et al., 1985; Kruglanski & Freund, 1983; Petty & Cacioppo, 1986; Tetlock & Kim, 1987), in the manner of "strategic illusionists."

The Ratio-Bias Paradigm

The ratio-bias (RB) experimental paradigm is of special interest to dual-process theories because it presents a conflict between the formal understanding of ratios, in the domain of the rational system, and the inherent appeal of the numerosity heu-

ristic (Hasher & Zacks, 1979; Kirkpatrick & Epstein, 1992; Pelham & Neter, 1995; Pelham, Sumarta, & Myakovsky, 1994) in the domain of the experiential system. It is an ideal situation for testing the overcompensation hypothesis because, as a game of chance, different levels of incentive (trivial vs. nontrivial) can be introduced and an objective measure of optimal behavior can be obtained. Thus, if our overcompensation hypothesis is correct, depressive individuals should respond more optimally than nondepressive persons in low (trivial), but not in high (nontrivial), incentive conditions.

To illustrate the RB paradigm, imagine two trays of red and white jelly beans. The smaller tray has 10 jelly beans, 1 of which is red, and the larger tray contains 100 jelly beans, 10 of which are red. If you draw a red jelly bean, without peeking of course, from one of the trays, you win $2. From which tray would you choose to draw? If you are like most of our participants, you would choose the larger tray (Kirkpatrick & Epstein, 1992). Although it is evident that the two trays offer the same odds of winning, most people select the larger tray because, they say, "It contains more winners." This situation demonstrates the RB phenomenon, which refers to the judgment of the probability of an unlikely event as greater when its probability is presented as a ratio of two larger numbers (e.g., 10-in-100) than of two smaller numbers (e.g., 1-in-10). The RB phenomenon even extends to cases in which the larger tray offers less favorable odds than the smaller one (e.g., 8-in-100 vs. 1-in-10; Denes-Raj & Epstein, 1994). In the Denes-Raj and Epstein study, nearly half the participants selected 8-in-100 rather than 1-in-10 odds, sometimes sheepishly explaining that although they knew it was foolish to go against the odds, they felt that somehow they were more likely to get a red bean when there were more of them. One cannot help wondering why so many people behave irrationally in the RB paradigm. It is very likely they behave irrationally because the numerosity heuristic is extremely compelling to the experiential system, as the encoding and use of frequency information is a fundamental process that becomes automatic at an early age (Gallistel & Gelman, 1992; Hasher & Zacks, 1984).

Another consistent finding in the RB research is that people make more optimal responses when faced with the prospect of losing than of winning money (Denes-Raj & Epstein, 1994; Kirkpatrick & Epstein, 1992; Pacini & Epstein, 1998; Pacini, Epstein, & Barrows, 1998). Because the influence of winning and losing on final outcome is equivalent, this finding was confusing until it became apparent that to respond optimally, many participants reformulated the decision task. In win trials, the task is relatively straightforward: draw a red bean and win money. In lose trials, in which money is lost on the drawing of a red bean, some participants reported switching their attention to the white beans (Pacini et al., 1998). Once they did so, the lose condition became very similar to the win condition for them. It was concluded that the inclination to transform avoidance tasks, such as avoiding the red beans, into tasks where the goal is straightforward, as in focusing on the white beans, occurs because experiential processing is essentially concretive and operates according to affirmative representations (Pacini et al., 1998). That is, the experiential system has difficulty with representing negation because it is an abstract concept (for a similar view, see Gilbert, 1991). A further consideration is that for participants who focus on white beans in the lose trials, both numerosity and objective probability favor making an optimal selection, thus explaining why most people would respond more optimally in the lose than in the win trials even if they do not use rational processing.

One of the most critical ideas from CEST that has been supported by the RB research (Denes-Raj & Epstein, 1994; Kirkpatrick & Epstein, 1992; Pacini & Epstein, 1998; Pacini et al., 1998) is that most people make decisions in a manner that suggests compromises between the rational and experiential systems. Although some participants respond rationally by always selecting the tray that offers the more favorable odds, most exhibit compromises by preferring the tray that is numerosity advantaged and probability disadvantaged, but only up to a point. For example, most prefer 9-in-100, but not 5-in-100, odds of a favorable outcome over 1-in-10 odds.

We have also found that individual differences play an important role in determining whether compromises are more heavily weighted in the experiential or rational direction. In an RB study comparing the performance of children of different ages and adults (Pacini et al., 1998), we found that 8-year-olds who did not understand ratios uniformly preferred 2-in-100, but not 1-in-100, odds over 1-in-10 odds; that most 12-year-olds who understood ratios preferred 5-in-100, but not 3-in-100, odds over 1-in-10 odds; and that nearly half the adults preferred 9-in-100, but not 5-in-100, odds over 1-in-10 odds. These findings are consistent with the CEST assumption that the interaction of the experiential and rational systems produces compromises and that the direction of the compromises shifts increasingly toward rational dominance with increasing maturity.

In another study of individual differences, we found that self-reported rational-thinking style was directly associated with responding optimally in the RB paradigm, whereas an experiential-thinking style had no such simple main effect but, rather, interacted with other variables in complex ways (Pacini & Epstein, 1998). These findings were interpreted as indicating that the inherent appeal of numerosity is so universal that its manifestation in certain tasks, such as the RB paradigm, depends more on individual differences in control by the rational system than on individual differences in the experiential system.

Of central importance to the current study is the influence of incentive on the RB effect. It will be recalled that a well-supported principle in impression-formation and persuasion research is that when people are weakly motivated they tend to process information heuristically (experientially), but when they are more strongly motivated to behave accurately they process more deeply (rationally). The overcompensation hypothesis assumes that individual differences associated with depression status determine the influence of incentives. Nondepressed individuals are expected to behave more optimally with increased incentive, and depressed individuals, less optimally. In past RB research, individual differences were found in the influence of incentive on nonoptimal responding (Denes-Raj & Epstein, 1994).

Pelham and Neter (1995) investigated the effect of motivation on responses to a variety of problems, including one that involved the numerosity heuristic. They found that incentives caused people to make more heuristic, less adequate responses in difficult, but not in easier versions of the problems. They

noted that this finding was consistent with the Yerkes–Dodson law (Yerkes & Dodson, 1908), according to which an increase in motivation facilitates performance in easy tasks and reduces performance in more difficult tasks, and with Hull's (1943) explanation in terms of the influence of a multiplicative relation of habit strength and drive level on the relative strength of dominant and competing responses. They concluded that the mediating role of task difficulty can account for divergent findings on motivation and processing mode in the social cognition literature.

As the RB task is relatively simple, involving a minimum expenditure of cognitive effort, we expected, consistent with the principle endorsed by Pelham and Neter, that nondepressed people would respond more optimally in the condition of increased incentive. However, we predicted, for reasons already discussed, the opposite for depressed people, whom we expected to behave more optimally in the condition of reduced incentive.

The Present Study

To test the overcompensation hypothesis for the depressive realism phenomenon, we compared the performance of subclinically depressed and nondepressed college students in the RB experimental paradigm. The dependent variables were number of nonoptimal responses in trials in which different probabilities were offered in the two trays and, in separate analyses, number of heuristic responses (responses in the numerosity direction) in trials in which the trays offered equal probabilities. The independent variables were gender, depression status (depressed vs. nondepressed), incentive (low vs. high), and valence (win vs. lose trials). We also examined a smaller group of previously depressed students that fortuitously became available during our selection of participants. Because this group was considerably smaller than the other groups, we treated it separately. As we had no theoretical basis for predicting this group's behavior, we simply proceeded empirically.

On the basis of the overcompensation hypothesis and previous findings, we made the following predictions:

1. The depressed group will make more optimal responses than the nondepressed group in the low-incentive condition (the most trivial condition), and the difference between the groups will either narrow or reverse in the high-incentive condition, depending on the motivating strength of the incentive.

2. Both groups will respond more optimally in lose than in win trials. This prediction followed from the consideration that optimal responses in lose trials may be made by using either rational or experiential processing, as explained earlier. For this same reason, the lose trials could not be used to test the overcompensation hypothesis.

3. The depressed group will report more maladaptive experiential processing in everyday life than the nondepressed group. This prediction is consistent with the idea that depressed people try to overcompensate for their experiential processing because they recognize that it is maladaptive.

4. The depressed group will report either less rational processing, more experiential processing, or both in everyday life than the nondepressed group. This prediction was derived from the assumption that depressed people have insufficient control of their experiential processing in consequential situations.

Method

Sample and Recruitment

The sample consisted of subclinically depressed, nondepressed, and previously depressed college students, as determined by BDI scores. To compensate for many of the conceptual and methodological problems that have been identified in the depression literature concerning student samples such as ours, we incorporated into our design as many of the suggestions proposed by Kendall, Hollon, Beck, Hammen, and Ingram (1987); Tennen, Hall, and Affleck (1995); and Weary, Edwards, and Jacobson (1995) as we reasonably could. First, we assessed depressive symptoms twice with the BDI to ensure temporal stability. Second, we compared groups whose scores on the two BDI measurements consistently indicated depression with those whose scores consistently indicated nondepression. We also compared these groups with a small group that had been classified as depressed on the first but not on the second administration of the BDI. This group, referred to as the *previously depressed,* was of interest because it allowed us to examine the characteristics of depression-prone people uninfluenced by their depressed state at the time of testing. Because of this group's small size, we did not include it in an overall comparison with the other groups, but rather compared it with each of the other two groups separately in what we viewed as subordinate analyses. Third, we checked the categorization of depression status by examining responses to questions assessing key symptoms of depression, namely sad mood, lack of satisfaction or boredom, and lack of interest in others. Only those who endorsed all three of these symptoms were retained in the depressed and previously depressed groups.

The sample was drawn from undergraduate psychology students who completed, for course credit, a prescreening questionnaire that included the BDI. Initial selection for the depressed group was based on BDI scores of 12 or higher ($n = 74$), which spans the categories of mildly depressed to severely depressed according to cutoff scores designated by Kendall et al. (1987), and scores of 0 ($n = 105$) for the nondepressed group. Prospective participants were contacted by phone and invited to take part in the study for course credit. Fifteen depressed and 39 nondepressed students declined to participate because they said they had conflicting schedules or did not need course credits.

Eighty-seven (50 depressed and 37 nondepressed) students from the prescreening sample agreed to participate in an experimental session, where they completed the second BDI (BDI2). The time lag between the first and second administration of the BDI was, on average, 5 weeks. To be retained in the nondepressed group, students had to obtain BDI2 scores of 3 or less, and those in the depressed group had to obtain scores of 10 or more. Eleven of the originally depressed who did not obtain scores of 10 or more on BDI2 constituted the previously depressed group. Only one person in the original nondepressed group did not obtain a score of 3 or less on BDI2. The final sample consisted of 39 depressed students (20 women and 19 men), 36 nondepressed students (19 women and 17 men), and 11 previously depressed students (5 women, 5 men, 1 with missing gender identification). Mean BDI2 scores were 0.58 (range = 0 to 3) in the nondepressed group, 20.00 (range = 10 to 44) in the depressed group, and 6.82 (range = 4 to 8) in the previously depressed group. Significantly more sadness, dissatisfaction, and loss of interest were separately reported in BDI2 by the depressed than the nondepressed group, in line with recommendations by Weary et al. (1995; all $ts > 6.00$, $p < .001$). There were no significant gender differences in BDI or BDI2 scores in any of the groups.

Materials

The Constructive Thinking Inventory (CTI). The CTI primarily measures differences in automatic, or experiential, constructive versus maladaptive ways of thinking and interpreting events in everyday life.

It includes a Global Constructive Thinking Scale and six main scales: Emotional Coping (e.g., "I don't let little things bother me."), Behavioral Coping (e.g., "When faced with upcoming unpleasant events, I usually carefully think through how I will deal with them."), Personal Superstitious Thinking (e.g., "I sometimes think that if I want something to happen too badly, it will keep it from happening."), Categorical Thinking (e.g., "I think there are many wrong ways, but only one right way, to do almost anything."), Esoteric Thinking (e.g., "I believe the moon or the stars can affect people's thinking."), and Naive Optimism (e.g., "When something good happens to me, I feel that more good things are likely to follow."). Five of the major scales also have subscales, or facets (see Table 1).

Some of the CTI scales (e.g., Emotional Coping and Behavioral Coping) primarily measure the content of beliefs, whereas others (e.g., Esoteric Thinking and Polarized Thinking) primarily measure the form, or style, of information processing. The remaining scales, including Personal Superstitious Thinking and Naive Optimism, and several facets measure combinations of content and process. The CTI has well-documented evidence of satisfactory reliability (internal-consistency coefficients of its major scales range from .80 to above .90) and validity, as determined by its coherent relations with a variety of indexes of effective functioning, including work success, relationship satisfaction, and mental and physical well-being (Epstein, 1992a, 1992b; Epstein & Brodsky, 1993; Epstein & Katz, 1992; Katz & Epstein, 1991).

The Rational-Experiential Inventory (REI). The REI (Epstein, Pacini, Denes-Raj, & Heier, 1996) provides independent measures of intuitive-experiential and analytic-rational thinking style, with a 12-item Faith in Intuition (FI) Scale and a 19-item modified version of Cacioppo and Petty's (1982) Need for Cognition (NFC) Scale. The NFC Scale measures degree of engagement in and enjoyment of cognitive activities (e.g., "I would prefer complex to simple problems."). The FI Scale measures confidence in feelings and initial impressions as a basis for decisions and actions (e.g., "When it comes to trusting people, I can usually rely on my 'gut-feelings.' "). In the current sample, the REI scales were independent ($r = -.07$, *ns*) and adequately reliable (for NFC, $\alpha = .84$; for FI, $\alpha = .78$).

The RB paradigm. Two transparent plastic trays, one larger and one smaller, contained different mixtures of red and white jelly beans. The smaller tray (9 cm × 7 cm × 5 cm) always contained 10 jelly beans, 1 of which was red (10% red). The larger tray (15 cm × 12 cm × 6 cm) always contained 100 jelly beans, among which the number of red beans (10, 9, or 7) varied by trial. The jelly beans were spread in a flat layer in each tray so that all were completely visible. The trays were labeled with the percentage of red beans and the absolute number of red and white beans. Play money was used and later exchanged for real money. The difference in the total amount of money that could be won between low- and high-incentive trials was not trivial, $.50 over 5 trials in the low-incentive condition and $10.00 in the high-incentive condition. In preliminary work, we observed that participants reported greater involvement in the $2 than in the $.10 trials.

Manipulation check. Four questions assessing the motivation to win (or to not lose) in the two incentive conditions were administered to check reactions to the incentive manipulation (e.g., "How badly did you want to win in the $2 win trials?"). Responses were on a 5-point scale that ranged from 1 (*not at all*) to 5 (*extremely*).

Procedure

Participants were tested individually by one of two experimenters who were unaware of their depression status. First, the participants read and signed consent forms explaining that they would earn course credit and have the opportunity to win money. After completing the BDI, the participants received game instructions and play money, which they were told would be exchanged with real money for any net earnings (maximum $10.50) at the end of the experiment.

The game of chance consisted of 16 trials. The first 12 trials varied by valence (win, lose), optimality of the large tray (10%, 9%, 7%), and incentive ($.10, $2). The small tray always contained 10% red jelly beans, and the large tray contained 10%, 9%, or 7% red jelly beans. Although they could not be used to test the overcompensation hypothesis, lose trials were retained to establish consistency with our previous studies of the RB effect and to keep the cost of the experiment within an affordable limit. The first 12 trials were ordered in a Latin square design. The last four trials were all win trials in which the large tray contained either 40% or 50% red jelly beans, and the small tray contained, respectively, 50% or 40% red beans. These were included to increase the likelihood that everyone would win some money.

On each trial, the experimenter presented the two trays with their respective labels and announced the trial valence (win or lose) and the amount of money at stake ($.10 or $2). To control for a position effect (i.e., right or left), tray positions were alternated on every trial. So that outcomes of previous selections would not influence new selections, the game was played in two rounds. In the first, the experimenter presented both trays to the participant and recorded his or her tray choices. In the second, the experimenter presented the previously chosen tray, placed it behind a cardboard screen, scrambled the jelly beans, and then let the participant draw.

After completing the game and the manipulation check, participants received cash for their net earnings. They then completed the CTI and REI. Afterwards, the experimenter debriefed and thanked them. The entire procedure lasted approximately 1 hr. and 10 min.

Results

Group Differences in Response to the Ratio-Bias Paradigm

Incentive manipulation check. The responses to the four manipulation-check items for incentive were entered into a repeated-measures analysis of variance (ANOVA), with depression status, gender, valence, and incentive as the independent variables. A significant main effect of incentive, $F(1, 71) = 76.98$, $p < .000$, indicated that participants reported more motivation in the high-incentive ($M = 3.37$, $SD = 0.99$) than in the low-incentive trials ($M = 2.43$, $SD = 0.76$). Depression status had a marginally significant effect, $F(1, 71) = 3.64$, $p = .06$, which showed that the depressed group ($M = 3.06$, $SD = 0.81$) tended to report greater motivation to win and not to lose than did the nondepressed group ($M = 2.73$, $SD = 0.68$). This finding, consistent with the overcompensation hypothesis, suggests that the depressed group tried harder across all types of trials than did the nondepressed group.

Nonoptimal responses. Selection of the tray that offered less favorable odds—that is, the large tray in win trials and the small tray in lose trials—constituted a nonoptimal response. The possible range of nonoptimal responses was from 0 to 8. The sample mean was 2.93 ($SD = 2.31$) indicating that, on average, participants made approximately three out of the eight possible nonoptimal responses. A repeated-measures ANOVA was conducted on the number of nonoptimal responses, with valence, incentive, and optimality (7% or 9% in the large tray) as within-subjects variables, and gender and depression status as between-subjects variables. There were significant main effects of optimality, $F(1, 67) = 9.52$, $p < .005$, valence, $F(1, 67) = 6.69$, $p < .05$, and gender, $F(1, 67) = 9.39$, $p < .01$, but not of depression, $F(1, 67) = 2.93$, $p = .09$. Consistent

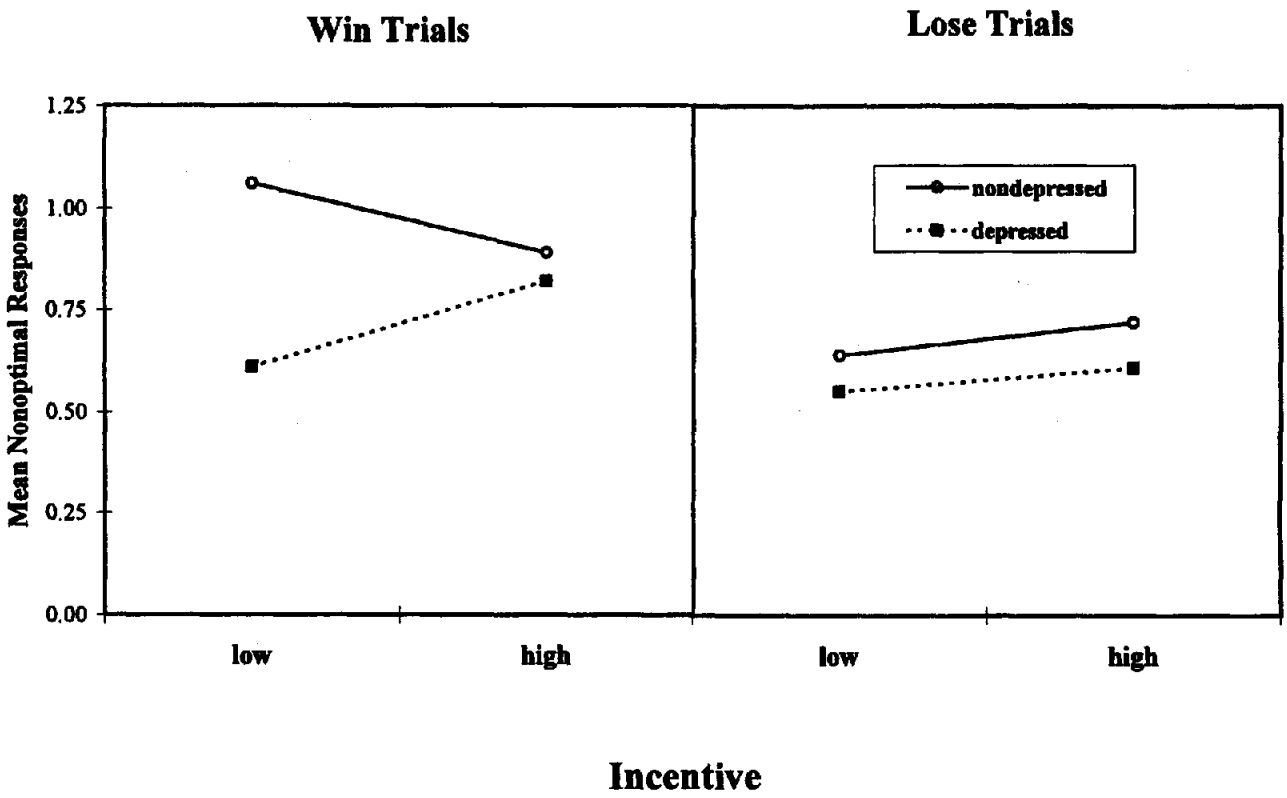

Figure 1. Mean number of nonoptimal responses of the depressed and nondepressed groups as a function of trial valence (win vs. lose) and incentive level ($.10 vs. $2) per trial.

with earlier findings (Denes-Raj & Epstein, 1994; Kirkpatrick & Epstein, 1992), more nonoptimal responses were made in win (M = 1.69, SD = 1.43) than in lose (M = 1.26, SD = 1.26) trials, and in the 9% trials (M = 1.68, SD = 1.31) than in the 7% trials (M = 1.25, SD = 1.24). Women made significantly more nonoptimal responses (M = 3.62, SD = 2.57) than did men (M = 2.19, SD = 1.75). There were no other significant main effects. The unanticipated significant interaction of gender and incentive observed in a previous study (Denes-Raj & Epstein, 1994) was not replicated (p = .161), and the means were not in the same direction.

The only significant interaction was a Depression Status × Incentive × Valence interaction, $F(1, 67) = 4.82$, $p < .05$. Follow-up analyses of the win and lose trials separately revealed that the three-way interaction was driven solely by the win trials, which produced a significant interaction of depression status and incentive, $F(1, 70) = 4.28$, $p < .05$. As Figure 1 shows, the interaction resulted from the depressed group responding more optimally (M = 0.61, SD = 0.79) than the nondepressed group (M = 1.06, SD = 0.86) in the low-incentive win condition, $F(1, 70) = 5.41$, $p < .05$, but not in the high-incentive win condition, in which the two groups performed almost identically (Ms = 0.82 and 0.89, respectively). As predicted (Prediction 2), there were no significant effects in the lose trials, in which there was relatively little variation among the four means. It may be concluded that the observed difference in nonoptimal responses between the two groups in the most trivial condition, the low-incentive, but not in the high-incentive, win trials, is consistent with the overcompensation explanation of the depressive realism phenomenon (Prediction 1).[2]

Heuristic processing in the 1-in-10 versus 10-in-100 trials. Four trials in which both trays offered 10% odds were included to test for group differences in the tendency to respond according to the numerosity heuristic when optimality is not involved. Responses were coded in the direction of the RB effect (large

[2] In addition to depression status ($\beta = -0.27$, $p < .05$), degree of rational processing, as measured by NFC ($\beta = 0.22$, $p < .05$), and maladaptiveness of experiential processing, as measured by CTI-Global scores ($\beta = 0.26$, $p < .05$), were significant and unique predictors of number of nonoptimal responses in the low-incentive win trials. Degree of experiential processing, as measured by FI ($\beta = 0.13$), was not. The question may be raised as to whether degree of rational processing, or maladaptiveness of experiential processing, or both, mediate the relationship between depression status and nonoptimal responses, as proposed by the overcompensation hypothesis. If they do, the significant effect of depression status should disappear once the mediators are taken into account. To test this, we conducted a hierarchical regression analysis on number of nonoptimal responses in the low-incentive win trials with gender (a control variable) and depression status as the first set of predictors, and NFC and CTI-Global scores as the second set of predictors. As hypothesized, the significant effect of depression status disappeared when NFC and CTI-Global scores were added to the equation. However, these results are to be treated cautiously because of multicollinearity among the predictors in the regression analysis.

tray selections in the win trials and small tray selections in the lose trials) and analyzed with a repeated-measures ANOVA with depression status, gender, incentive, and valence as predictors. This analysis did not yield any significant effects. The average number of heuristic responses across the four trials was 2.61 (SD = 1.06).

Although there were no significant effects due to depression status or incentive, the RB effect was replicated in these data. To test for a basic RB effect in each condition, we compared the proportion of small relative to large tray selections with an equal division (50%) by chi-square analysis. Results showed a significant RB effect in the low-incentive win trial, in which 69% of participants selected the large tray, χ^2 (1, N = 74) = 11.21, $p < .000$; in the high-incentive win trial, in which 72% of participants selected the large tray, $\chi^2(1, N = 74) = 13.84$, $p < .000$; and in the high-incentive lose trial, in which 67% of participants selected the small tray, $\chi^2(1, N = 74) = 8.33$, $p < .000$. The RB effect was nonsignificant ($p = .42$) in the low-incentive lose trial, in which 54% selected the small tray. Consistent with previous research, these results indicate the robustness of the RB effect and its greater magnitude in win than in lose trials.

That there was no group difference in preference for the numerosity heuristic when optimality was not at issue indicates that the results from the trials in which optimality was at issue cannot be attributed to a simple preference for numerosity but, rather, had to be determined by differences in preferences for optimal choices.

Self-Reported Quality and Quantity of Experiential and Rational Information Processing

The CTI and REI were used to measure maladaptive experiential processing and degree of experiential and rational processing, respectively. To test Predictions 3 and 4, we conducted ANOVAs on CTI and REI scores with gender and depression status as predictors. Because of the large number of comparisons, we discuss as major findings only those that are significant at the $p < .001$ level. The others, although conventionally significant ($p < .05$), we treat as trends.

Maladaptive experiential processing. We predicted that the depressed group would obtain less favorable CTI scores than the nondepressed group. The critical information is presented in Table 1. The group differences that were found support Prediction 3. The data are not presented by gender because there were only two significant gender effects ($p < .01$), namely, that men reported thinking in more categorical and polarized terms than women, and that women reported having more esoteric beliefs than men. There were no significant interactions of depression status and gender for any of the CTI scales.

Turning to the specific effects associated with depression status, almost all scales produced highly significant group differences in the expected direction (see Table 1). This pattern was true for both process and content scales, as well as for scales that combine both. The strongest group differences were on the Emotional Coping Scale and its facets, which identify the specific ways in which depressed people think that are the source of their poor emotional coping, namely, dwelling on negative events, negative overgeneralization, low self-acceptance, and undue sensitivity to disapproval and other negative experiences.

Whereas the Emotional Coping Scale measures adjustment to the inner world of thought and feelings, the Behavioral Coping Scale measures adjustment to the outer world by referring to ways of thinking that facilitate and interfere with effective performance. Two of its three facets, action orientation and realistic positive thinking, discriminate significantly in the expected direction between the depressed and nondepressed groups. Interestingly, the third facet, conscientiousness, does not. If we allow for exaggerated negative reporting by the depressed group because of their current mood, it suggests that the depressed group may actually be more conscientious than the nondepressed controls. This is consistent with the higher proportion of depressed than of nondepressed students who agreed to participate in the experiment, and with the depressed group's more optimal performance on the low incentive win trials of the RB paradigm. Possibly their general conscientiousness is in response to their sensitivity to disapproval and rejection and their greater desire, therefore, to please others.

The depressed group also obtained significantly less favorable scores than the nondepressed group on the two CTI scales measuring primarily process, namely, Esoteric Thinking, and, to a lesser extent, Polarized Thinking. Among the facets of Esoteric Thinking, formal superstitious thinking (e.g., "I believe in good and bad omens.") tended to most differentiate the groups.

There were also significant group differences on the CTI scales measuring combined process and content. The depressed group scored higher on Personal Superstitious Thinking, which combines negative thinking and superstitious thinking (e.g., "When something good happens to me, I believe it is likely to be balanced by something bad."); the Categorical Thinking facets of distrust of others, which combines distrustfulness and extreme thinking (e.g., "I have learned from bitter experience that most people are not trustworthy."), and intolerance, which combines negative thinking about others with categorical thinking (e.g., "I feel that if people treat you badly, you should treat them the same way."). It is interesting that the groups did not differ substantially on Naive Optimism or its facets, which combine positive thinking with overgeneralization.

In summary, in support of prediction, the picture of the automatic thinking of subclinical depressive individuals that emerges from the CTI is that it is maladaptive in both content and process. With respect to content, it is characterized by negative thinking that contributes to poor emotional coping and is antithetical to behavioral accomplishment. With respect to process, it tends to be simplistic, categorical, and unrealistic.

Degree of rational and experiential processing. We predicted that the depressed group would engage in less rational processing, as measured by the NFC Scale, or more experiential processing, as measured by the FI Scale, or both, than the nondepressed group (Prediction 4). As Table 2 shows, the data favor a greater difference in rational than in experiential processing. The depressed group scored significantly lower than the nondepressed group on NFC, whereas on FI, the difference was substantially smaller. Both of these main effects were qualified by interactions of depression status and gender: for NFC, $F(1, 70) = 6.57$, $p < .05$; for FI, $F(1, 70) = 4.10$, $p < .05$. Although the difference between the depressed and nondepressed groups

Table 1
Comparison of Group Means on the Constructive Thinking Inventory (CTI)

CTI scale	Depressed group		Nondepressed group			
	M	*SD*	*M*	*SD*	*df*	*F*
Global Constructive Thinking	74.00	13.20	112.50	12.98	(1, 72)	161.77***
Emotional Coping	56.74	12.67	93.60	14.31	(1, 72)	136.29***
Self-acceptance	18.38	4.55	27.42	4.37	(1, 74)	76.57***
Absence of negative overgeneralization	9.46	2.85	16.22	2.82	(1, 74)	106.60***
Nonsensitivity	17.02	5.43	26.53	5.31	(1, 74)	58.59***
Absence of dwelling	12.16	3.65	23.46	4.26	(1, 72)	148.82***
Behavioral Coping	43.82	7.38	54.97	6.27	(1, 74)	49.36***
Positive thinking	12.92	3.56	15.94	2.38	(1, 74)	18.33***
Action orientation	19.95	4.17	27.78	4.08	(1, 74)	67.43***
Conscientiousness	14.41	2.46	15.19	2.08	(1, 74)	2.21
Personal Superstitious Thinking	24.69	4.77	14.77	3.80	(1, 74)	98.01***
Categorical Thinking	45.89	10.19	34.03	7.90	(1, 72)	30.55***
Polarized thinking	15.43	5.29	12.48	3.76	(1, 73)	7.49**
Distrust of others	17.08	4.09	10.30	3.53	(1, 73)	57.92***
Intolerance	10.56	2.84	8.42	2.21	(1, 74)	13.23***
Esoteric Thinking	37.50	8.58	29.67	10.65	(1, 73)	12.21***
Unusual beliefs	16.79	4.74	13.39	5.59	(1, 73)	8.00**
Formal superstitious thinking	20.43	5.40	16.28	5.80	(1, 74)	10.33**
Naive Optimism	48.49	9.27	49.08	5.53	(1, 74)	0.11
Overoptimism	16.05	4.10	15.64	2.84	(1, 74)	0.25
Stereotypical thinking	9.82	2.22	8.83	2.22	(1, 74)	3.69
Pollyanna-ish thinking	22.61	4.71	24.61	2.95	(1, 74)	4.74*

Note. Depressed, $n = 39$; Nondepressed, $n = 36$. Responses were made on a 1 (*completely false*) to 5 (*completely true*) scale and summed to form scores.
$^{*}p < .05$. $^{**}p < .01$. $^{***}p < .001$.

in NFC scores was in the same direction for men and women, it was greater for the men ($p < .001$) than for the women ($p = .06$). The interaction showed a similar but weaker pattern in FI scores. As the Gender × Depression interactions were unanticipated and of low magnitude, they should not be taken seriously until replicated.

The Previously Depressed Group

The previously depressed group ($n = 11$) was compared with each of the other groups on their RB task performance and on their CTI and REI scores by using the nonparametric Kruskal-Wallis ANOVA, which does not assume equal cell size or homogeneity of variance. On the RB task, there were no significant differences in nonoptimal and in heuristic responses between the previously depressed and the other groups. However, there was a nonsignificant tendency ($p = .09$) for the previously depressed to respond, like the depressed group, more optimally than the nondepressed group in the low-incentive win trials, with the group means converging in the high-incentive win trials. If replicated, this pattern would suggest that the previously depressed group engages in compensatory processing in a manner similar to the depressed group.

On the CTI and REI, the previously depressed group resembled the depressed group in some ways, and the nondepressed group in others. Like the depressed group, they were lower on NFC, $\chi^2(1, N = 46) = 6.84$, $p < .01$, and the nonsensitivity facet, $\chi^2(1, N = 47) = 8.53$, $p < .01$, and higher on the unusual beliefs facet, $\chi^2(1, N = 47) = 4.54$, $p < .05$, than the nondepressed group. Like the nondepressed group, they were higher on Behavioral Coping, $\chi^2(1, N = 50) = 8.49$, $p < .01$, particularly on its facet of positive thinking, $\chi^2(1, N = 50) = 7.97$, $p < .01$, and lower on FI, $\chi^2(1, N = 48) = 3.80$, $p < .05$, Personal Superstitious Thinking, $\chi^2(1, N = 50) = 14.07$, $p < .001$, Categorical Thinking, $\chi^2(1, N = 48) = 5.71$, $p < .05$, and the stereotyped thinking facet of Naive Optimism, $\chi^2(1, N = 50) = 5.29$, $p < .05$, than the depressed group. The previously depressed group scored in between the other two groups on a number of variables. They scored significantly more favorably than the depressed group and significantly less favorably than the nondepressed group (all ps $< .05$) on the CTI scales of Global Constructive Thinking, Emotional Coping, and the action-orientation facet of Behavioral Coping. These results have interesting implications for hypotheses concerning which kinds of thought patterns are prognostic of subclinical depressive episodes and which are symptoms, implications that we discuss in the next section.

Discussion

The results of the present study support the view of Beck (1967, 1976) and others that depressed people suffer from underlying unrealistic negative schemata about themselves, the world, and the future that distort their conscious thinking and behavior. Paradoxically, the results are also consistent with the depressive realism phenomenon, according to which depressed

Table 2
Comparison of Group Means on the Rational-Experiential Inventory (REI)

REI scale	Depressed group		Nondepressed group			
	M	*SD*	*M*	*SD*	*df*	*F*
Need for Cognition						
Total	58.95	10.78	69.19	7.01	(1, 70)	26.72***
Men	54.67	10.24	70.41	7.62	(1, 33)	26.37***
Women	62.80	9.98	68.10	6.43	(1, 37)	3.85
Faith in Intuition						
Total	43.95	6.53	41.29	4.78	(1, 70)	4.22*
Men	45.83	5.89	40.47	5.11	(1, 33)	8.23**
Women	42.25	6.76	42.21	4.43	(1, 37)	0.00

Note. Depressed, $n = 38$; Nondepressed, $n = 36$. Responses were made on a 1 (*completely false*) to 5 (*completely true*) scale and summed to form scores.
* $p < .05$. ** $p < .01$. *** $p < .001$.

people are more accurate than others in carefully controlled laboratory experiments. A resolution of this paradox was provided by a hypothesis according to which subclinically depressed people are able in trivial situations to overcompensate for their more general tendency toward maladaptive experiential processing in more consequential situations by relying on rational information processing. Our results are consistent with this position and indicate the importance of examining both process- and content-related cognitions to gain an understanding of the nature of maladaptive thinking in subclinical depression.

Depressive Realism as a Function of Level of Incentive

The findings from the win trials of the RB task were in accord with the prediction we derived from the overcompensation hypothesis. On the win trials, the nondepressed group made more nonoptimal responses than the depressed group in the low-incentive condition, and the groups converged in the high-incentive condition. The prediction that in the high-incentive condition the groups would either converge or reverse their positions raises the question of why we found the convergence rather than the reversal. A reasonable possibility is that the monetary incentive we offered was insufficient to produce a reversal. To produce a reversal, it may be necessary to manipulate incentive by using outcomes that are more personally significant, particularly for depressed people, such as the possibility of disapproval or failure (e.g., Benassi & Mahler, 1985; Vazquez, 1987). It remains for future research to test this hypothesis.

In accordance with previous research (Denes-Raj & Epstein, 1994; Kirkpatrick & Epstein, 1992), we found that people made more optimal responses in the lose than in the win trials. As explained earlier, in the lose trials, people may arrive at optimal decisions by rational processing, or, if they focus on the white rather than the red beans, by experiential processing as well. As such, the lose trials could not provide a meaningful test of the overcompensation hypothesis. Nevertheless, they were retained in the present study to help establish consistency between the present and previous findings with the same paradigm and to contain the cost of the experiment.

The RB results of the present experiment are consistent with a wide body of research by others using different paradigms, as well as with our own prior research with the RB paradigm. The greater optimality of the depressed than the nondepressed group in the low-incentive win condition is consistent with the findings of Alloy and Abramson (1979) that originally instigated interest in the depressive realism phenomenon. The increased optimal responding of the nondepressed group in the high-incentive win condition is consistent with Dunn and Wilson's (1990) observation that when stakes are high, nondepressed people do not exhibit the illusion of control that they do when incentives are lower. The nonoptimal, heuristic responding of the nondepressed group in the low-incentive condition is in accordance with social-cognitive research findings demonstrating that people tend to process information heuristically when they are not motivated to engage in more demanding rational processing (see review in Fiske & Taylor, 1991). It is also consistent with previous RB research in which participants not selected for depression status have consistently made more nonoptimal responses in win than in lose trials (Denes-Raj & Epstein, 1994; Kirkpatrick & Epstein, 1992).

It is important to keep in mind that in the present study we did not examine the depressive realism phenomenon in its original form, in which the self-report of control, confounded with stereotypic accuracy (Cronbach, 1955; Coyne & Gotlib, 1983), constituted the dependent variable. Rather, we examined a behavioral process variable, number of nonoptimal responses, from which we could make inferences about two interacting processes, namely, experiential and rational. Most research on depressive cognition, with a few notable exceptions (e.g., Edwards & Weary, 1993; Teasdale, 1988), has been concerned solely with the content of schemata, such as negative self-views, helplessness, personal control, and differential views about the self and others. This approach, although valuable, appears to present only part of the picture of cognitive processing in subclinical depression. The present research indicates that it is also important to consider the nature of cognitive processes in depressive thinking.

Edwards and Weary (1993), in particular, have taken an important step in recognizing that style of processing is just as central to the problem of depressive cognition as content. They presented a view of cognitive processing in subclinical depres-

sion that is similar to ours in some respects and different in others. They, like we, believe that depressed persons process information in a more effortful way than nondepressed persons. However, whereas we propose that the primary motivation for this is depressed individuals' desire to control their maladaptive experiential processing, they proposed that the reason for their deeper processing is to compensate for a perceived lack of control over life events. These positions can be viewed as supplementary, with one emphasizing an inner, and the other, an outer fundamental problem. Another difference is that we assumed that situational considerations determine whether depressed individuals process information deeply or not. This assumption allows us to account for the depressive realism effect as well as the Edwards and Weary finding that depressed participants engaged in more effortful processing than nondepressed controls in a laboratory impression-formation task with no significant consequences. It remains to be seen whether depressed individuals will continue to exhibit deeper (more rational) processing than nondepressed controls in a situation with significant consequences for inaccuracy.

Group Differences in Self-Reported Maladaptive Information Processing

The CTI was administered to compare the adaptiveness of the automatic (experiential) thinking of the subclinically depressed and nondepressed participants. In support of prediction, the depressed group obtained more maladaptive experiential processing scores on nearly all scales, some of which measured primarily content (i.e., Emotional and Behavioral Coping), others of which measured primarily cognitive processes (i.e., Esoteric Thinking and Polarized Thinking), and still others that measured a combination of both (i.e., Personal Superstitious Thinking, which is unrealistic and negative in content; and the facets of Categorical Thinking, distrust of others and intolerance, which combine extreme thinking with negative views of others).

That the subclinically depressed group reported a greater degree of certain negative beliefs, such as low self-acceptance, is hardly surprising, as it is recognized as a fundamental component of depression. Somewhat more interesting is the depressed participants' report of distrusting others, with its implications for problematic interpersonal relationships. Of yet greater interest is that depressed participants reported what appear to be negatively motivated selective cognitions, such as dwelling on negative, but not on positive events, and overgeneralizing in response to negative but not to positive occurrences (the equivalent positive events appear in the Naive Optimism Scale, on which the groups did not differ). This raises an issue that deserves more attention than it has received, namely, why, in terms of their current dynamics and past experiences, subclinically depressed people are motivated to think and behave in ways that maintain negative views. Of equal interest are process variables that do not include negative content, on which the two groups differed. We have already discussed group differences on the process variable of rational processing in relation to performance on the RB task. The CTI results add two other process variables that differentiated the groups, Esoteric Thinking and Polarized Thinking. It may be concluded that the cognitions of subclinically depressed people are not only maladaptive in content, but also in the thought process itself. It will be important in future research to examine such maladaptive processing more thoroughly and to determine which kinds of cognitive processes, if any, are prognostic rather than just diagnostic of subclinical depression. Some preliminary relevant data that we obtained with a previously subclinically depressed group are discussed later.

Group Differences in Self-Reported Degree of Experiential and Rational Processing

According to the overcompensation hypothesis, depressed individuals have insufficient rational control of their experiential processing for any of the following reasons: Their rational control is abnormally weak, their experiential processing is abnormally strong, or both. As the REI provides independent assessments of the two modes of information processing, it was possible to determine which of these three possibilities, if any, is correct. Our results showed that the depressed group reported having less interest and engagement in rational processing than the nondepressed group. The depressed students endorsed items such as "It is good enough for me to know the right answer without knowing why," and "I would rather do something that requires little thought than something that is sure to challenge my thinking abilities." The results on experiential processing were equivocal, as the group difference on the FI Scale was small and gender specific. As the Gender × Depression Status interactions in the NFC and FI data were unanticipated, it is idle to speculate on their significance until they are replicated.

That the subclinically depressed group in this study reported low interest and engagement in rational processing may have interesting implications for understanding and treating depression. Its significance depends on whether it can withstand replication with other samples and measures, and on the extent to which it identifies a vulnerability factor rather than just a symptom of subclinical depression. As discussed in the next section, there is reason to suspect it is a vulnerability factor.

Cognitive Variables That Distinguish Between Vulnerability to and Symptoms of Subclinical Depressive Episodes

To what extent are the features of information processing that distinguished the two groups a consequence rather than a cause of depression? It is impossible to answer this question with the data from the main groups. However, the small group of previously depressed participants provided some relevant findings. Because of the small sample size and the exploratory nature of the analysis, the findings with this group are best regarded as hypotheses that require testing in future research with larger samples.

The variables that tentatively qualify as vulnerability factors for subclinical depression are those that distinguish the previously depressed group from the nondepressed but not from the depressed group. They are vulnerability factors because the participants, not depressed at the time they reported these reactions, nevertheless obtained scores very similar to the depressed group. Included are low interest and engagement in rational

processing (NFC Scale of REI), high sensitivity to disapproval (CTI nonsensitivity facet), and a high degree of the unusual-beliefs facet.

The variables that qualify only as symptoms of subclinical depression are those that distinguish the depressed group from the previously depressed and the nondepressed groups. They include higher engagement in experiential processing, as measured by the FI Scale of REI, and the following maladaptive cognitions, as measured by the CTI: poor overall constructive thinking, poor emotional coping, poor behavioral coping, low action orientation, low positive thinking, high personal superstitious thinking, high categorical thinking, high distrust, and high stereotyped thinking. These variables include not only well-recognized symptoms of depression, such as poor emotional and behavioral coping and reduced instrumental activity and positive thinking, but also cognitive variables that are less well recognized, such as increased experiential processing, categorical thinking, and stereotyped thinking, and reduced rational processing. Although the subclinically depressed people who reported these ways of thinking are able to get by without treatment in everyday life, it is evident that their thinking processes are counterproductive. One may ask how they are able to function within normal limits given their maladaptive cognitions. The answer suggested by our research is that they are able to compensate for their maladaptive processing, at least within the limits of situations that are not highly emotionally engaging.

Limitations of the Present Study

An obvious limitation of this study is that the level of depression of our subclinically depressed group was mild compared with clinical levels of depression. The subclinically depressed group consisted of functioning college students who were able to go about the business of everyday living in a way that seriously depressed patients cannot. Thus, what we observed in their behavior in the RB task may not apply to clinically depressed patients, who might not have the motivation or ability to rationally compensate for their maladaptive experiential processing, as we assumed our subclinically depressed group did. This, of course, remains for future research to determine.

However, it should be considered that the investigation of subclinical depressives is a limitation only if one wishes to generalize to clinical depression. Such generalization is clearly unwarranted without subsequent research that justifies it. Rather, the study must be evaluated for what it is, a study of subclinical depression, which is warranted in its own right. It is evident from the self-descriptions of subclinically depressed people that, despite functioning according to external appearances somewhat adequately, they are extremely unhappy. Moreover, the number of subclinically depressed people undoubtedly far exceeds the number of those who are more seriously depressed. Thus, conducting research on understanding and perhaps ultimately developing procedures for alleviating subclinical depression requires no apology, for it is a worthy endeavor apart from whatever it may contribute to the understanding and treatment of clinical depression.

We earlier referred to another limitation, namely the small size of the sample of previously depressed people. Because of the small sample size, the findings can best be regarded as hypotheses that should be tested in follow-up research with larger samples. The proposal of promising new hypotheses, it is worth remembering, is no less important to the advancement of science than the validation of old hypotheses.

So far, we have discussed the limitations of the study with respect to generalizing from the people who participated in it, or sample generalization. An equally important limitation is associated with stimulus generalization. To make conceptually meaningful generalizations that are not restricted to a specific stimulus or experimental paradigm, it is necessary to demonstrate the occurrence of a phenomenon with a variety of conceptually relevant stimuli. It remains to be seen how well our overcompensation hypothesis will be supported by new studies that use procedures other than the RB paradigm. As mentioned earlier, an important area for future research is the examination of the influence of incentive levels that derive their significance from social consequences to which depressives are particularly sensitive, such as rejection or disapproval, in contrast to the monetary incentives we investigated.

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