DEPRESSED AND NONDEPRESSED STUDENTS: JUDGMENT OF CONTROL, DEFENSIVENESS, AND COGNITIVE FUNCTIONING

DISSERTATION

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Ninety-six undergraduates were given four tasks under either reward or punishment conditions. Each task consisted of 20 trials of pressing or not pressing a button to make a light come on. Monetary reinforcement was contingent on light onset for all tasks and on accuracy of judgment of control for the 2nd, 3rd, and 4th tasks. Cognitive processing was comprehensively assessed for each task by measuring expectancy, judgment of control, perception of environmental stimuli, evaluation of performance, attribution, and reinforcement value.

Results showed that subjects were more accurate in moderate than in low control and in low than moderate frequency. Females were more accurate in perceiving environmental stimuli and had lower self-esteem, lower efficacy expectancies, and higher self-rated reinforcement values for monetary incentives than males. Low defensives were accurate in expectancy of control, judgment of control in punishment, and estimation of environmental stimuli.

Subjects in reward were more accurate in perceiving reinforcing events and they gave themselves more credit for

task performance than subjects in punishment gave themselves blame for comparable performance. Those in punishment had more stable and external attributions and were more anxious, depressed, and hostile.

Depressives and nondepressives reacted differently to the monetary contingency on accuracy of judgment of control. Depressives showed overestimation of control immediately after initiation of this contingency, then gradually decreased their estimation until they were relatively accurate on the last task. Nondepressives showed more accurate judgment of control immediately after monetary contingency on accuracy, but returned to overestimation on subsequent tasks. These findings gave partial support to Alloy and Abramson (1979) in that mild depressives became increasingly accurate in judgment of control across tasks.

Female depressives, compared to female nondepressives, were less accurate in perceiving environmental stimuli and gave themselves less credit in reward. Although depressives did not set a particularly high criterion for success as suggested by Beck and Seligman, all subjects set criteria for success higher than both estimated and actual maximal control (*ps* < .05).

TABLE OF CONTENTS

LIST OF TABLES

LIST OF ILLUSTRATIONS

Figure Page

CHAPTER I

INTRODUCTION

By any standards, depression is a major health problem. It is estimated that 20 percent of the females and 10 percent of the males in the United States have had a major depressive episode, with at least one-third of these cases requiring hospitalization (American Psychiatric Association, 1980; President's Commission on Mental Health, 1978). In addition, there appears to be a clear linkage between depression and suicide. An estimated 80 percent of suicidal patients are significantly depressed, and depressed patients are at least twenty-five times more likely to commit suicide than those in the normal population (Flood & Seager, 1968; Robins & Guze, 1972; Rosenhan & Seligman, 1984).

What is depression? After more than four decades of research, it is still difficult to find a single symptom universally ascribed to depression (Lewinsohn, 1975; Pehm, 1976). In an attempt to unify the classification of major depressive episodes, the American Psychiatric Association (1980) requires at least four specific symptoms to be present and relatively persistent for at least two weeks. Such symptoms include appetite or weight change, sleep disturbance (insomnia or hypersomnia), changes in activity level (psychomotor agitation or retardation), decreased interest in formerly pleasant activities, energy loss and

fatigue, negative feelings about oneself, diminished ability to concentrate, and suicidal ideation.

Most attempts to deal with the etiology of depression can be grossly classified into psychosocial and biological approaches. Within the psychosocial approach, relationships have been proposed between depression and: developmental events (Abraham, 1957; Akiskal, 1979; Freud, 1917; Klein, 1935; Jacobson, 1971), antecedent social stress (Brown, 1972; Brown, Harris, & Copeland, 1977; Brown, Sklair, Harris, & Birley, 1973; Paykel, 1973; Paykel, Meyers, Dienelt, Klerman, Lindenthal, & Pepper, 1969), reinforcement anomalies (Coyne, 1976; Lewinsohn, 1974; Lewinsohn, Biglan, & Zeiss, 1976; Lewinsohn, Weinstein, & Shaw, 1969), social skill deficits (Hersen, Eisler, Alford, & Agras, 1973; Lewinsohn & Graf, 1973; McLean, 1976; Youngren & Lewinsohn, 1978), aversive control (Ferster, 1973, 1974; Lazarus, 1968; Suarez, Crowne, & Adams, 1978), loss of reinforcer effectiveness (Carson & Adams, 1980; Costello, 1972a, 1972b; Strickland, Hale, & Anderson, 1975), maladaptive cognitions (Beck, 1967, 1974, 1976, 1979; Ellis, 1962; Kovacs & Beck, 1978; Valins & Nisbett, 1971), and learned helplessness (Seligman, 1975; Abramson, Seligman, & Teasdale, 1978).

Within the biological approach, evidence from twin (Allen, 1976; Perris, 1979) and adoption studies (Cadoret, 1978; Mendlewicz & Rainer, 1977) suggests a genetic predisposition to depression. Moreover, the success of

electroconvulsive therapy, monoamine oxidase inhibitors, and tricyclic antidepressants has led researchers to focus on the role of neurotransmitters (Carson & Carson, 1984).

Given the commonly acknowledged heterogeneity of depressed people, it is unlikely that any one cause is universally or singularly associated with depression. Akiskal (1979) advocates an "etiological chain" of various psychosocial and biological factors that culminates in depression Recently, there have been increased attempts to bridge the two approaches in order to create a more comprehensive framework for studying depression (Carson & Carson, 1984).

Nevertheless, despite these efforts to combine biological and psychosocial approaches, cognitive models within the psychosocial approach seem to have achieved an ascendancy in recent years. In the late 1970's, research suggested that interventions based on cognitive approaches to depression may produce greater improvement, more complete remissions, and fewer dropouts than either drug treatment (Rush, Beck, Kovacs, & Hollon, 1977) or behavior therapy (Shaw, 1977). Since then, much research has been devoted to cognitive models of depression, particularly those of Beck and Seligman.

Cognitive Models of Depression

Beck's model. Beck (1967, 1974, 1976, 1979) attributes depression vulnerability to aberrant cognitions, which can negatively distort the content of environmental experiences. He invokes three sets of aberrant cognitions: the cognitive triad, schemata, and faulty information processing.

Cognitive triad. The cognitive triad consists of pessimistic views about self, ongoing experiences, and the future. The first component revolves around thoughts of oneself as being inadequate, deprived, undesirable, and defective. Beck postulates that depressives attribute unpleasant experiences to personal unworthiness and interpret ongoing experiences as manifesting defeat and failure, even when there are more plausible positive explanations. For them, small obstacles are perceived as impassable barriers. Depressives' view of the future is one of hopelessness; they believe that current negative events will continue indefinitely. They expect unremitting hardship, frustration, deprivation, and failure. Beck (1974) postulates that this cognitive triad is relatively dormant unless triggered by environmental stress, especially stress involving loss of control over reinforcement.

Schemas. This concept is used to explain why depressives maintain their pain-inducing and self-defeating attitudes despite objective evidence of positive factors in their lives. Schemas are stable, organized representations

of past experiences which provide the basis for screening, differentiating, and coding environmental stimuli. Schemas may be inactive for long periods of time, but can be energized or activated by specific environmental inputs such as stress. The kinds of schemas employed determine how an individual will structure different experience. For example, previous experiences of failure may predispose an individual to become preoccupied with repetitious thoughts of failure. For depressives, these repetitious thoughts are easily activated by a large range of stimuli, and as depression worsens, there may not be a logical connection between the actual stimuli and the negative thoughts.

Faulty information processing. Beck (1967, 1979) argues that depressives often process environmental information in extreme, negative, categorical, absolute, and judgmental ways. He classifies these faulty information processes into paralogical, stylistic, and semantic errors. Paralogical errors include: arbitrary inference, i.e., drawing a specific conclusion in the absence of supportive evidence or in the presence of contrary evidence; selective abstraction, i.e., focusing on detail and ignoring other salient features of an experience; and overgeneralization, i.e., drawing a conclusion on the basis of isolated incidents and applying that conclusion to unrelated situations. Depressives' stylistic errors include distorted magnification and minimization in evaluating an event's

significance. For example, trivial mistakes are viewed as fatal errors. Semantic errors of thinking involve: personalization, i.e., the unfounded proclivity to relate external events to themselves when there is no basis for making such a connection. For example, depressives tend to attribute failure to personal unworthiness without basis for such assumption. Dichotomous thinking refers to a tendency to place all experiences in one of two opposite categories (complete success or complete failure), and then assume that the extreme negative categorization must be true.

In sum, the theoretical sequence of Beck's model of depression can be described as: psychosocial stressor activates the cognitive triad --› illogical matching of negative schemas and environmental stimuli --› negative distortions and systematic errors --› symptoms of depression (Carson & Carson, 1984). With its emphasis on schemas and faulty thought patterns, this model adopts an information-processing metaphor. It assigns primacy to cognitive factors in the organization of incoming stimuli and emphasizes how this organization affects emotion, motivation, and behavior (Coyne & Gotlib, 1983; Taylor and Fiske, 1983).

Seligman's model. A second major cognitive formulation of depression is the learned helplessness model proposed by Seligman and his associates (Seligman, 1975; Abramson, Seligman, & Teasdale, 1978). The original learned

helplessness model (Seligman, 1975) derived from animal studies, was later extended to debilitated human task performance, and was then offered as an explanatory model of depression. When individuals perceive response-outcome noncontingency, they will experience either personal or universal helplessness. Personal helplessness occurs when people believe that only their own responses are unrelated to outcomes. Universal helplessness, on the other hand, occurs when people believe the course of events is independent of their own and others' responses.

A reformulation (Abramson, Seligman, & Teasdale, 1978) of the learned helplessness model introduced the role of attribution processes. Following the experience of helplessness, people attribute uncontrollability to a cause which can be stable or unstable, global or specific, and internal or external. People with personal helplessness attribute negative outcomes to global, stable, and internal factors, whereas those with universal helplessness attribute negative outcomes to specific, unstable, and external factors. In addition, Abramson et al. (1978) argue that mere exposure to uncontrollability is insufficient to cause depression. Instead, attributions to global, stable, and internal factors lead to expectations of future negative outcomes, resulting in depressive symptoms.

Abramson et al. (1978) summarized the theoretical sequence for depression as: objective noncontingency -->

perception of present and past noncontingency --> attribution for present or past noncontingency --> expectation of future noncontingency --> expectation of future negative outcomes --> symptoms of helplessness and depression. In sum, the revised learned helplessness model views depressive symptoms as resulting from expectations of future negative outcomes.

Comparison of the two cognitive models of depression. Although both Beck and Seligman adopt cognitive approaches, there appears to be a discrepancy in their theoretical formulations. Beck's (1967, 1974, 1976, 1979) model asserts that depressed people assume excessive responsibility for negative outcomes (self-blame), whereas the learned helplessness model (Seligman, 1975) indicates that depressed people perceive themselves as having no control over negative outcomes (Abramson & Sackeim, 1977; Blaney, 1977; Rizley, 1978).

There are several explanations for this discrepancy. First, researchers (Coyne & Gotlib, 1983; Fiske & Linville, 1980) suggest that the two models are complementary. They argue that Beck's model draws attention to the organization of prior knowledge (schemas) and how this organization shapes the processing of new information. The attributional learned helplessness model, on the other hand, focuses on how incoming information is explained and how such explanations determine subsequent cognitions, affect, and

behaviors. In other words, Beck's model explains how depressives arrange and organize information from external stimuli and Seligman's model emphasizes how they attribute meaning to this information.

Secondly, Beck's assertion about depressives' blaming themselves for negative outcomes is similar to Seligman's formulation of personal helplessness. Depressives believe the cause of their failure is due to their personal inadequacy in not being able to emit a required behavior. In other words, both theories agree that depressives exert self-blame for negative outcomes.

Finally, both models make the same prediction about depressives' underestimation of the contingency between their responses and outcomes. Beck notes that depressives mistakenly view themselves as unable to emit effective responses, and Seligman postulates that depressives' experience of past noncontingency will lead to helplessness and expectation of future noncontingency. In other words, both theories predict that depressives underestimate their degree of control.

Cognitive Functioning of Depressives

Over the last decade, these two cognitive models of depression have generated a great deal of research. To evaluate their efficacy in predicting depressives' cognitive behavior, five broad areas are examined: expectancy of control, self-evaluation of performance, perception of environmental information, and attribution processes.

Expectancy of control. Depressives' expectancies of performance can be evaluated in terms of invariance and accuracy. Expectancies are invariant when they do not vary across time and situation, whereas accuracy refers to the match between expectancies and actual outcomes.

Invariance of expectancy. The original learned helplessness model of depression (Seligman, 1975) hypothesized that depressives have a general belief in response-reinforcement independence, and tend to respond to skill tasks as if outcomes were governed by chance. In other words, depressives' expectancies remain the same in skill or chance tasks and in success or failure. Subsequent research supported this contention and found that depressives' expectancies for skill tasks increased less after success and decreased less after failure than did those of nondepressed people (e.g., Abramson, Garber, Edwards, & Seligman, 1978; Klein & Seligman, 1976; Miller & Seligman, 1973, 1976). However, these confirming results derived mainly from Seligman and his associates; other researchers generally failed to support these predictions (see review by Coyne & Gotlib, 1983).

Coyne and Gotlib (1983) explain the conflicting results by arguing that, although it may be true that there are differences between depressed and nondepressed people with respect to shifts in performance expectations, these differences are not as strong or consistent as originally

hypothesized. This explanation has been accepted by Seligman and his associates, who agree that there are no clear-cut predictions about expectancy shifts in the absence of knowledge about individual attributions (Abramson et al., 1978).

Accuracy of expectancy. According to both cognitive models of depression, depressives expect less success and more failure than is realistic, whereas nondepressives' expectancies are accurate (Beck, 1974). Depressives' negative bias in expectancy of control was supported by studies done with clinically depressed patients (Golin, Terrell, & Johnson, 1977; Golin, Terrell, Weitz, & Drost, 1977; Lobitz & Post, 1979). However, Layne's review article (1983) shows numerous studies indicating accuracy of mild depressives' expectancies of success and failure. These studies showed that nondepressive subjects expected to perform better than the other subjects, whereas mild depressives expected to do only as well as the others. The actual performances of both groups supported expectancies of mildly depressed subjects.

The above findings that mild depressives, compared to nondepressives, were accurate in expectancy of control seem to contradict the predictions of the two most popular cognitive models of depression. While there are few studies attempting to account for depressives' accuracy, Langer (1975) provided an elaborate explanation for the inaccuracy

of the nondepressives. She coined the term "illusion of control," an inappropriately high expectation of personal success, to describe nondepressives' optimistic expectancies of their performance. Langer argued that this illusion of control represents people's urge to master the environment by assuming a causal relationship between their responses and outcomes, so that they can feel more confident on subsequent performances.

Langer's theory, however, does not explain why depressives are accurate. It can be inferred that depressives do not have an illusion of control; therefore, they would not have excessive performance expectations. Two alternatives are possible in the absence of illusion of control: one can either be accurate or have expectations that are low. It is not clear why depressives were accurate rather than low in their expectations of performance.

In summary, research on depressives' expectancies of performance are somewhat disappointing, providing no robust predictions about their consistency and offering no satisfactory explanation for their accuracy. Bandura (1977) pointed out that in order to understand people's expectancies about their performances, we must distinguish between efficacy and outcome expectations. Efficacy expectancy refers to the conviction that one can successfully execute the behavior required to produce a desired outcome; outcome expectancy refers to one's

estimation that a given behavior will lead to a certain outcome. Bandura argued that these two expectations have different antecedent and remedial implications. Abramson et al. (1978) noted that people with personal helplessness will have low efficacy but high outcome expectations in negative outcomes. In other words, these people believe that responses producing the desired outcome do exist, but are unavailable to them due to their personal inadequacies. However, no studies examined the differences between depressives' and nondepressives' efficacy and outcome expectancies.

Evaluation of performance. As regards self-evaluation, both cognitive models of depression predict that depressed people will underestimate success and overestimate failure as compared to the nondepressed. Several studies support these predictions and find that depressed people evaluate themselves more negatively than do the nondepressed in the absence of differences in actual performance (Butler & Mathews, 1983; Lobitz & Post, 1979; Smolen, 1978; Wollert & Buchwald, 1979; Zarantonello et al., 1984). This holds for difficult and ego-involving tasks (Zarantonello, Johnson, & Petzel, 1979), for the Digit Symbol test (Ciminero & Steingarten, 1978), and for social skills (Lewinsohn, Mischel, Chaplin, & Barton, 1980).

Despite the apparent overwhelming support for depressives' negative evaluation of their performance,

Gotlib (1981, 1982, 1983) failed to find differences between depressed and nondepressed psychiatric patients. To explain these differing results, he suggests that the pattern of lowered self-evaluation may not be specific to depression, as low scores on general psychological adjustment are also linked to negative self-evaluation (Barling & Fincham, 1979). Therefore, he argues that although this pattern of negative self-evaluation may be a characteristic of depression, it is not specific to this disorder. Since no other researchers have made similar comparisons between depressed and nondepressed psychiatric patients, Gotlib's speculation must be considered tentative.

In addition to Gotlib's research, several studies show inaccurate evaluations by both depressed and nondepressed groups. Lewinsohn et al. (1980) and Rizley (1978) found that nondepressed people often rated themselves more positively than they were rated by observers, a phenomenon similar to the self-serving bias in which people take credit for their perceived success and deny responsibility for failure (Harvey & Weary, 1984; Kelly & Michela, 1980). Similarly, some studies have found that depressed people rated themselves less negatively than they were rated by others (Arkowitz, Holliday, & Hunter, 1982; Gotlib & Meltzer, 1982; Kahn, Coyne, & Margolin, 1982).

In summary, research findings about depressives' evaluation of performance are conflicting and confusing.

With the present state of affairs, any conclusive predictions about depressives' evaluation of performance seem premature.

Among those studies supporting the predictions of Beck and Seligman that depressives overestimate failure and underestimate success, several conclude that this is due to depressives' distorted evaluative abilities (see review article by Coyne & Gotlib, 1983). Such claims not only demonstrate an unawareness of disconfirming results (e.g., Arkowitz et al., 1982; Gotlib, 1981, 1982, 1983; Kahn et al., 1982), but it also makes unwarranted theoretical leaps (Coyne & Gotlib, 1983; Layne, 1983; Mischel, 1973).

There are several reasons why the depressives' negative bias may not indicate cognitive distortion. First, self-evaluation may be related more to initial expectation than to actual performance (Mischel, 1973). Based on previous experiences of failure in similar situations, depressives may develop an initial expectancy of failure. Beck (1974, 1976, 1979) and Abramson et al. (1978) suggest that depressives also attribute their perceived failure to personal inadequacies, and they assume that they perform worse than other people. As a result, depressives' negative self-evaluations may be attributions for their initial expectancies of failure rather than appraisals of their actual task performance.

Secondly, Layne (1983) states that depressives' relative pessimism should not be confused with distortion. Depressed people do, in fact, live more difficult lives than the nondepressed, both as children and as adults (see review article by Lloyd, 1980). Thus, their relative pessimism may be as realistic as nondepressed people's optimism.

Thirdly, cognitive distortion must be assessed via external criteria of reality, and not merely in a comparison with the nondepressed As Langer (1975) points out, normal people usually entertain an illusion of control. In real life, most situations are ambiguous as to how much control is possible; it may be adaptive to assume control and then act accordingly. Although normals may be more adaptive in assuming that they have control, they are, nevertheless, inaccurate in their judgment. Therefore, differences between them and the depressed may well indicate the inaccuracy of normal's evaluations rather than an underestimation or cognitive distortion by the depressed.

Perception of environmental information. Beck (1967, 1974, 1976, 1979) suggests that depressives distort their perception of the environment. Supposedly, they filter out its positive aspects and inflate the negative. However, on the Rorschach inkblot test, depressives consistently yield higher form levels and more pure form responses than do nondepressives (Allison, Blatt, & Zimet, 1968; Holt, 1968). This means that depressives' perceptions match the inkblot

better. Their perceptions of the inkblot include less movement, shading, and color. People with this kind of Rorschach performance are said to be accurate in their perception (Erdberg & Exner, 1983; Exner, 1974).

Other studies also demonstrate the accuracy of depressives' judgment of control over outcomes as compared to nondepressives (e.g., Alloy & Abramson, 1979, 1982; Alloy, Abramson, & Viscusi, 1981; research on judgment of control will be detailed in a later section). In general, one can conclude that depressives have not evidenced the perceptual distortions hypothesized by Beck's model of depression.

Recall of information. Several studies indicate that depressed people, when compared to nondepressed, often recall less success/pleasant events (Kuiper, 1978; Nelson & Craighead, 1977; Teasdale & Spence, 1984; Weiner & Rehm, 1975) and/or more failure/unpleasant events (Bradley & Mathews, 1983; Fennell, Melanie, & Campbell, 1984; Fogarty & Hemsley, 1983; Ingram, Smith, & Brehm, 1983; Nelson & Craighead, 1977). While this is almost universally supported by research, there are several plausible explanations other than cognitive distortion. Silberman (1983) points out that depressed people are more dependent than the nondepressed on both high emotionality and high stimulus concreteness for recall. Therefore, the negative bias of the depressives may not be a cognitive distortion in

the way that Beck suggests. It may be that, for depressives, negative events have intense emotionality and are more distinct, allowing better recall.

The second explanation for depressives' negative bias in recall is offered by Ingram, Smith, and Brehm (1983). They hypothesized that the depressed may have deficits in processing favorable information rather than an oversensitivity in processing negative information. In their study, students were required to rate given words as self-descriptive or not. After this, they were provided either success or failure feedback, and then were asked to recall the previously rated words. Depressed students did not respond to success feedback by recalling more favorable self-references, while nondepressed students did. The authors argued that depressed students were unable to use positive information to activate positive schemas, and they were less efficient in perceiving and encoding positive self-referent information.

In sum, Beck's prediction about the negative bias of depressives in recall holds true for most current research. However, it is not clear that these results indicate cognitive distortion.

Attributional processes. Many theories state that depressives employ irrational causal attributions (Abramson et al., 1978; Beck, 1967, 1974, 1976, 1979; Ellis, 1962; Rehm, 1977; Vestre, 1984). Depressives are said to minimize

their roles in success and to maximize their roles in failure. Abramson et al. (1978) specify that depressives often attribute their failure to internal, global, and stable factors, and this is supported by numerous studies (Alloy, Abramson, Peterson, & Seligman, 1984; Blaney, Behar, & Head, 1980; Golin, Sweeney, & Schaeffer, 1981; Kuiper, 1978; Raps et al., 1982; Seligman, Abramson, Semmel, & von Baeyer, 1979; Zuroff, 1981). Several studies, however, have not found differences in causal attributions of success between depressed and nondepressed people (Abramson, Seligman, & Teasdale, 1978; Kuiper, 1978; Lewinsohn et al., 1981; Rizley, 1978).

These differential results of depressives' attributions may be due to uncontrolled intervening variables. Most research assumes a one-to-one relation between depression and attribution. However, recent studies demonstrate that unexpectedness of outcome (Gotlib & Olson, 1983), confirmation of expectancy (Chapman & Lawer, 1984), and self-efficacy (Rosenbaum, Jaffee, & Yoram, 1983) interact with attributional processes.

Unexpectedness of outcome. Several studies have indicated that people tend to attribute unexpected outcomes to external factors (Feather & Smith, 1971; Gotlib & Olson, 1983). Gotlib & Olson (1983) further suggest that the external attribution for success by depressives and for failure by nondepressives are reflections of these people's

attributions for unexpected outcomes. They argue that previous studies manipulated outcomes externally, e.g., by providing positive or negative feedback. In general, depressives are more likely to expect failure (Beck, 1974; 1976; Rehm, 1977), so success is usually unexpected; nondepressives expect the opposite. When depressives are provided with positive feedback, which is unexpected, they attribute this to external causes. On the other hand, when nondepressives are provided with negative feedback, they attribute this unexpected outcome to external factors. Thus, the differential causal attributions of these two groups may be related to their initial expectancies of success and failure.

In order to control for the unexpectedness of outcome, Gotlib and Olson (1983) did a study in which students were allowed to make their own judgment of success or failure. He compared depressed patients, nondepressed psychiatric patients, and nondepressed nonpsychiatric controls in their attributions of success and failure on a verbal recognition task. In this study, the differential attribution pattern of depressives and nondepressives disappeared. In all three groups, subjects who classified their performance a success attributed their outcome more to internal and less to external factors than did subjects who classified their performance as a failure. In other words, when the effects of unexpectedness of outcome are removed, depressives and

nondepressives do not differ in their attributions for success and failure. Thus, it seems possible that causal attribution may not be directly related to depression. Instead, individual's initial expectations of success and failure may affect their subsequent attributions.

Confirmation of expectancy. Chapman and Lawer (1984) suggest that outcome attributions are a function of both expectancy confirmation and valence of actual outcome. They obtained students' expectancy of either passing or failing an examination as well as their pre- and post-examination attributions. The disconfirmed failures, those who initially expected to pass but actually failed, increased their attribution to external, unstable causes when compared with pre-examination attributions. In other words, when outcomes are disconfirmed, people tend to change from internal to external unstable causes, e.g. lack of luck. When expectations were confirmed for either passing or failure in the examination, pre- and post-examination attributions were consistent. However, the confirmed pass, those who initially thought they would pass and indeed passed, tended to see internal factors as more important than external ones. These findings also support the hypothesis generated by Gotlib and Olson (1983) that attributions are related to expectancy of outcome.

Self-efficacy. Rosenbaum, Jaffee, and Yoram (1983) argue that people's general repertoire of self-control

skills and their general expectations for self-efficacy might be as important as their attributions for the generalization of helplessness from the training task to the test task. For example, those who have self-efficacy will attribute success to internal rather than external causes.

In general, research on depressives' causal attribution suggest that the relationship between depression and attribution is not as robust as predicted by the revised learned helplessness model (Coyne & Gotlib, 1983; Peterson & Seligman, 1984; Peterson, Villanova, & Raps, 1985). Future studies should investigate the interactions among expectancies, attributional style, and the valency of outcome rather than emphasizing a simple one-to-one correlation between depression and causal attribution.

Summary on depressives' cognitive functioning. Despite a large body of conflicting findings, some general conclusions can be drawn (e.g., Alloy & Abramson, 1979; Carson & Carson, 1984; Coyne & Gotlib, 1983; Layne, 1983; Reuhlman, West, & Pasahow, 1985).

Nondepressed individuals. Nondepressives tend to exhibit greater expectancy shifts under skill than under chance conditions even when outcomes are actually experimenter-controlled. Their expectancy estimates and judgment of control show an illusion of control. They tend to overestimate their control over positive outcomes and blame negative outcomes on a lack of control. In addition,

they make internal attributions for positive outcomes and external attributions for negative outcomes.

Mildly depressed individuals. Most research results on depressives' cognitive functioning are based upon undergraduate students classified as mildly depressed on the Beck Depression Inventory. These mildly depressed students do not change their expectancies as a function of the experimenter-described nature of the task ("skill" vs. "chance"), and their expectancies seem to reflect the actual degree of contingency. When compared with nondepressives, their judgments of contingency are relatively accurate, and they do not appear to be influenced by outcome frequency or desirability. However, they tend to recall less positive and/or more negative events than do nondepressives.

Severely depressed individuals. The few studies done on clinically depressed patients (Golin, Terrell, & Johnson, 1977; Golin, Terrell, Weitz, & Drost, 1977; Lobitz & Post, 1979) suggest a negative bias in depressives' expectancy of control. However, no study has directly assessed these people's judgment of contingency. It is unclear whether clinically depressed patients are accurate, as are mildly depressed, or whether they show an underestimation of control, as suggested by Beck and Seligman.

The general conclusions that mild depressives show negative bias in recall are consistent with Beck's and Seligman's models of depression. However, mild depressives'

accuracy in perception of the environment (e.g., expectancy and judgment of contingency) runs contrary to the predictions of both theories. In order to better understand this contradiction between research findings and theoretical models, judgment of contingency will be examined in detail.

Judgment of Contingency

The concept of contingency forms the basis for most learning theories (Bolles, 1972; Mackintosh, 1975; Maier & Seligman, 1976; Rescorla & Wagner, 1972). Bandura (1977) and Mackintosh (1975) suggest that organisms learn to ignore stimuli uncorrelated with reinforcement in order to attend more closely to reinforcement-related stimuli. Seligman (1975) argues that when people learn that reinforcement is independent of their behavior, they perceive these outcomes as uncontrollable. A state of helplessness occurs, resulting in emotional, motivational, and cognitive deficits which interfere with subsequent performance and learning.

Alloy and Abramson Study. In an attempt to understand depressed people's subjective judgment of contingencies, Alloy and Abramson (1979) presented depressed and nondepressed students with a series of problems varying in actual degree of contingency. In each problem, subjects estimated the degree of contingency between their responses (pressing or not pressing a button) and an environmental outcome (onset of a green light).

In experiment 1 (Alloy & Abramson, 1979), students were presented with three contingency problems, on which they had 25 percent, 50 percent, or 75 percent actual control of green light onset. All students were able to detect differences in the degree of control across conditions and surprisingly, depressed and nondepressed students did not differ in their judgment of contingency, with both groups being accurate. All subjects were more accurate in moderate than in high or low control. Experiment 1 provided no evidence that depressed students distorted response-outcome relations in the manner predicted by Seligman's and Beck's models of depression.

In experiment 2, students were assigned to one of two conditions in which responses and outcomes were noncontingently related but differed in overall frequency of light onset. Results indicated that nondepressed individuals showed an illusion of control in a noncontingent, high reinforcement situation; but not in a noncontingent, low reinforcement situation. Depressed individuals, on the other hand, were not affected by reinforcement rate when outcomes were noncontingently related to responses. They accurately detected their lack of control over outcomes.

Experiment 3 investigated the valence of outcome as a psychological determinant of the illusion of control. Subjects were assigned to one of the two problems similar to

experiment 2, except that the light was associated with either gain (reward) or loss of money (punishment). Frequency of light onset was held constant across the two problems, with responses and outcomes actually noncontingent. Depressed people accurately detected noncontingency between their responses and outcomes across situations, whereas the nondepressed showed overestimation of control in reward, but not in punishment. Compared to experiment 2 in which outcomes did not include money, nondepressed people showed more pronounced overestimations of control in the reward condition.

In experiment 4, students received one of the two problems, both of which had a 50 percent control between the response and the light onset (i.e., light came on 75 percent of the time when subjects pressed the button and 25 percent of the time when subjects did not press the button), but which differed in the outcome valence (gain or loss money). Contrary to the predictions of Seligman's and Beck's theories of depression, depressed students did not underestimate the degree of contingency between their responses and outcome in a positive situation (gain money), or overestimate their control in a negative situation (loss money). Nondepressed students, on the other hand, underestimated their degree of control over outcomes when they lost money, and overestimated when they gained money. In other words, when compared to nondepressed subjects,

depressed students accurately judged the degree of contingency between their responses and outcomes regardless of outcome valence.

Conclusion of Alloy and Abramson Study. Alloy and Abramson (1979) concluded that depressed students' judgment of contingency was accurate: they were "sadder but wiser." Nondepressed students, on the other hand, overestimated the degree of contingency between their responses and outcomes when contingent outcomes were desired, and underestimated the degree of contingency when contingent outcomes were undesired.

In order to ascertain their claims that depressives are actually the more accurate perceivers of contingency than nondepressives, Alloy and Abramson replicated their experiments and found similar results (Abramson & Alloy, 1981, 1982; Alloy, Abramson, & Viscusi, 1981; Martin, Abramson, & Alloy, 1984). Their research has consistently demonstrated nondepressives' overestimation of control for positive outcomes, whereas depressives can accurately judge the degree of contingency. In addition, other research employing different methodologies has also obtained similar results. Using an anagram solving task, Langer (1975) and Golin and his colleagues (Golin, Terrell, & Johnson, 1977; Golin, Terrell, Weitz, & Drost, 1979) also reported that normal as well as psychiatric control subjects exhibited an illusion of control in a chance situation into which

elements of skill had been introduced (e.g., active involvement), whereas the depressed subjects did not succumb to this illusion.

In an attempt to account for nondepressives' illusion of control in positive outcomes, Alloy and Abramson proposed the following explanation. In experiment 1 of their (1979) study, both depressed and nondepressed people were able to judge the contingency correctly. However, the two groups differed in their judgment in experiments 3 and 4 when money was involved. The differences in their judgments of contingency were not random, instead, they were systematically related to the characteristics of the outcome (i.e., nondepressives overestimated in positive outcomes and underestimated in negative outcomes, whereas depressives remained accurate across situations.) Alloy and Abramson (1979) argued that since nondepressives were able to judge outcomes accurately in neutral situations, their illusion of control did not result from the faulty perception of environmental data, but rather in their organization of incoming information.

Alloy and Abramson (1979) suggested that nondepressed people were motivated to maintain or enhance self-esteem. Studies (Bradley, 1978; Frankel & Synder, 1978; Miller, 1978; Miller & Ross, 1975) have shown that taking credit for good outcomes will maintain or enhance self-esteem, whereas viewing bad outcomes as caused by factors outside the self

is not damaging to self-esteem. In other words, nondepressed people assign themselves more control of the situations when money can be gained to enhance their self-esteem; whereas they blame lack of control when money is lost so that they are not personally responsible for the outcome.

Alloy and Abramson (1979) argued that the absence of the motive to enhance self-esteem can be employed to account for depressives' accurate judgment of control. Previous studies indicated that depressives often have low self-esteem (Beck, 1964, 1967, 1976, 1979; Bibring, 1953; Freud, 1957). Alloy and Abramson claimed that depressives were not motivated to enhance their low self-esteem; therefore, they could judge accurately the contingency between responses and outcomes.

There are three problems with the above explanation. First, as mentioned by Alloy and Abramson, questions emerge concerning the generality of their results to clinical populations of severe depressives. Theoretically, as depression becomes more severe, self-esteem should decrease, resulting in less of a motive to enhance esteem. In other words, severe depressives should be even more accurate perceivers than mild depressives. No studies have demonstrated this postulation and clinical evidence seems to contradict it.

Secondly, there are two possibilities with low self-esteem. Individuals can strive to maintain their low-esteem, i.e., the consistency model, or they can strive to enhance esteem, i.e., the enhancement model (Maddi, 1980). For nondepressives, both models explain their illusion of control equally well. However, for depressives, questions remain as to why these people would prefer consistency to enhancement, and why they would lack the motive for enhancement. In order to substantiate Alloy and Abramson's explanation about depressives' accuracy of judgment, further research seems necessary.

The third problem with Alloy and Abramson's explanation is related to methodology. In their studies, subjects indicated judgment of contingency on a scale ranging from 0 percent to 100 percent, with 0 percent meaning no control and 100 percent as complete control. On this scale, the lowest possible estimation would be 0 percent. Thus when actual control over outcomes was zero (Alloy and Abramson, 1979, experiment 2 and 3), it was impossible to detect underestimation of control, a response pattern suggested by cognitive theories of depression to be characteristic of depressives. Therefore, mild depressives' apparent accuracy in judgment of contingency under zero control may reflect a design artifact.

Self-esteem

Alloy and Abramson (1979) propose the lack of a motive to enhance self-esteem as a explanation of depressives' accuracy in judgment of control. To better understand this postulation, a more detailed examination of depressives' self-esteem seems necessary.

Development of self-esteem. Self-esteem, a person's characteristic self-evaluation (Wylie, 1961), is related to aspirations and values (James, 1890), reflected appraisals of others (Mead, 1934), and adequate parental attention and concern (Rosenberg, 1965). Coopersmith (1967) lists four major factors contributing to the development of self-esteem. The amount of respect, acceptance, and concern individual receives from significant others is the most important. Then, comes the history of success, status, and position held in the world. The third factor is whether one lives up to aspirations in areas that are regarded as personally significant. The fourth factor is the individual's manner of responding to devaluation. The ability to defend oneself reduces the experience of anxiety and helps to maintain personal equilibrium.

Self-esteem and depression. Several studies have demonstrated a relationship between depression and low self-esteem (Abramson et al., 1978; Beck, 1967, 1974, 1976; Bibring, 1953; Freud, 1957; Zemore & Bretell, 1983). Both depressed and low self-esteem people often report feelings

of personal inadequacy and dissatisfaction in life. They also share similar attributional styles: using excessive self-blame and assigning failure to internal causes (Beck, 1974, 1976, 1979; Shikanai, 1983). Although it is clear that a correlation exists between depression and low self-esteem, it is difficult to specify a causal linkage. Do people have low self-esteem because they are depressed, or do low self-esteem people become depressed because of their feelings of inadequacy? Moreover, are depression and low self-esteem simply different names for the same phenomenon?

Self-esteem and task performance. Brockner (1983) found self-esteem to have an important role in mediating performance after failure. Students were given either a little, an extended, or no failure before working on a task. Low self-esteem people performed marginally better than high self-esteem people in the little failure condition, but significantly worse than high self-esteem people in the extended failure condition. Brockner argued that after facing a small amount of failure, low self-esteem people's enhanced performance reflected reactance, while their impaired performance after extended failure reflected learned helplessness (Wortman & Brehm, 1975). The performance of high self-esteem people supported egotism theory (Frankel & Synder, 1978), which suggests that a small failure may not threaten high self-esteem people, and so they are not motivated to enchance their performance on a

subsequent task. After an extended failure, however, high self-esteem people are motivated to protect their self-esteem by performing better.

In conclusion, self-esteem studies indicate a clear relationship between low self-esteem and depression, and the motive to enhance self-esteem appears to play an important role in subsequent task performance. Alloy and Abramson (1979) argued that depressives do not have a strong motive to enhance self-esteem, so they do not show illusion of control or excessive blame for failure and they are accurate in their judgment. Although Brockner's (1983) study showed that low self-esteem people performed better after a small failure, it is unclear whether depressives' reactance is strong enough to discount Alloy and Abramson's (1979) postulation about their lack of motive to enhance self-esteem.

Defensiveness

As mentioned, previous studies indicate a relationship between the ability to maintain self-esteem and task performance. Coopersmith (1967) pointed out that the ability to maintain self-esteem, tolerate stress, and minimize unfavorable consequences in adverse situations is related to one's defenses. Persons who have defenses that are effective, varied, and flexible, without being massive, are presumably able to reduce personal distress and anxiety (Bellak, Hurvich, & Gediman, 1973; Coopersmith, 1967; Crowne, 1979; Freud, 1956).

Models of defenses. Two models have been developed to explain defenses: psychoanalytic and information-processing. The traditional psychoanalytic model (Freud, A., 1966; Freud, S., 1854; Miller & Swanson, 1966; Plutchik, Kellerman, & Conte, 1979; Valliant, 1977) assumes that biological needs place the individual in conflict with moral sanctions. The failure to resolve this conflict leaves the person vulnerable to continuing conflict-generated anxiety. Defenses are then invoked to dissipate this anxiety. The psychoanalytic explanation is a general model that attempts to explain all types of defenses.

The information-processing model (Heilbrun, 1978) does not attempt to explain the development of defenses, but assumes they are in an individual's behavioral repertoire. Defenses are mobilized when people become aware of information that is threatening to self-esteem. The extent to which individuals utilize a particular defense and the hierarchy of preferences among defenses are considered to be personality attributes or defensive styles (Gleser & Ihilevich, 1969; Heilbrun, 1978; Juni & Yanishefsky, 1983). Heilbrun's model assumes that defenses are present in everyone, but the mobilization of a specific defense depends on how one organizes and gives meaning to incoming information. In other words, defenses are person- and situation-specific.

Both models agree that defenses function to reduce anxiety and can either be adaptive or maladaptive. The main difference is that the psychoanalytic model views defenses as unconscious processes; whereas the information-processing model deals with defenses that are consciously processed.

Defensiveness and adaptive functioning. Defenses can be either pathological or adaptive, with researchers differing as to whether these two dimensions are dichotomous or on a continuum. The idea of a continuum between pathology and normality in defensive functioning was first implied by Freud (1895) when he said that defenses became pathological only when exaggerated. Later, Freud (1937) argued that even small amounts of defense might become dangerous because energy were invested in the activation of defenses (Freud, 1946). Anna Freud (1966) distinguished pathological from adaptive defensive functioning in terms of whether defenses lead to symptom formation or to healthy social adaptation. Sperling (1953), on the other hand, argued that defenses always resulted in a pathological impairment of the integrative function, and he concluded that they were thus always maladaptive.

Loewenstein (1967) concluded that defenses should be classified according to their utility (effectiveness vs. ineffectiveness) to particular individuals in particular situations. Bellak, Hurvich, and Gediman (1973) further suggested that adaptive defenses are those that meet reality

requirements without interfering with ego functions. Adaptive defenses include: repression, isolation, identification, sublimation, and reaction formation. But even with these, if they are overgeneralized and rigid, they can become maladaptive and interfere with adaptive functioning.

Defensiveness, self-esteem, and depression. Recent research shows an interesting relationship between defenses and self-esteem (Zuber, 1981, 1983). A typology of defenses and self-esteem was offered by Zuber (1981, 1983), who classified students as having high or low self-esteem, and high or low defensiveness. Two types of errors occurred in the recognition of a picture of self: misidentification of others as self (narcissistic projection) and delayed recognition of the picture of self (avoidance of self-confrontation). Students with both high defensiveness and low self-esteem had the strongest tendency to avoid self-confrontation, while students with high defensiveness and high self-esteem showed the strongest tendency to narcissistic projection. Other research on high defensive, high self-esteem people support the narcissistic nature of such individuals (Coopersmith, 1962; Harder, 1979, 1984; Reich, 1933; Silber & Tippett, 1965). Students with low defensiveness and low self-esteem showed the smallest tendency to avoid self-confrontation. In other words, Zuber's (1981, 1983) studies indicate that nondefensive

people with low self-esteem are the most accurate perceivers of pictures of themselves.

Depressives, who presumably have low self-esteem, are similar to Zuber's low defensiveness, low self-esteem group in their accuracy of judging environmental information. This suggests a possible relationship among depression, defensiveness, and accurate perception of environment.

Strategies of Schematic Processing

Differential strategies of schematic processing have also been proposed to explain people's judgment of contingency (Beck, 1974; Kuiper & Derry, 1981; Markus & Sentis, 1982; Markus & Smith, 1981; Reuhlman et al., 1985). These studies suggest that the level of schema utilized depends on the level of depression. Reuhlman et al. (1985) hypothesize that nondepressives tend to use positive schemas, severe depressives negative schemas, and mild depressives respond with uncertainty, as if they are not using either positive or negative schemas. They argue that mild depressives are accurate in judgment of contingency because of their aschematic processing, which requires them to attend more closely to environmental cues and interpret information in a less automatic, more accurate way. Although this explanation appears plausible, no empirical studies have been found to demonstrate the hypothesized differential strategies for these groups of people.

Summary

Research suggests that depressives do not exhibit cognitive distortions in the manner suggested by the major cognitive theories of depression. On the contrary, depressives seem to have accurate perceptions across situations, whereas nondepressives overestimate control for positive outcomes and underestimate control for negative outcomes. The motive of enhancing self-esteem has been put forward to explain the differential accuracy of both groups. Nondepressives may enhance self-esteem by taking credit for positive outcomes and blaming negative outcomes on a lack of control. On the other hand, level of defensiveness and differential strategies of schematic processing have also been proposed to explain people's judgment of contingency.

Purpose of Present Study

This study uses an Alloy and Abramson (1979) type of task to clarify depressives' cognitions in the judgment of contingency by discriminating between those showing a high or a low level of general defensiveness. In addition, most previous research has used tasks on which subjects' actual control over outcomes was zero, making it impossible to detect underestimations of control, a response pattern that is suggested by cognitive theories of depression to be characteristic of depressives. The present study rectifies this problem by manipulating subjects' control over outcomes.

Previous research has generated contradictory findings about depressives' cognitive distortions. One of the reasons may be that these studies based their results on one or two aspects of cognition, while extending their conclusions to cognitive functioning in general. It is possible that depressives may be accurate in certain areas (e.g., judgment of control) but distorted in other areas of cognition. The present study attempts to identify depressives' possible specific distortions by administering a comprehensive cognitive assessment after each task. The areas of cognition under investigation are: expectancy of control, judgment of control, perception of environmental information, evaluation of performance, attribution, reinforcement value, mood and self-esteem.

The final aim of the study is to determine whether nondepressives' illusion of control is maintained when a contingency is placed on accuracy. In real life, it may be adaptive to adopt an "illusion of control" unless there are tangible consequences for inaccuracy.

Hypotheses

(1) Depressives will show more accurate judgment of control than nondepressives when there is a monetary contingency on light onset but no monetary contingency on accuracy of judgment. Specifically, nondepressives will show an overestimation of control in reward and an underestimation of control in punishment.

(2) When there is no monetary contingency on accuracy of judgment, high defensive subjects will show greater overestimation of control in reward and underestimation in punishment than will low defensive subjects. This effect will be greatest for high defensive nondepressives and smallest for low defensive depressives. Zuber (1981, 1983) indicated that low defensive people are more accurate perceivers of themselves; therefore, they should be better able to judge their control over outcomes. On the other hand, high defensive people tend to maximize in positive outcomes and minimize in negative outcomes in their perception of control in order to achieve favorable evaluations from others and to enhance their self-esteem (Crowne, 1979).

(3) Nondepressives' judgment of control will be accurate for tasks on which they are rewarded for accuracy or punished for inaccuracy. Moreover, this increase in accuracy will be greater for low than high defensive nondepressives. When reward or punishment is contingent on accuracy, nondepressives will correct their illusion of control in positive outcomes and their underestimation in negative outcomes to enhance self-esteem by achieving maximal gain and minimal loss. Therefore, their judgment of control will become more accurate. However, high defensive nondepressives will not benefit as much as low defensive nondepressives from the external contingency for accuracy

because of their inflexibility and rigidity (Bellak et al., 1974; Crowne, 1972).

(4) Low defensive nondepressives will show the greatest, and high defensive depressives the least, increase in accuracy of judgment of control (self-correction) as money is made contingent upon accuracy. Previous studies indicate that depressives are preoccupied with negative schemas, which may be independent of external stimulation, and they are sometimes unresponsive to environmental changes (Beck, 1967, 1974, 1976, 1979). Thus, depressives are less affected by external reinforcement and punishment than nondepressives, so their judgment of control should remain fairly constant across conditions. Since high defensiveness is related to rigidity and inflexibility, high defensive depressives should be least responsive to changes in the environment and exhibit the smallest self-correction in judgment of control.

(5) Depressives, when compared to nondepressives, will show a greater internality and stability in their causal attributions when they lose money for the light not coming on. According to Beck and Seligman, depressives tend to take personal responsibility for negative outcomes, e.g., their own inadequacies, and this will occur to a greater extent in depressives with low defensiveness.

(6) Depressives will show low efficacy expectations but high outcome expectations when they lose money for the

light not coming on; whereas nondepressives will show high efficacy expectations but low outcome expectations in this situation. In negative outcomes, depressives tend to view themselves as inadequate and worthless, i.e., low efficacy expectations. They believe that the responses producing the desired outcomes exist, but are unavailable to them, i.e., high outcome expectations (Abramson et al., 1978; Beck, 1974). This pattern of expectancies will occur to a greater extent for depressives with low defenses. On the other hand, when nondepressives experience negative outcomes, they still view themselves as capable of emitting the optimal responses, i.e., high efficacy expectations, but the outcomes are not related to these optimal responses, i.e., low outcome expectations. In this way, nondepressives can maintain their self-esteem by blaming negative outcomes on a lack of control (Bradley, 1978; Frankel & Synder, 1978). High defensive nondepressives will exhibit this pattern of expectancies to a greater extent than low defensive nondepressives.

(7) Depressives, compared to nondepressives, will take less credit when they gain money for the light onset and greater blame when they lose money for the light not coming on. This derives from Alloy and Abramson's (1979) suggestion that depressives may lack the motive to enhance self-esteem.

(8) Depressives will set a higher criterion for successful performance in making the light come on than nondepressives, and this criterion will be highest for low defensive depressives and lowest for high defensive nondepressives.

CHAPTER II

METHOD

Subjects

Sixty-four female and 32 male students enrolled at a moderately-sized southwestern university were selected to participate in the experiment. Students' ages ranged from 18 to 50 years (*M* = 21.93, *SD* = 5, median = 20.5), with 90 percent under 27. The majority (80 percent) were Caucasian, 11 percent were Black, and the rest were mainly Mexican and Oriental. Of these students, 92 percent were undergraduates, and 50 percent had never participated in psychological experiments. Subjects received cash earnings and extra credit in psychology courses for participation in a study investigating problem-solving skills in college students.

Instruments

Depression. Intensity of depression was measured by the Beck Depression Inventory (BDI: Beck, Ward, Mendelson, Mock, & Erbaugh, 1961). This inventory is composed of 21 symptoms and attitudes. Each item describes a specific behavioral manifestation of depression and consists of a graded series of 4 self-evaluative statements, ranked to reflect the range of severity of the symptom. Numerical values from 0 to 3 are assigned to each statement indicating the degree of severity. The composite score represents the sum of numerical values assigned to each item.

Internal consistency of the inventory was assessed by two methods. Kruskal-Wallis non-parametric analysis of variance by ranks showed that all categories had a significant relationship to the total scale (all *ps* < .001, except item S, *p* < .01). Split-half reliability was calculated by a Pearson correlation coefficient between the odd and even categories and yielded reliability coefficients of .86 (.93 with a Spearman-Brown correction). Stability of the inventory was shown by comparing its scores with clinical ratings from psychiatrists over a period of several weeks. Changes in BDI scores paralleled changes in the clinical ratings.

The validity of the inventory has been extensively documented (e.g. Bumberry, Oliver, & McClure, 1978; Davis, Burrows, & Poynton, 1975; Hammen, 1980) and generally shows satisfactory results. The correlations between BDI scores and clinically rated severity of depression ranged from .60 to .77 (Beck, 1967; Bumberry et al., 1978; Metacalfe & Goldman, 1965). The BDI has been reported to discriminate reliably between depression and anxiety (Beck, 1976), and Bumberry et al. (1978) indicate that this inventory is a valid instrument for measuring depression in a college student population. Students scoring 9 or above on this inventory were assigned to the depressed group and those scoring below 9 were assigned to the nondepressed group according to the cut off points used by Alloy and Abramson

(1979). A *t*-test between nondepressed and depressed subjects showed that these two groups were different from each other on BDI (*M*s = 13.83, 3.06; *t* = 14.01, *df* = 94, *p* < .001).

Measure of defensiveness. The level of defensiveness was measured by the Marlowe-Crowne Social Desirability Scale (MC-SD: Crowne & Marlowe, 1960, 1964). This scale consists of 33 true-false items with 18 keyed true and 15 keyed false, making a response set interpretation of scores highly improbable. The scales were constructed to tap social desirability, i.e., describing oneself in terms of culturally acceptable and approved behaviors which are, at the same time, relatively unlikely to occur (Crowne & Marlowe, 1960). Crowne (1979) also states that when people are unwilling to acknowledge, or unable to recognize unfavorable self-characteristics, their behavior is highly defensive. Therefore, the scale has been conceptualized as representing both responsiveness to social pressure and general defensiveness (Bergin, Levin, Jacobson, & Millham, 1977; Crandall, 1966; Crowne & Marlowe, 1964; Evans, 1979; Millham, 1977; Ramanaiah & Martin, 1980).

The internal consistency of the scale using the Kuder-Richardson formula 20 was .88. Test-retest (one-month interval) reliability was satisfactory (*r* = .89). The scale was correlated with Edwards Social Desirability Scale (*r* = .35) and with L, F, and K subscales of the Minnesota

Multiphasic Personality Inventory (*rs* = .40, .54, -.36, respectively). The scale loaded strongly on Self-Deception and Impression Management factors (Paulhus, 1984) and attribution and Denial (Millham, 1974; Ramanaiah, Schill, & Leung, 1977). A high score indicates a high level of defensiveness. Using the norms (mean = 14) for the college students from Crowne and Marlowe (1960), students scoring at or above the mean were assigned to the high defensiveness group and those scoring below the mean were assigned to the low defensiveness group.

Measure of self-esteem. Self-esteem was measured by the Self-Rating Scale (SRS: Fleming & Courtney, 1984; Fleming & Watts, 1980), using a 7-point Likert format, ranging from 1 ("Almost Always") to 7 ("Almost Never"). The present scale consists of 36 items, with a high score indicating high self-esteem. In order to break possible response sets, response categories are staggered so that high self-esteem categories appear on the right side of the answer space for some items and on the left side for others.

Five factors were initially extracted from the scale: Self-regard, Social Confidence, School Abilities, Physical Appearance, and Physical Abilities. All factors are at least moderately intercorrelated ($r > .20$) with one or more others. The correlations of each factor with the total scale were .65, .67, .42, .54, and .44 respectively. Internal consistency (coefficient α) of each of the five

factors was .82, .87, .77, .82, and .88 respectively, and for the total scale, .92, suggesting good item consistency. Test-retest (one-week interval) reliability was satisfactory (r = .84). Second-order factor analysis yielded only one general factor and is consistent with the hierarchical interpretation of self-esteem offered by Shavelson, Hubner, and Stanton (1976). The scale demonstrates the lowest correlation (r = .22, p < .001) with social desirability when compared to other measures of self-esteem (Fleming et al, 1980), and is negatively related to anxiety, depression, and anomie (rs = -.62, -.48, -.38 respectively, all ps < .001).

Measure of mood changes. The changes in mood before and after each task were measured by the Multiple Affect Adjective Check List Today Form (MAACL: Zuckerman & Lubin, 1965). This consists of 132 adjectives to assess anxiety (21 items), hostility (28 items), and depression (40 items), with 43 unscored buffer items. The Today Form of the list was devised to provide for the assessment of changes in depression, anxiety, and hostility as a function of external conditions. The reliabilities for odd-even and plus-minus items ranged from .17 to .92 (median = .72) for different groups of subjects. Internal consistency estimates were satisfactory (.77, .79, and .84 for anxiety, depression, and hostility respectively). Test-retest (one week interval) reliabilities were low (.00 to .40), reflecting sensitivity to mood fluctuation (Kelly, 1972).

The MAACL was demonstrated to have differential validity to reflect meaningful changes in affect for groups of subjects who were under different types of stresses and stress-reducing manipulations (Kelly, 1972; Megargee, 1972; Polivy, 1981). All three subscales of the MAACL Today Form showed small negative correlations with the K subscales of the Minnesota Multiphasic Personality Inventory, indicating subjects were willing to admit socially undesirable feelings as a transient state (Kelly, 1972). Both anxiety and hostility subscales were significantly related to observer ratings of anxiety and hostility, respectively (Zuckerman, Lubin, & Robin, 1965).

Comprehensive cognitive assessment. In order to identify possible distortions in specific areas of cognitive functioning, a comprehensive cognitive assessment was done for each subject after each task. This includes: expectancy, judgment of control, perception of environmental information, evaluation of performance, attribution, and reinforcement value.

Expectancy. Subjects' expectancy of control of their responses (pressing and not pressing) over the experimental outcome (onset of green light) was measured on a 0 to 100 percent scale (0 percent as no control" and 100 percent as "complete control"; Alloy and Abramson, 1979). A similar scale was used to indicate the percentage of time subjects believed the green light would come on if they made an

optimal sequence of responses, i.e., outcome expectancy. The likelihood of making an optimal sequence of response, i.e., efficacy expectancy, was represented by a percentage ranging from 0 to 100 percent (0 percent as "no chance at all" and 100 percent as "total certainty"). All three questions were administered prior to each task.

Judgment of control. Subjects indicated the estimated degree of control of their responses over green light onset on a scale ranging from 0 to 100 percent (0 percent as "no control" and 100% as "complete control"; Alloy and Abramson, 1979). In addition, subjects estimated the percentages of the time they thought the light would have come on if they had made an optimal sequence of responses, i.e., estimated maximal control. The likelihood of making the optimal sequence of responses was represented on a scale ranging from 0 to 100 percent (0 percent as "no chance at all" and 100 percent as "total certainty").

Perception of environmental information. This includes three questionnaires derived from Alloy and Abramson (1979). For the reward condition, the Judgment of Total Reinforcement requires subjects to estimate the overall percentage of trials on which green light onset occurred, regardless of which response they made. The Judgment of Reinforcement If Press and If Not Press were designed to assess whether subjects knew the raw data necessary to compute the conditional probabilities that were necessary

for making an accurate judgment of control. These two scales require subjects to estimate percentage of trials on which the green light came on when they pressed and when they did not press, respectively. For the punishment conditions, questions were similar to the reward condition except that judgments related to reinforcement were changed to judgments of punishment. Therefore the Scales are: Judgment of Total Punishment, Judgment of Punishment if Press, and Judgment of Punishment if Not Press. For both conditions, subjects also estimate the percentage of times the green light would have come on if they had responded randomly.

Evaluation of performance. Subjects indicated the level of control they thought they should have obtained for a successful performance on a scale of 0 to 100 percent (0 percent as "no control" and 100 percent as "complete control"). For subjects in the reward condition, the amount of credit subjects felt they deserved for their performance was measured on a scale of 0 to 100 percent (0 percent as "no credit given" and 100 percent as "complete credit given"). For subjects in the punishment condition, a similar scale was used for measuring amount of blame given (0 percent as "no blame given" and 100 percent as "complete blame given").

Measure of attribution. Subjects' attributions were measured by a self-report questionnaire modified after Weiner, Nierenberg, and Goldstein (1976). There are two forms to this questionnaire: Form A for reward and Form B for punishment. The forms are identical except for appropriate word changes. The questionnaire consists of four 7-point scales dealing with locus of control (Rotter, 1966) and causal stability (Weiner, 1974). Question 1 offers two internal attributes differing in stability: 1 as "Tried hard" (unstable) and 7 "Always good" (stable); question 2 offers two unstable attributes differing in locus of control: 1 as "Tried hard" (internal) and 7 as "Luck" (external); question 3 offers two external attributes differing in stability: 1 as "Lucky" (unstable) and 7 as "Always easy" (stable); and question 4 offers two stable attributes differing in locus of control: 1 as "Always good" (internal) and 7 as "Always easy" (external). Two overall scores are formed by summing scores on questions 1 and 3 (stability), and questions 2 and 4 (locus of control), with high scores indicating stability and externality of attribution, respectively.

Reinforcement value. Subjects' determination of the reinforcement value was measured by two items adopted from Pretty and Seligman (1984). These items were: 1) "the money I was offered had no influence on my interest to do the task"; and 2) "I would not have been as motivated to do

the tasks if it weren't for the money offered me." These were rated on 7-point scales, ranging from 1 ("strongly disagree") to 7 ("strongly agree"). In addition, subjects were asked to draw the outlines of a nickel and a half-dollar coin on a piece of 8" X 11" blank paper.

Post-experiment questionnaires. Subjects' impressions about the experiment were assessed by three open-ended questions: 1) "What do you think are the purposes or hypotheses of this study?", 2) "What responses did you feel the experimenter wanted you to make?", and 3) "What are the factors affecting the green light onset?" In addition, subjects were asked to indicate the extent to which they were trying to be accurate in their judgment of control on a scale ranging from 1 ("Did not try hard") to 7 ("Tried very hard").

Apparatus

The apparatus was designed according to the description by Alloy and Abramson (1979). The stimulus presentation apparatus consisted of a black wooden stand-up platform (25 cm x 25 cm) on which a red and a green light were positioned 5 cm from the top of the platform facing the subject. The subject's response apparatus consisted of a 15.5 cm x 7.5 cm x 4 cm black wooden box, on which a spring-loaded button was mounted in the center. The apparatus was covered and placed on a table. A one-way mirror separated the experiment-room from the monitor-room where the experimenter administered the stimulus and recorded subjects' responses.

Experimental design

The experiment was a 2 (Trait mood: Depressed, Nondepressed) X 2 (Defensiveness: High, Low) X 2 (Sex: Male, Female) X 2 (Condition: Reward, Punishment) factorial design. Each subject had to complete four similar tasks. Each task consisted of 20 trials of pressing or not pressing a button in order to turn the green light on. The four tasks were: moderate frequency of green light onset (80-20 or 20-80, see below) and moderate contingency (60 percent control); low frequency (60-20 or 20-60) and moderate contingency (40 percent control); moderate frequency (80-60 or 60-80) an low contingency (20 percent control); and low frequency (40-20 or 20-40) and low contingency (20 percent control). The first number of each sequence indicates the percentage of green light onset when subjects pressed the button, and the second number represents onset percentage when subjects did not press the button. The absolute difference between these two numbers indicates actual control. For example, in moderate frequency, moderate contingency (80-20) tasks, green light occurred 80 percent of the time after subjects made button-presses, 20 percent of the time when subjects did not make any button-presses, with an actual control of 60 percent.

The four tasks were presented in a randomized order. Each subject received two tasks with higher frequency of green light onset for making button-presses and the other

two tasks with higher frequency of green light for not pressing. A sample task sequence would be: (80-20) for task 1, (20-40) for task 2, (60-20) for task 3, and (60-80) for task 4.

The two conditions were reward and punishment. In the reward condition, subjects were given a nickel every time the green light came on for the four tasks, and $.50 for making accurate judgments of control on tasks 2, 3, and 4. Accuracy of judgment was defined as being within ten percentage points of the actual percentage control. On average, subjects earned a total of two to three dollars each. In the punishment conditions, subjects started with five dollars. A nickel was taken away whenever the green light did not come on for the four tasks, and $.50 was taken away for each inaccurate estimation of control on tasks 2, 3, and 4. On average, a total of two to three dollars was taken away per subject.

Procedure

Screening tests. Groups of students were given questionnaires to complete. These included: the Beck Depression Inventory (BDI), the Self-rating Scale, the Marlowe-Crowne Social Desirability Scale (M-C SD Scale), the Multiple Affect Adjective Checklist, and demographic items. This took about 30 minutes. Subjects were selected on the basis of their scores on the BDI and the M-C SD Scale. Those who scored below 9 on the BDI were classified as

nondepressives, and those above 9 as depressives. Students who scored below 14 on the M-C SD Scale were classified as low defensives, and those scoring 14 or above were classified as high defensives. The sex ratio of students was maintained at two females to one male per cell. Twenty-four depressed low defensives, 24 depressed high defensives, 24 nondepressed low defensives, and 24 nondepressed high defensives were selected, making a total of 96 subjects (64 females and 32 males). Selected subjects were arranged to come for the experiment within one week of screening. All students (total = 228) participating in the screening test received extra credit in psychology courses.

Experiment. Each subject was welcomed by the experimenter and seated at a desk in the experiment-room. All instructions were preaudio-recorded and transcribed into a booklet. Both taped and written instructions were given at the same time. The subject was told this was a study about problem-solving skills in college students. Each subject was required to complete questionnaires before and after the experimental tasks.

The subject was then introduced to the apparatus. He/she was told that he/she had to do four similar tasks to learn how to turn the green light on and to learn the degree of control he/she had over whether or not the green light came on. It was explained that 0 percent control meant no control at all and 100 percent control meant complete control.

The subject had to make a button-press response within three seconds after the red light went off, otherwise it would be counted as a no button-press response. If the green light came on, it would appear only after the red light went off and within two seconds after the subject made the option of either pressing or not pressing the button. The subject was told that there would only be four possibilities on any given trial: 1) he/she pressed the button and the green light came on, 2) he/she pressed the button and the green light did not come on, 3) he/she did not press the button and the green light came on, and 4) he/she did not press the button and the green did not come on. Following Alloy and Abramson (1979), subjects were told that since they also had to know what happened when the button was not pressed, it was to their advantage not to press the button on some of the trials.

Depending on the condition, the subject was given the reward or the punishment system. In the reward system, the subject was given a nickel credit each time the green light came on for all tasks. He/she had to judge the degree of control over the onset of green light for all four tasks. After task 1, the subject was told that an additional $.50 credit would be earned for each accurate judgment of control at the end of tasks 2, 3, and 4. The subject was told whether he/she had gained or not gained the additional money credit before the begining of the next task.

In the punishment condition, the subject started with five dollars credit. A nickel was deducted each time the green light did not come on for all four tasks, and an additional $.50 was taken away for each inaccurate judgment of control at the end of tasks 2, 3, and 4. Cash earnings were to be distributed after the subject had completed all four tasks and the post-experiment questionnaires.

The subject was informed that the experimenter would leave the room and monitor the experiment via a one-way mirror and was asked if he/she had any questions. The subject was then asked to sign a consent form for participation in the study and reassured that all information would be anonymous and confidential. After the consent form was signed, the experimenter left the room.

While in the monitor-room, the experimenter turned on the red light for one second to start each trial. The experimenter then either presented or did not present the green light according to the scheduled sequence of green lights and to the subject's responses of pressing or not pressing the button. The experimenter recorded the responses of the subject on each trial.

The experimenter instructed the subject in the experiment-room through the speaker to complete the expectancy scale at the beginning of each task, and to complete the cognitive assessment at the end of each task.

The cognitive assessment questionnaires took about five to ten minutes to complete.

This procedure continued until all four tasks were completed. The order of the four tasks was randomly determined for each subject. The experimenter then returned to the experiment-room, and administered the Self-rating Scale. After the questionnaires were completed, cash earnings were given and the subject was asked not to discuss the experiment with other students. Questions were answered, a credit slip was given, and the subject was thanked for participation. The whole procedure took about one hour to complete. All procedures are in accord with APA guidelines.

CHAPTER III

RESULTS

Overview

Tables 1 through 8 are included in Appendix P. Table 1 presents the names and definitions of all major variables; Table 2 shows the means and standard deviations for all major dependent variables combined across the four tasks; Tables 3 and 4 contain the means and standard deviations for differential degrees of control and frequency, respectively. Table 5 shows the intercorrelations among major variables; Table 6 summarizes the Mood X Defensivesness X Sex X Problem ANOVAs; and Tables 7 and 8 present summaries of Mood X Problem X Control and Mood X Problem X Frequency ANOVAs, respectively.

Results are discussed under the subheadings of expectancy of control, judgment of control, perception of environment, evaluation of performance, attribution, reinforcement value, mood changes, and self-esteem. The sequence of statistical procedures on each major dependent variable is: (1) a 2 (Mood: Nondepressed, Depressed) X 2 (Defensiveness: High, Low) X 2 (Sex: Male, Female) X 2 (Problem: Reward, Punishment) ANOVA for the four tasks combined; (2) a 2 (Mood: Nondepressed, Depressed) X 2 (Problem: Reward, Punishment) X 2 (Control: Moderate (60 percent and 40 percent), Low (20 percent)) ANOVA with repeat measures on control; (3) a 2 (Mood: Nondepressed,

Depressed) X 2 (Problem: Reward, Punishment) X 2 (Frequency: Moderate (80-20) and (80-60)), Low ((60-20) and (40-20)) ANOVA with repeated measures on frequency; and (4) Pearson correlations with major variables.

Post hoc simple main effects analyses were performed for all significant interactions (Jaccard, 1983; Winer, 1971) and were illustrated with figures (Appendix Q). The control and frequency ANOVAs were done to determine the main effects of control and frequency, and possible interactions with mood and problem types with either control or frequency. Therefore, main effects for mood and problem type are detailed in the Mood X Defensiveness X Sex X Problem ANOVAs and will not be reiterated in descriptions of the control and frequency ANOVAs.

Expectancy of Control

Accuracy of expectancy of control. Accuracy of expectancy was calculated by taking the difference between expectancy of control (i.e., subjects' pre-task estimation of control) and actual control. Small absolute difference scores show accuracy of estimations, positive difference scores overestimations, and negative difference scores underestimations.

A 2 (Mood) X 2 (Defensiveness) X 2 (Sex) X 2 (Problem) ANOVA was done on these difference scores. Main effects for defensiveness, $F(1,80) = 3.92$; and sex, $F(1,80) = 6.11$ ($ps < .05$) were found. Low defensives were more accurate than

high defensives (Ms = 11.08, 17.47); and females were more accurate than males (Ms = 11.46, 19.92).

A 2 (Mood) X 2 (Problem) x 2 (Control) ANOVA with repeated measures on control showed a main effect for control, $F(1,92) = 286.64$ ($p < .001$). Subjects were more accurate in their expectancy of control in moderate than in low control (Ms = -1.02, 29.59).

A 2 (Mood) X 2 (Problem) X 2 (Frequency) ANOVA with repeated measures on frequency showed a main effect for frequency, $F(1,92) = 41.23$ ($p < .001$). Subjects were more accurate in moderate than in low frequency (Ms = 7.78, 20.67).

Results from Table 5 (Appendix P) showed that accuracy of expectancy of control was positively correlated with: defensiveness, efficacy expectancy, outcome expectancy, accuracy of judgment of control, self-correction, likelihood of success, and deviation from objective criterion for success (rs = .26, .62, .39, .72, .20, .53, .27, respectively; ps < .005). Accuracy of expectancy of control was negatively related to number of previous experiments ($r = -.24$; $p < .01$).

Efficacy expectancy. Efficacy expectancy refers to subjects' pre-task estimation of the possibility of their making an optimal set of responses. A 2 (Mood) X 2 (Defensiveness) X 2 (Sex) X 2 (Problem) ANOVA on efficacy expectancy showed a mood X defensiveness X problem 3-way

interaction, $F(1,80) = 4.51$; and a main effect for sex, $F(1,80) = 9.36$ ($ps < .005$). The main effect for sex showed males having higher efficacy expectancies than females (Ms = 57.50, 47.67). Post hoc analyses of the mood X defensiveness X problem 3-way interaction showed only two groups differed from each other. Depressed low defensives had lower efficacy expectancies than depressed high defensives (Ms = 46.67, 55.37) ($p < .05$; Figure 1, Appendix Q).

Results from a 2 (Mood) X 2 (Problem) X 2 (Control) ANOVA with repeated measures on control indicated that self-efficacy did not vary with control. A 2 (Mood) X 2 (Problem) X 2 (Frequency) ANOVA with repeated measures on frequency showed a main effect for frequency, $F(1,92) = 4.45$ ($p < .05$). Subjects had higher efficacy expectancies when they were in low than in moderate frequency (Ms = 52.39, 49.37).

Efficacy expectancy was correlated with: defensiveness, accuracy of expectancy of control, outcome expectancy, accuracy of judgment of control, likelihood of success, deviation from objective criterion for success, and estimation of reinforcement/punishment during random responses (rs = .17, .62, .41, .49, .64, .19, .23, respectively; $ps < .05$). Self-efficacy was negatively related to: number of previous experiments, stability of attribution, and internal locus of control (rs = -.26, -.17, -.17, respectively; $ps < .05$).

Outcome expectancy. Outcome expectancy refers to subjects' pre-task estimation of green light onset during optimal responses. Results from a 2 (Mood) X 2 (Defensiveness) X 2 (Sex) X 2 (Problem) ANOVA on outcome expectancies were nonsignificant (*ps* > .05).

A 2 (Mood) X 2 (Problem) X 2 (Control) ANOVA with repeated measures on control showed nonsignificant results (*ps* > .05). A 2 (Mood) X 2 (Problem) X 2 (Frequency) ANOVA with repeated measures on frequency showed a main effect for frequency, $F(1,92) = 6.11$ ($p < .005$). Subjects had higher outcome expectancies in low than in moderate frequency (*Ms* = 58.4, 54.16).

Outcome expectancy was related to: age, accuracy of expectancy of control, efficacy expectancy, accuracy of judgment of control, likelihood of success, accuracy of estimation of maximal control, estimation of reinforcement/punishment during random responding, amount of blame given, and deviation from objective criterion for success (*rs* = .32, .39, .41, .30, .33, .66, .17, .24, .29, respectively; *ps* < .05). Outcome expectancy was negatively related to number of previous experiments ($r = -.28$; $p < .005$).

Judgment of Control

Accuracy of judgment of control without monetary reinforcement for accuracy. Accuracy of judgment of control without monetary reinforcement for accuracy was calculated

by taking the difference between a subject's judgment of control and actual control for his/her first task. Small absolute difference scores indicate accuracy of judgment, positive difference scores overestimations, and negative difference scores underestimations.

The 2 (Mood) X 2 (Defensivesness) X 2 (Sex) X 2 (Problem) ANOVA revealed a defensiveness X sex 2-way interaction, $F(1,80) = 3.87$ ($p < .05$). Post hoc analyses showed female low defensives were more accurate than male low defensives (Ms = 7.22, 26.13) ($p < .05$; Figure 2, Appendix Q).

Accuracy of judgment of control with monetary reinforcement for accuracy. Monetary contingency on accuracy was given for tasks 2, 3, and 4.

(1) 2nd task. The second task refers to the task in which monetary reinforcement for accuracy was first started. A 2 (Mood) X 2 (Defensiveness) X 2 (Sex) X 2 (Problem) ANOVA on the accuracy of judgment showed a main effect for mood, $F(1,80) = 5.22$ ($p < .025$). Nondepressives were more accurate than depressives when monetary contingency on accuracy was first reinforced (Ms = 5.40, 19.58).

(2) 3rd task. The third task refers to the task in which subjects were given monetary reinforcement for accuracy. A 2 (Mood) X 2 (Defensiveness) X 2 (Sex) X 2 (Problem) ANOVA on the accuracy of judgment showed a defensiveness X sex 2-way interaction, $F(1,80) = 5.00$ ($p <$

.05). Post hoc analyses showed female low defensives were more accurate than male low defensives (Ms = .94, 19.19) ($p < .05$; Figure 3, Appendix Q).

(3) 4th task. This refers to the last task with monetary reinforcement. A 2 (Mood) X 2 (Defensiveness) X 2 (Sex) X 2 (Problem) ANOVA on accuracy of judgment showed a main effect for mood, $F(1,80) = 8.68$ ($p < .005$). Depressives were more accurate than nondepressives on the last task (Ms = -4.10, 14.42). Figure 4 (Appendix Q) shows the accuracy of judgment of control on the four tasks for depressed and nondepressed subjects.

Overall accuracy of judgment of control. Accuracy of judgment of control was calculated for all four tasks combined. Small absolute difference scores indicate accuracy of judgment, positive difference scores overestimations, and negative difference scores underestimations. A 2 (Mood) X 2 (Defensiveness) X 2 (Sex) X 2 (Problem) ANOVA on overall accuracy of judgment of control showed a defensiveness X problem interaction, $F(1,80) = 6.08$ ($p < .01$). Post hoc analyses showed that in punishment, low defensives were more accurate than high defensives (Ms = 3.96, 12.83). Also, low defensives were more accurate in punishment than in reward (Ms = 3.96, 14.23) (ps < .05; Figure 5, Appendix Q).

A 2 (Mood) X 2 (Problem) X 2 (Control) ANOVA with repeated measures on control indicated a main effect for

control, $F(1,92) = 211.46$ ($p < .001$). Subjects were more accurate in their judgment of control in moderate than in low control (Ms = -6.06, 25.93).

A 2 (Mood) X 2 (Problem) X 2 (Frequency) ANOVA with repeated measures on frequency showed a main effect for frequency, $F(1,92) = 8.84$ ($p < .005$). Subjects were more accurate in their judgment of control in low than in moderate frequency (Ms = 6.26, 13.59).

Accuracy of judgment of control was positively related to: self-correction, accuracy of expectancy of control, efficacy expectancy, outcome expectancy, likelihood of success, amount of credit given in reward, and deviation from subjective and objective criteria for success (rs = .22, .72, .49, .30, .55, .33, .21, .38, respectively; ps < .05). Accuracy of judgment of control was negatively related to: number of previous experiments, pre-task self-esteem, pre-task anxiety, depression, and hostility, external locus of control, and decreases in anxious and depressive mood (rs = -.22, -.18, -.26, -.25, -.25, -.22, -.19, -.19, respectively; ps < .05).

Self-correction. Judgment of control for the first task occurs before any monetary reinforcement for accuracy, whereas judgment of control for the subsequent tasks occurs under a monetary reinforcement for accuracy. Self-correction scores were calculated by taking the difference between the absolute value of accuracy of judgment of

control for the last and the first task (Table 1, Appendix P). Positive self-correction scores indicate improvement in accuracy and negative scores deterioration.

A 2 (Mood) X 2 (Defensiveness) X 2 (Sex) X 2 (Problem) ANOVA on self-correction scores showed a main effect for sex, $F(1,80) = 4.92$ ($p < .05$). Males showed greater improvement in accuracy than females ($Ms = 11.59, -2.44$). A 2 (Mood) X 2 (Defensiveness) X 2 (Sex) X 2 (Problem) ANOVA was done on self-correction scores with accuracy of judgment of control for the 1st task as the covariate. Results showed that males and females did not differ, $F(1,79) = 3.22$ ($p > .05$).

Self-correction was positively related to accuracy of expectancy of control and accuracy of overall judgment of control ($rs = .20, .22$, respectively; $ps < .05$). It was negatively related to subjects' estimation of sizes of nickel and half-dollar coins ($rs = -.19, -.29$, respectively; $ps < .05$)..

Estimation of likelihood of optimal responses. A 2 (Mood) X 2 (Defensiveness) X 2 (Sex) X 2 (Problem) ANOVA on subjects' estimation of the likelihood of their making optimal responses showed no significant results ($ps > .05$). In addition, the 2 (Mood) X 2 (Problem) X 2 (Control) ANOVA with repeated measures on control also showed nonsignificant results ($ps > .05$).

A 2 (Mood) X 2 (Problem) X 2 (Frequency) ANOVA with repeated measures on frequency showed a mood X frequency 2-way interaction, $F(1,92) = 7.93$; and a main effect for frequency, $F(1,92) = 43.05$ ($p < .005$). The main effect for frequency indicated that subjects had higher estimations when they were in moderate than in low frequency (Ms = 54.62, 40.93). Post hoc analyses of the mood X frequency interaction indicated that nondepressives in moderate frequency (M = 56.88) had higher estimations than either depressives or nondepressives in low frequency 'Ms = 44.53, 37.33) (ps < .05; Figure 6, Appendix Q).

Estimation of likelihood of success at post-task was related to: accuracy of expectancy, efficacy expectancy, outcome expectancy, accuracy of judgment of control, accuracy of estimation of maximal control, and deviation from objective criterion for success (rs = .53, .64, .33, .55, .21, .27, respectively; ps < .05). Negative correlations were found with: accuracy of estimation of reinforcement/punishment during no button-pressing and accuracy of estimation of reinforcement/punishment during random responses (rs = -.17, -.25, respectively; ps < .05).

Accuracy of estimation of maximal control. Accuracy of estimation of maximal control was calculated by taking the difference between subjects' estimation of maximal control at post-task and actual maximal control. Actual maximal control was indicated by the larger number in each onset

sequence. For example, in the (80-20) sequence, maximal control is 80 percent. Small absolute difference scores represent accuracy of estimations, positive difference scores overestimations, and negative difference scores underestimations. Results from a 2 (Mood) X 2 (Defensiveness) X 2 (Sex) X 2 (Problem) ANOVA were nonsignificant (*ps* > .05).

A 2 (Mood) X 2 (Problem) X 2 (Control) ANOVA with repeated measures on control showed a main effect for control, $F(1,92) = 36.00$ ($p < .001$). Subjects were more accurate in their estimation of maximal control in low than in moderate control (*Ms* = .33, -11.77).

A 2 (Mood) X 2 (Problem) X 2 (Frequency) ANOVA with repeated measures on frequency showed a problem X frequency 2-way interaction, $F(1,92) = 4.66$; and a main effect for frequency, $F(1,92) = 82.16$ (*ps* < .05). The main effect showed that subjects were more accurate in low than in moderate frequency (*Ms* = 3.33, -14.67). Post hoc analyses of the problem X frequency 2-way interaction showed that subjects in reward condition with low frequency (*M* = .84) were more accurate than those in reward or punishment with moderate frequency (*Ms* = 13.31, 16.04) (*ps* < .05; Figure 7, Appendix Q).

Accuracy of estimation of maximal control at post-task was related to: outcome expectancy, likelihood of success, estimation of reinforcement/punishment, and deviation from

objective criterion for success (*rs* = .66, .21, .26, respectively; *ps* < .05). Accuracy of estimation of optimal responses was negatively related to deviation from subjective criterion for success (*r* = -.58; *p* < .001).

Perception of Environmental Information

Estimation of total onset of reinforcement/punishment. Accuracy of estimation of total onset of reinforcement (light coming on in reward) or punishment (light not coming on in punishment) refers to the difference between subjects' estimation and actual onset. Small absolute difference scores indicate accuracy of estimations, positive difference scores overestimations, and negative difference scores underestimations.

A 2 (Mood) X 2 (Defensiveness) X 2 (Sex) X 2 (Problem) ANOVA on these scores showed a mood x sex interaction *F*(1,80) = 5.22; and main effects for defensiveness, *F*(1,80) = 6.15 and problem type, *F*(1,80) = 22.57 (*ps* , .05). Results from the main effects showed that low defensives were more accurate than high defensives (*Ms* = -.56, -6.35), and subjects were more accurate in reward than in punishment (*Ms* = 1.58, -8.24). Post hoc analyses of the mood X sex interaction showed only two groups differing from each other. Female nondepressives were more accurate than female depressives (*Ms* = -.78, -6.63) (*p* < .05; Figure 8, Appendix Q).

Results from a 2 (Mood) X 2 (Problem) x 2 (Control) ANOVA with repeated measures on control only reiterated the main effects for problem types. A 2 (Mood) X 2 (Problem) X 2 (Frequency) ANOVA with repeated measures on frequency showed a problem X frequency 2-way interaction, $F(1,92) = 138.45$; and main effects for frequency, $F(1,92) = 116.84$ and problem, $F(1,92) = 22.50$ ($ps < .01$). Subjects were more accurate in their estimations in low than in moderate frequency ($Ms = 6.1 -13.05$). Post hoc analyses of the problem X frequency 2-way interaction showed that subjects in reward with both moderate and low frequency ($Ms = 2.87, 1.17$) were more accurate than subjects in punishment with low frequency ($M = 11.09$), which in turn were more accurate than those in punishment with moderate frequency ($M = -28.97$) ($ps < .05$; Figure 9, Appendix Q).

Accuracy of estimation of total reinforcement or punishment was positively correlated with: number of previous experiments, accuracy of judgment of control, accuracy of estimation of reinforcement/punishment during pressing, and accuracy of estimation of reinforcement/punishment during no pressing ($rs = .17, .18, .46, .26$, respectively; $ps < .05$). Negative correlations were found with: scores on BDI, money earned/taken away, stability of attribution, and post-task anxiety ($rs = -.18, -.24, -.21, -.19$, respectively; $ps < .05$).

Estimation of reinforcement or punishment during button-pressing. Accuracy of estimation of reinforcement or punishment during button-pressing refers to the difference between subjects' estimation and actual onset. Small absolute difference scores indicate accuracy, positive difference scores overestimations, and negative difference scores underestimations.

A 2 (Mood) X 2 (Defensiveness) X 2 (Sex) X 2 (Problem) ANOVA on accuracy of this estimation showed a mood X defensiveness X sex 3-way interaction, $F(1,80) = 5.68$; and a main effect for problem type, $F(1,80) = 18.80$ ($ps < .05$). The main effect of problem type showed that subjects were more accurate in reward than in punishment (Ms = -6.04, -15.26). Post hoc analyses of the mood X defensiveness X sex 3-way interaction showed only two groups differing from each other. Among male depressives, high defensives were more accurate than low defensives (Ms = -5.53, -19.72) ($p < .05$; Figure 10, Appendix Q).

A 2 (Mood) X 2 (Problem) X 2 (Control) ANOVA with repeated measures on control showed no main effect for control or interactions among mood, problem, and control. A 2 (Mood) X 2 (Problem) X 2 (Frequency) ANOVA with repeated measures on frequency showed a problem X frequency 2-way interaction, $F(1,92) = 23.28$; and a main effect for frequency, $F(1,92) = 54.55$ ($ps < .001$). Main effect for frequency showed that subjects were more accurate in low

than in moderate frequency (Ms = .66, -19.33). Post hoc analyses of the problem X frequency 2-way interaction showed subjects in punishment with moderate frequency (M = -31.42) were less accurate than all other subjects (ps < .05; Figure 11, Appendix Q).

Accuracy of estimation of reinforcement/punishment during button-pressing was related to accuracy of total reinforcement/punishment (r = .46; p < .05). This variable was negatively correlated with external locus of control, money earned/taken, and post-task anxiety (rs = -.19, -.22, -.24, respectivly; ps < .05).

Accuracy of estimation of reinforcement/punishment during no button-pressing. Accuracy of estimation of reinforcement/punishment during no button-pressing refers to the difference between subjects' estimation and actual onset. Small absolute difference scores indicate accuracy, positive difference scores overestimations, and negative difference scores underestimations. A 2 (Mood) X 2 (Defensiveness) X 2 (Sex) X 2 (Problem) ANOVA on these scores showed a defensiveness X problem type 2-way interaction effect, F(1,80) = 6.34 (p < .05). Post hoc analyses showed that in reward, low defensives were more accurate than high defensives (Ms = -8.65, -17.04). Low defensives were more accurate in reward than in punishment (Ms = -8.65, -18.13) (ps < .05; Figure 12, Appendix Q).

A 2 (Mood) X 2 (Problem) X 2 (Control) ANOVA with repeated measures on control revealed a main effect for control, $F(1,2) = 4.63$ ($p < .05$). Subjects were more accurate in moderate than in low control (Ms = -5.81, -16.38).

A 2 (Mood) X 2 (Problem) X 2 (Frequency) ANOVA with repeated measures on frequency showed a problem X frequency 2-way interaction, $F(1,92) = 24.08$; and a main effect for frequency, $F(1,92) = 76.28$ (ps < .001). Main effect for frequency showed that subjects were more accurate in low than in moderate frequency (Ms = -1.00, -26.79). Post hoc analyses of the problem X frequency interaction showed subjects in punishment with moderate frequency were less accurate than others (M = -34.78) (ps < .05; Figure 13, Appendix Q).

Accuracy of estimation of reinforcement during no button-pressing was positively correlated with the amount of credit given in reward ($r = .26$, $p < .05$). It was negatively related to likelihood of success and stability of attribution (rs = -.17, -.27, respectively; ps < .05).

Estimation of reinforcement/punishment during random responses. A 2 (Mood) X 2 (Defensiveness) X 2 (Sex) X 2 (Problem) ANOVA on this variable showed a sex X problem type 2-way interaction effect, $F(1,80) = 4.51$ ($p < .05$). Post hoc analyses showed that males in reward condition (M = 47.58) were similar to females in punishment condition (M =

47.75) in having higher estimation than males in the punishment condition (*M* = 37.71) (*p*s < .05; Figure 14, Appendix Q).

A 2 (Mood) X 2 (Problem) X 2 (Control) ANOVA with repeated measures on control revealed a mood X control 2-way interaction, *F*(1,92) = 4.71; and a main effect for control, *F*(1,92) = 4.64 (*p* < .05). Main effect for control showed that subjects had higher estimations in low than in moderate control (*M*s = 46.61, 43.63). Post hoc analyses of the mood X control 2-way interaction showed that nondepressives had lower estimation in moderate than in low control (*M*s = 42.54, 48.53) (*p* < .05; Figure 15, Appendix Q).

A main effect for frequency, *F*(1,92) = 23.03 (*p* < .001) was found on a 2 (Mood) X 2 (Problem) X 2 (Frequency) ANOVA with repeated measures on frequency. Subjects had higher estimations in moderate than in low frequency (*M*s = 49.20, 40.88).

The estimation of reinforcement/punishment during random responses was related to: efficacy expectancy, outcome expectancy, accuracy of judgment of control, accuracy of estimation of maximal control, amount of credit given in reward, and sizes of nickel and half-dollar coin (*r*s = .23, .17, .26, .37, .30, .28, .24, respectively; *p*s < .05). This variable was also negatively related to likelihood of success and deviation from objective criterion for success (*r*s = -.25, -.17, respectively; *p*s < .05).

Evaluation of Performance

Amount of credit or blame given. A 2 (Mood) X 2 (Defensiveness) X 2 (Sex) X 2 (Problem) ANOVA was done on the amount of credit given in reward or blame in punishment with the money earned in reward or money taken away in punishment as the covariate. Results showed a main effect for problem type, $F(1,80) = 76.33$; and a mood X sex X problem 3-way interaction, $F(1,80) = 6.40$ ($ps < .01$). All subjects in reward gave themselves more credit than those in punishment gave themselves blame for comparable performance ($Ms = 59.96, 23.57$). Post-hoc analyses on the mood X sex X problem interaction indicated that in reward, female nondepressives gave themselves more credit than female depressives ($Ms = 66.41, 52.63$). In punishment, male nondepressives blamed themselves more than male depressives ($Ms = 30.34, 13.19$) ($ps < .05$; Figure 16, Appendix Q).

A 2 (Mood) X 2 (Problem) X 2 (Control) ANOVA with repeated measures on control and money earned/taken as covariate showed no significant main effect or interaction effects with either mood or problem ($ps > .05$). Similar procedures for frequency showed a main effect for frequency, $F(1,92) = 9.58$; and a problem X frequency 2-way interaction, $F(1,92) = 10.92$ ($ps < .005$). Subjects gave themselves more credit/blame in moderate than in low frequency ($Ms = 45.21, 38.43$). Post-hoc simple main effects analyses on the problem X frequency interaction showed in reward, subjects

gave themselves more credit in moderate than in low frequency (Ms = 67.07, 53.06) (ps < .05; Figure 17, Appendix Q).

Amount of credit given in reward was positively related to: accuracy of judgment of control, likelihood of success, accuracy of estimation of reinforcement during no button-pressing, and estimation of reinforcement during random responses (rs = .33, .29, .26, .30, respectively; ps < .05). Amount of credit given in reward was negatively correlated with: scores on BDI and pre-task depression (rs = -.28, -.26, respectively; ps < .05).

Amount of blame given in punishment was related to outcome expectancy (r = .24, p < .05). This variable was negatively correlated with stability of attribution and decreases in self-esteem (rs = -.27, -.39, respectively; ps < .05).

Amount of money earned in reward or taken away in punishment was positively related to: pre-task anxiety, stability of attribution, and external locus of control (rs = .18, .30, .19, respectively; ps < .05). However, it was negatively related to: accuracy of estimation of total reinforcement/punishment, accuracy of estimation of total reinforcement/punishment during button-pressing, and size of a nickel (rs = -.24, -.22, -.27, respectively; ps < .05).

Deviation from subjective criterion for success. All subjects set their criteria for successful performance

higher than a subjective criterion, i.e., estimated maximal control (*Ms* = 69.66, 59.18; *t* = 4.89, *df* = 95, *p* < .001). Deviation from subjective criterion for success was obtained by subtracting subjects' estimation of maximal control from criterion for success. Positive difference scores indicate subjects' estimations of criterion for success higher than the estimated maximal control and negative difference scores indicate subjects' estimations lower than the estimated maximal control.

A 2 (Mood) X 2 (Defensiveness) X 2 (Sex) X 2 (Problem) ANOVA showed a defensiveness X sex X problem 3-way interaction, *F*(1,80) = 5.52 (*p* < .01). Post hoc analyses of the 3-way interaction indicated that in punishment, female low defensives' estimation of a criterion for success was closer to the estimated maximal control than female high defensives' estimation (*Ms* = 1.61, 17.58) (*p* < .05; Figure 18, Appendix Q).

Results from a 2 (Mood) X 2 (Problem) X 2 (Control) ANOVA with repeated measures on control were nonsignificant (p > .05). A 2 (Mood) X 2 (Problem) X 2 (Frequency) ANOVA with repeated measures on frequency showed a main effect for frequency, *F*(1,92) = 5.83 (*p* < .05). Subjects set their criterion for success closer to the subjective criterion in low than moderate frequency (*Ms* = 7.26, 13.88).

Deviation from subjective criterion for success was correlated with accuracy of judgment of control, and

objective criterion for success (rs = .21, .65, respectively; ps < .01), and negatively related to: GPA, outcome expectancy, and accuracy of estimation of maximal control (rs = -.21, -.28, -.58, respectively; ps < .05).

Deviation from objective criterion for success. All subjects set their criteria for successful performance higher than an objective criterion, i.e., actual maximal control (Ms = 69.66, 64.90; t = 2.6, df = 95, p < .01). Deviation from objective criterion for success was calculated by subtracting actual maximal control from criterion for success. Positive difference scores indicate subjects' criterion for success higher than the actual maximal control and negative difference scores indicate subjects' criterion for success lower than the actual maximal control. A 2 (Mood) X 2 (Defensiveness) X 2 (Sex) X 2 (Problem) ANOVA showed no significant results.

A 2 (Mood) X 2 (Problem) X 2 (Control) ANOVA with repeated measures on control showed a main effect for control, $F(1,92) = 20.74$ ($p < .001$). Subjects' criterion for success was closer to actual maximal control in moderate than low control (Ms = -.55, 10.08).

A 2 (Mood) X 2 (Problem) X 2 (Frequency) ANOVA with repeated measures on frequency showed a 3-way interaction, $F(1,92) = 5.40$; and a main effect for frequency, $F(1,92) = 108.48$ (ps < .05). The main effect showed that subjects' estimation was closer to actual maximal control in moderate

than in low frequency (Ms = -14.83, 34.43). Post hoc analyses of 3-way interaction indicated that in punishment, nondepressives' estimation was closer to the actual maximal control in moderate than in low frequency (Ms = -15.15, 19.48) ($p < .05$; Figure 19, Appendix Q).

Deviation from objective criterion for success was related to: pre-task self-esteem, accuracy of expectancy of control, efficacy expectancy, outcome expectancy, accuracy of judgment of control, likelihood of successs, accuracy of estimation of maximal control, and deviations from subjective criterion for success (rs = .17, .27, .19, .29, .38, .27, .26, .65, respectively; ps < .05). This variable was negatively correlated with: GPA, and estimation of reinforcement/punishment during random responding (rs = -.27, -.17, respectively; ps < .05).

Attribution

Stability. A 2 (Mood) X 2 (Defensiveness) X 2 (Sex) X 2 (Problem) ANOVA on stability of attribution showed a 4-way interaction effect, $F(1,80) = 5.24$; mood X defensiveness X Sex 3-way interaction, $F(1,80) = 10.02$, mood X sex, $F(1,80) = 6.26$; defensiveness X sex, $F(1,80) = 5.57$; defensiveness X problem type, $F(1,80) = 5.66$; sex X problem type 2-way interaction, $F(1,80) = 4.76$; and main effects for sex, $F(1,80) = 5.21$ and problem type, $F(1,80) = 15.37$ (ps < .05). Results from the main effects showed that males were more stable than females (Ms = 8.45, 7.74), and subjects were

more stable in punishment than in reward (Ms = 8.51, 7.43). Post hoc analyses of the mood X defensiveness X sex X problem 4-way interaction showed that for male depressives in reward, those with high level of defenses were more stable than those with low level of defenses (Ms = 11.5, 6.38). For females in punishment, nondepressed low defensives were more stable than depressed high defensives (Ms = 9.03, 7.75) (ps > .05; Figures 20 and 21, Appendix Q).

ANOVAs with repeated measures on control and frequency showed nonsignificant control and frequency effects (ps > .05). Stability of attribution was positively related to external locus of control and money earned/taken away (rs = .30, .30, respectively; ps < .05), but negatively related to: efficacy expectancy, accuracy of estimation of reinforcement/punishment during no button-pressing, estimation of reinforcement/punishment during random responding, and amount of blame given in punishment (rs = -.17, -.29, -.19, -.26, -.27, respectively; ps < .05).

Locus of control. High scores on locus of control indicate externality. A 2 (Mood) X 2 (Defensiveness) X 2 (Sex) X 2 (Problem) ANOVA showed a main effect for problem type, F(1,80) = 12.27 (ps < .001). All subjects had more external locus of control in punishment than in reward (Ms = 8.57, 7.54). ANOVAs on control and frequency showed nonsignificant results for control and frequency (ps > .05).

External locus of control was positively related to stability of attribution and amount of money earned/taken (*rs* = .24, .19, respectively; *ps* < .05). Locus of control was negatively related to: efficacy expectancy, accuracy of judgment of control, and accuracy of estimation of reinforcement/punishment during button-pressing (*rs* = -.17, -.22, -.19, -.34, respectively; *ps* < .05).

Reinforcement Value

Effect of money on tasks interest and motivation. High scores on this variable indicate agreement that money had influenced subjects' interest and task motivation. A 2 (Mood) X 2 (Defensiveness) X 2 (Sex) X 2 (Problem) ANOVA on this variable showed a 4-way interaction, $F(1,80) = 6.37$ ($p < .01$). Post hoc analyses showed that in reward, male nondepressed high defensives (*M* = 4.44) were similar to male depressed low defensives (*M* = 4.44) in having lower scores than female depressed high defensives in punishment (*M* = 6.45) (*ps* < .05; Figures 22 and 23, Appendix Q).

A 2 (Mood) X 2 (Problem) X 2 (Control) ANOVA with repeated measures on control showed no significant results (*ps* > .05). However, a 2 (Mood) X 2 (Problem) X 2 (Frequency) ANOVA with repeated measures on frequency showed a main effect for frequency, $F(1,92) = 4.76$ ($p < .05$). Subjects agreed more with the statement in low than in moderate frequency (*Ms* = 5.68, 5.52).

Scores on this scale were positively related to: age, scores on BDI, pre-task anxiety (*rs* = .21, .19, .18, respectively; *p* < .05). These scores were negatively correlated with changes of anxious, depressive, and hostile mood (*rs* = -.24, -.17, -.17, respectively; *ps* < .05). In other words, when subjects agreed more that money influenced task interest, they tended to reduce their anxiety, depression, and hostility at post-task when compared to pre-task mood.

Sizes of nickel and half-dollar coin. A 2 (Mood) X 2 (Defensiveness) X 2 (Sex) X 2 (Problem) ANOVA on subjects estimation of the size of a nickel revealed a main effect for sex, *F*(1,80) = 11.20 (*p* < .001); with females estimating the size of a nickel larger than males (*Ms* = 16.98, 14.95). Similar procedures on the size of half-dollar coin indicated a mood X sex interaction effect, *F*(1,80) = 4.82, and a main effect for sex, *F*(1,80) = 6.61 (*ps* < .05). The main effect for sex indicated females estimated a larger size than males (*Ms* = 30.61, 27.67). Post hoc analyses of the mood X sex interaction showed that male nondepressives (*M* = 23.60) had smaller half-dollar size than all other subjects (*ps* < .05; Figure 24, Appendix Q). Actual sizes of nickel and half-dollar coin are 20 mm and 30 mm, respectively.

Results from control and frequency ANOVAs for nickel and half-dollar sizes were nonsignificant (*ps* > .05). A 2 (Mood) X 2 (Problem) X 2 (Frequency) ANOVA with repeated

measures on frequency on half-dollar coin size showed a 3-way interaction, $F(1,92) = 4.46$; and a mood X frequency 2-way interaction, $F(1,92) = 6.58$ ($ps < .05$). Post hoc analyses of the 3-way interaction showed that depressives in low frequency in punishment ($M = 25.75$) had smaller estimation than depressives in reward ($M = 28.77$) ($ps < .05$); Figure 25, Appendix Q).

Estimation of coin size was negatively related to age and self-correction of judgment of control ($rs = -.23, -.17$ for nickel size; $-.20, -.29$ for half-dollar coin size; $ps < .05$).

Mood Changes

Post-task mood. A 2 (Mood) X 2 (Defensiveness) X 2 (Sex) X 2 (Problem) ANOVA on post-task anxiety, depression, and hostility showed main effects for mood on all three scales, $F(1,80) = 30.18, 24.60, 14.82$ ($ps < .001$); and main effects for problem type on anxiety and depression $F(1,80) = 4.71, 4.07$ ($ps < .05$). At post-task, depressives were more anxious, depressed, and hostile than nondepressives; and subjects in punishment were more anxious and depressed than those in reward.

In general, post-task mood was positively related to BDI and pre-task mood, but negatively related to defensiveness and pre- and post-task self-esteem (Table 5, Appendix Q).

Post- to Pre-task mood changes. Mood changes refer to the difference between subjects' mood after and before the

experiment. Positive difference scores indicate increases in mood intensity at post-task and negative difference scores indicate decreases in mood intensity at post-task. 2 (Mood) X 2 (Defensiveness) X 2 (Sex) X 2 (Problem) ANOVAs were performed on changes in anxiety, depression, and hostility separately. The ANOVA on changes in anxiety showed main effects for mood and sex, $F(1,80) = 4.71, 4.33$ ($ps < .05$). Depressives ($M = -1.00$) and males ($M = -1.34$) changed most, becoming less anxious at post-task.

The ANOVA on changes in depressive mood showed a main effect for mood, $F(1,80) = 5.96$ ($p < .05$). Nondepressives changed more, increasing more in depressive mood than depressives ($Ms = 1.67, -1.50$).

A mood X problem type 2-way interaction was found on the changes in hostility, $F(1,80) = 4.20$ ($p < .05$). Post hoc analyses of the 2-way interaction showed that in punishment, nondepressives changed more, becoming more hostile than depressives at post-task ($Ms = 1.59, -1.38$) ($p < .05$; Figure 26, Appendix Q).

In general, changes in anxiety, depression, and hostility were positively related to defensiveness. However, changes in these mood were negatively related to: number of previous experiments, likelihood of success, accuracy of estimation of reinforcement/punishment and the extent to which subject agreed that money had effect on tasks interest and motivation ($ps < .05$, Table 5).

Self-esteem

Post-task self-esteem. A 2 (Mood) X 2 (Defensiveness) X 2 (Sex) X 2 (Problem) ANOVA on post-task self-esteem indicated a main effect on mood, $F(1,80) = 28.23$ ($p < .001$). Nondepressives had higher self-esteem than depressives (M = 174.58, 141.15).

Post-task self-esteem was related to: defensiveness, pre-task self-esteem, changes in self-esteem and depressive mood (rs = .28, .90, .32, .19, respectively; $ps < .05$, Table 5). Post-task self-esteem was negatively related to: GPA, scores on BDI, pre- and post-task anxiety, depression, and hostility ($ps < .05$, Table 5).

Post- to pre-task change in self-esteem. Changes in self-esteem refers to the difference between subjects' self-esteem after and before the experiment. Positive scores indicate increases in self-esteem at post-task and negative scores decreases. All results on a 2 (Mood) X 2 (Defensiveness) X 2 (Sex) X 2 (Problem) ANOVA on changes in self-esteem were nonsignificant.

Changes in self-esteem were negatively related to: age, efficacy expectancy, likelihood of success, and accuracy of estimation of total reinforcement/punishment, and amount of blame given in punishment (rs = -.18, -.24, -.17, -.39, respectively; $ps < .05$).

Correlations of Other Variables

Table 5 (Appendix P) represents the intercorrelations among all major variables. Subjects' scores on BDI were

correlated with: the extent to which subjects agreed with effect of money on tasks interest and motivation (rs = .19), pre- and post-task anxiety, depression, and hostility (rs = .59, .66, .58 for pre-task; and .60, .61, .52 for post-task). BDI scores were negatively related to: defensiveness, amount of credit given in reward, and pre- and post-task self-esteem (rs = -.18, -.28, -.60, -.58, respectively; ps < .05).

Level of defensiveness was related to: pre- and post task self-esteem, accuracy of expectancy of control, and efficacy expectancy (rs = .31, .28, .26, .27, respectively; ps < .05). Defensiveness was negatively correlated with: GPA, BDI, pre-task anxiety and hostility, accuracy of estimation of total reinforcement/punishment, and post-task depressive and hostile mood (rs = -.22, -.18, -.24, -.17, -.18, -.18, -.19; ps < .05).

Results on specific hypotheses

(1) The hypothesis that depressives will show more accurate judgment of control than nondepressives when there is monetary contingency on light onset but no monetary contingency on accuracy of judgment was not supported. Depressives and nondepressives did not differ from each other (p > .05), with both overestimating their control across reward and punishment conditions.

(2) The hypothesis that low defensives will show more accurate judgment of control when there is no monetary contingency for accuracy was not supported (p > .05).

(3) The hypothesis that low defensives and nondepressives will be more accurate than high defensives and depressives when there is monetary contingency for accuracy of judgment of control was partially supported. Results showed nondepressives were more accurate than depressives immediately after the first reinforcement for accuracy ($p < .05$). However, nondepressives' accuracy of judgment was not maintained. They did not differ from depressives in their judgment on the following task ($p > .05$). For the last task, nondepressives showed an overestimation of control and were less accurate than depressives ($p < .005$), despite tangible consequences for accuracy.

(4) The hypothesis that low defensives and nondepressives will increase in their accuracy of judgment of control (self-correction) when monetary reinforcement is contingent upon accuracy was not supported ($p > .05$).

(5) The hypothesis that depressives, when compared to nondepressives, will show greater internality and stablity in their causal attribution under punishment was not supported. Although main effects for mood were not found, a mood X defensiveness X sex X problem 4-way interaction, and a main effect for problem type were found for stability of attribution. Subjects' attributions were more stable in punishment than in reward. Post hoc analyses of the 4-way interaction suggested that in punishment, female

nondepressed low defensives were more stable than female depressed high defensives ($p < .05$).

(6) The hypothesis that depressives and low defensives will show low efficacy but high outcome expectancy in punishment was partially supported. Analyses of variance revealed a mood X defensiveness X problem type 3-way interaction on self-efficacy. Post hoc analyses showed that depressed low defensives had lower efficacy expectancy than depressed high defensives across problem types ($ps < .05$). Similar procedure on outcome expectancy showed that depressives and nondepressives did not differ ($p > .05$).

(7) The hypothesis that depressives and low defensives will take little credit for positive outcomes and large blame for negative outcomes, whereas nondepressives and high defensives show the reverse patterns, were partially supported. Results showed that in reward, female nondepressives gave themselves more credit than female depressives. However, in punishment, male nondepressives blamed themselves more than male depressives ($ps < .05$).

(8) The hypothesis that low defensives and depressives will set an excessively high criterion for success was not supported. Female low defensive, compared to female high defensives, set a lower criterion for success in negative outcomes. All subjects set criteria for success higher than estimated and actual maximal control.

Chapter IV

Discussion

Results will be summarized and discussed under the subheadings of expectancy of control, judgment of control, perception of environmental stimuli, evaluation of performance, attribution, reinforcement value, mood and self-esteem, depression effect, defensiveness effect, sex effect, problem type effect, control effect, and frequency effect.

Expectancy of control. The present study shows that low defensives and females are more accurate in their expectancy of control than other subjects. Previous studies have found that people with low levels of defensiveness are accurate in their perception of the environment (Zuber, 1981, 1983); and females are better decoders of interpersonal behavior (Hall, 1978; Hall & Braunwald, 1981; LaFrance & Mayo, 1978; Tang, Critelli & Schneider, 1985). Since these two groups can accurately perceive environmental stimuli, they should be accurate in their expectancy of control. The present results support this contention.

Similar to studies showing that males have higher self-esteem and are more confident about their performance (Fleming & Courtney, 1984), the present study found that males had higher efficacy expectancies than females. Depressives, who might be expected to show low self-esteem and personal helplessness (Abramson et al., 1978; Beck,

1974), did not differ from nondepressives in efficacy and outcome expectancies. However, depressed low defensives did have lower efficacy expectancies than depressed high defensives. Therefore, Beck's and Abramson et al.'s predictions about depressives' viewing themselves as inadequate may be only applicable to depressives with low levels of defensiveness.

In general, subjects who were accurate in their expectancy were also accurate in their judgment of control, and they selected a more reasonable criterion for successful performance, i.e., one that was closer to actual maximal control. Subjects who were inaccurate in expectancy of control tended to select a criterion for successful performance that exceeded the maximal control possible on the task.

Judgment of control. In 1979, Alloy and Abramson did four experiments to investigate depressives' and nondepressives' judgment of control. In experiment 1, depressives and nondepressives did not differ and were more accurate in moderate (50 percent) than in high (75 percent) and low (20 percent) control. In experiment 2, subjects were given zero control. Nondepressives overestimated when frequency of light onset was high and underestimated when frequency was low. Depressives, on the other hand, were relatively accurate in both high and low frequency. In experiment 3, subjects were assigned to either reward or

punishment conditions with zero control. Nondepressives overestimated their control in reward while depressives were relatively accurate across conditions. In experiment 4, subjects were given moderate control (50 percent) in either reward or punishment. Results replicated depressives' accuracy across situations, while nondepressives overestimated in reward but underestimated in punishment. Subsequent studies generally supported these findings (e.g., Abramson and Alloy, 1981, 1982; Alloy, Abramson, & Viscusi, 1981; Martin, Abramson, & Alloy, 1984).

The present results showed that when there was monetary reinforcement on light onset but not on judgment of control accuracy, nondepressives and depressives did not differ from each other. All subjects overestimated their control across problem types. Immediately after the first monetary contingency on accuracy, nondepressives were significantly more accurate than depressives. However, nondepressives' accuracy was maintained for only one task. The two groups did not differ in accuracy on the following task. By the last task, nondepressives exhibited an overestimation of control for both reward and punishment conditions; depressives, being less accurate immediately after the monetary contingency for accuracy, steadily increased in accuracy and were significantly more accurate than nondepressives (Figure 4, Appendix Q).

Nondepressives' pattern for judgment of control can perhaps be explained by egotism theory (Frankel & Synder, 1978). When a monetary contingency on accuracy was first initiated, nondepressives were motivated to be accurate to enhance self-esteem. After receiving feedback about their accuracy, they might have become overconfident and assumed themselves to have more control of the situation than they actually did. Thus, they overestimated on the next task. After receiving feedback about their inaccuracy, they might have thought their estimation of control was too low and continued to overestimate.

Depressives' judgment of control showed the reverse pattern, suggesting the operation of reactance (Wortman & Brehm, 1975) and learned helplessness (Abramson et al., 1978). When depressives were informed of the monetary contingency, they might have experienced additional stress and perhaps become anxious, fearing that they might not perform as well as others. Although depressives' level of anxiety did not differ significantly before and after the contingency on accuracy, means were in the expected direction (*Ms* = 8.48, 8.94, 9.06, 8.38 for the 1st, 2nd, 3rd, and 4th tasks, respectively). Their overestimation of control for the task on which monetary accuracy first started may have reflected reactance, an urge to relieve stress by assuming control of the situation (Wortman & Brehm, 1975). After receiving feedback of their inaccuracy,

they may have related their failure to past noncontingencies, and realized that they had overestimated on the previous task. They then progressively reduced their estimation of control on subsequent tasks, becoming increasingly more accurate.

Low defensives were more accurate in their overall judgment when in punishment than in reward; and in punishment, low defensives were more accurate than high defensives. This suggests that both high and low defensives succumb to overestimation of control for positive outcomes. This is congruent with studies of self-serving bias, in which people assume control and take credit for positive outcomes to enhance self-esteem (Harvey & Weary, 1984; Kelly & Michela, 1980).

Note that low defensives were more accurate than high defensives in their judgment of control only in punishment. It may be that punishment is a more stressful situation than reward and high defensives might have employed defensive coping strategies such as denying environmental stimuli and assuming too much control. Thus, high defensives, compared to low defensives, overestimated their control in punishment.

Males benefitted from the monetary contingency for accuracy, showing greater improvement in accuracy than females. There are two explanations for these findings. First, it may be due to a ceiling effect for female low

defensives, who were more accurate than male low defensives before the contingency for accuracy, leaving relatively less room for females to improve on subsequent tasks. This explanation is supported by the finding that males and females did not differ when initial accuracy was covaried from self-correction. Second, as suggested by Alloy and Abramson (1979), those with high self-esteem may be more motivated to enhance their self-esteem than those with low esteem. Since this study and others (Coopersmith, 1967; Fleming & Courtney, 1984) found males to have higher self-esteem, they may have been more motivated to achieve accuracy.

In general, those who were accurate in judgment of control were also accurate in their expectancies, gave themselves more credit in reward, and selected a more reasonable criterion for successful performance.

Perception of environment. Results showed that low defensives and subjects in reward accurately judged percentages of reinforcement/punishment. The finding that low defensives can accurately estimate various percentages across problem types further supports the contention that they are accurate perceivers of environmental stimuli.

Punishment is generally viewed as ambiguous, undesirable, and threatening to self-esteem. Learning theorists maintain that reward facilitates learning, whereas punishment generally inhibits learning (Walters & Grusec,

1977). The present study showed that people in punishment did not accurately appraise the various percentages of light onset. It may be that people in punishment are preoccupied with thoughts of how to reduce anxiety and other unfavorable consequences, and these thoughts may have interfered with attention to cues or the processing of information.

Contrary to Alloy and Abramson's (1979) study, but similar to Beck and Seligman's prediction, female nondepressives were more accurate than female depressives in estimating amount of reinforcement/punishment. This suggests that mood has a more salient effect on females' perception of the environment than on males.

Evaluation of performance. The present study shows that subjects in reward gave themselves more credit than those in punishment gave themselves blame for comparable performance. This is similar to the self-serving bias phenomenon, in which people take credit for success and deny responsibility for failure (Harvey & Weary, 1984; Kelly & Michela, 1980). Researchers suggest that this evaluative pattern enhances self-esteem in reward and minimizes damage to esteem in punishment (Alloy & Abramson, 1979; Bradley, 1978; Frankel & Synder, 1978; Miller, 1978).

Results also showed that, in reward, female nondepressives gave themselves more credit than female depressives. This is similar to Beck's and Seligman's postulation of depressives' negative evaluation of their

performance. However, male nondepressives blamed themselves more than did male depressives. It may be that the present punishment contingency (i.e., taking away a nickel for the light not coming on and $.50 for being inaccurate) was not sufficient to threaten male nondepressives. They were willing to assume responsibility and take the blame for their performance. This explanation is supported by the findings that male nondepressives became less anxious at post-task, while male depressives maintained the same anxiety level during the course of experiment. In addition, male nondepressives increased their self-esteem more than male depressives did over the course of the experiment.

In general, subjects who were willing to give themselves credit were more accurate in judgment of control and estimation of environmental stimuli. Those who were reluctant to give themselves credit were more depressed at pre-task.

Subjects generally set their criteria for successful performance higher than their estimated maximal control and actual maximal control. In other words, subjects irrationally felt that in order to consider their task performance a success, they would have to perform at a level higher than what they had estimated as the optimal performance possible as well as higher than the actual control possible. It appears that subjects were too hard on themselves, setting aspirations higher than their possible

abilities. This perfectionistic thinking pattern may be especially true for college students, as this culture is known to encourage competition and high aspirations. Indeed, other studies have also found patterns of entrenched, perfectionistic thinking among a majority of college students (Beck & Burns, 1979; Burns, 1980).

Contrary to predictions, depressives did not set a particularly high criterion for success. However, among females, low defensives set a criterion for success closer to their estimated maximal control than did high defensives. Those who had high self-esteem and were accurate in both their expectancy and judgment of control set a more realistic criterion for success in terms of their actual maximal control.

Attribution. Results showed that males and subjects in punishment believed that the causes of their performance outcomes were relatively stable and enduring. In addition, subjects in punishment showed an external locus of control. Previous studies (e.g., Frankel & Synder, 1975; Weiner, 1976) suggest that stable, external attributions to negative outcomes can protect one's self-esteem.

Similar to previous findings (e.g., Lewinsohn et al., 1981), the present study did not find mood a robust predictor of attribution. Instead, mood, defensivenes, sex, and problem type interacted to affect attribution, and because of the complex interactions involved, these results should be interpreted with caution.

Those with stable attributions also had a more external locus of control and they were more accurate in judgment of control and perception of environment. In addition, they were more willing to blame themselves for their task performance in punishment.

Reinforcement value. Results showed that mood did not emerge as a robust predictor of reinforcement value. Complex interactions were found with other variables and these results should be interpreted cautiously.

Females had larger, as well as more accurate estimations of coin size than males. Previous studies indicate that those who view money as important will show larger estimations of coin size (Ashley, Harper, & Runyon, 1951; Brunner & Goodman, 1947). This suggests that females, compared to males, viewed the monetary reinforcement as more important. However, the higher reinforcement value for females did not seem to affect their accuracy of expectancy. With estimation of coin size as a covariate, females were still more accurate in the expectancy of control than males, $F(1,92) = 6.32$ ($p < .01$).

Mood and self-esteem. Results showed that, compared to nondepressives, depressives generally had lower self-esteem, and were more anxious, depressed, and hostile at the end of the experiment. Anxious, depressed, and hostile people also had low defensiveness and low self-esteem at both pre- and post-task.

Mood changes showed that the experimental tasks had different effects on depressives and nondepressives. Compared to pre-task, both depressives and males were less anxious at post-task, while nondepressives became more depressed and hostile. This may be due to differences in performance between depressives and nondepressives on the last task. After the 4th task, depressives showed improvement in judging control and received feedback about their accuracy. Thus they became less anxious at post-task. Nondepressives, on the other hand, showed progressive overestimations of control and received feedback about their inaccuracy, becoming more depressed and hostile at post-task.

Depression effect. Contrary to Alloy and Abramson's (1979) findings, the present study showed that depressives and nondepressives did not differ in overall accuracy of judgment of control across situations. This was true for all tasks combined, and for the task with monetary reinforcement on light onset but not on accuracy of judgment.

Several explanations can be offered for these differing findings. First, the type of tasks used are different. Alloy and Abramson used one task consisting of 40 trials, while the present study used four tasks, each consisting of 20 trials. Second, the monetary reinforcement was higher in Alloy and Abramson's study, a quarter for each desired

outcome, while this study used a nickel. Third, Alloy and Abramson did not provide a monetary contingency on accuracy, whereas this study gave $.50 for each accurate judgment after the first task. Finally, Alloy and Abramson gave immediate, continuous visual feedback of how much money subjects earned or lost. The present study gave oral feedback only on subjects' accuracy of judgment at the end of the 2nd, 3rd, and 4th tasks. In addition, when Alloy and Abramson used a monetary contingency for light onset, either zero or 50 percent control was presented to subjects. Subjects in the present study were given tasks with both moderate (60 percent or 40 percent) and low (20 percent) control, and both moderate (80-20, 80-60) and low (60-20, 40-20) frequency.

In sum, the present study represents short tasks with low monetary reinforcement, monetary contingency on accuracy, delayed feedback, and varying degrees of control and frequency of reinforcement/punishment. These tasks may be more similar to everyday tasks and thus may be probably more representative samples of depressives' cognitive functioning. However, the low monetary contingency in the present study may not have triggered nondepressives' self-enhancing distortions as much as Alloy and Abramson's contingency did.

As discussed in the "Judgment of control" section, depressives and nondepressives reacted differently to

monetary contingency on accuracy of judgment. These findings gave partial support for Alloy and Abramson in that depressives did become progressively more accurate during the experiment, and, by the last task, they were more accurate than nondepressives. However, it is not clear, if there were further trials, whether depressives would remain accurate or begin progressively underestimating control, as suggested by Beck and Seligman.

Findings suggest that depression has a different impact on the cognitive processes of males and females. Female depressives, compared to female nondepressives, were less accurate in estimation of total reinforcement/punishment, and they gave themselves less credit in reward. Among males, depressives and nondepressives did not differ in these cognitive processes. It may be that depression has a more detrimental effect on female cognitive functioning than on males. This suggest that, in addition to traditional therapeutic approaches, efforts should be made to improve female depressives' cognitive functioning. For example, they can be taught how to attend to environmental cues more closely and to give themselves more credit for successful performance (e.g., self-reinforcement training).

Defensiveness effect. Congruent with the present author's prediction and with other studies (e.g., Zuber, 1981, 1983), low defensives were more accurate perceivers than high defensives. People with low defensiveness were

accurate in expectancy of control, judgment of control in negative outcomes, and in estimation of environmental contingencies during no button-pressing. These results indicated that low defensives were accurate perceivers across a number of situations, and they can maintain this accuracy even in adverse situations involving punishment.

Gender effect. Similar to previous studies (Hall, 1978; Tang et al., 1985), the present results showed that females were more accurate in their perception of the environment than were males. Females were more accurate in expectancy of control and estimation of coin size. Female low defensives, compared to male low defensives, were more accurate in judgment of control with or without monetary contingency for accuracy.

In general, females are twice as likely as males to suffer major depressive episodes and to require hospitalization (American Psychiatric Association, 1980). Most researchers explain this sex difference in the prevalence and severity of depression as a result of females' greater willingness to seek help for their emotional discomfort (Garfield, 1976). Results from the present study provide an alternate explanation. It may be that females' realistic perception of environmental stimuli, low self-esteem, low self-efficacy, and high value placed on external reinforcement may have created a differential depression vulnerability for females.

The above explanation is congruent with current research on the promotion of mental health. Studies (e.g., Beck, 1979; Tapper, 1978) have found that low self-esteem and low self-efficacy may predispose individuals to depression. Thus attempts to promote female psychological health by reducing depression vulnerability should involve procedures that enhance self-esteem and self-efficacy, e.g., conscious-raising groups and assertion training (Tapper, 1978).

Females' accurate perception of environmental stimuli may also predispose them to depression. Several studies (e.g., Alloy and Abramson, 1979; Layne, 1983) have indicated that accurate and realistic perception may be related to depression. This suggests that in everyday life, it may be more adaptive to assume an optimistic attitude (e.g., Langer, 1975).

Lastly, females' high value on external reinforcement may be related to their greater depression vulnerability. Bandura (1977) suggests that both intrinsic (e.g., self-reinforcement) and extrinsic incentive should be used to enhance psychological functioning. Therefore, therapy interventions that aim to promote female mental health by reducing their vulnerability to depression should include procedures that help to increase self-reinforcement.

Problem type effect. Results showed that problem type exerted a major impact on cognitive functioning. Compared

to those in punishment, subjects in reward were more accurate in perceiving reinforcing events. Subjects in reward gave themselves more credit than those in punishment gave themselves blame. Subjects in punishment had stable, external attributions, and were more anxious, depressed, and hostile.

People's differing cognitive processes under reward and punishment appear to reflect their striving to enhance self-esteem. In reward, giving oneself more credit than is deserved enhances esteem and increases motivation on subsequent tasks (e.g, Bradley, 1978; Frankel & Synder, 1978). In punishment, stable and external attributions protect esteem since outcomes are viewed as results of enduring factors outside one's control.

It is interesting that subjects accurately perceived reinforcing events in reward and underestimated negative stimuli in punishment. For judgment of control, this and other studies (e.g., Alloy & Abramson, 1979) have found that people overestimate control in reward more than in punishment. In other words, people's accuracy in judging control was unrelated to their accuracy in perceiving the raw data on which control estimates are based (Alloy & Abramson, 1979; Jenkins & Ward, 1965). It may be that in reward, assuming control provides greater enhancement of self-esteem than does overestimating reinforceing events. This is congruent with studies on locus of control (e.g.,

Rotter, 1966) which find that people tend to attribute positive outcomes to internal factors. In punishment, it may be that subjects were more motivated to reduce stress by denying the occurrences of negative stimuli than to enhance self-esteem. In addition, subject's attribution to external factors in negative outcomes may have attenuated overestimation of control. As a result, subjects were more accurate in judging control in punishment even though these judgments were based on less accurate perceptions of environmental stimuli.

Control effect. As predicted, people's cognitive processes varied with degree of control. Similar to Alloy and Abramson (1979, Experiment 1), subjects were more accurate in moderate (60 percent or 40 percent) than in low (20 percent) control. Subjects in the present study were more accurate in both expectancy and judgment of control, and they set a more realistic criterion for success. It may be that people tend to estimate in the middle ranges when in new, uncertain, or ambiguous situations. Second, in real life, moderate control probably occurs more often than either high or low control. As people have more exposure to and are more familiar with cues associated with moderate control, they may be more accurate in judging control in these situations.

Frequency effect. Contrary to the effect of control, low frequency (60-20, 40-20) of reinforcement/punishment

seemed to facilitate more accurate cognitive processes than moderate frequency (80-20, 80-60). Results showed that subjects in low frequency had higher self-efficacy, set a more realistic criterion for success, and were more accurate in judging actual control, maximal control, and reinforcement/punishment frequency. Research indicates that people often associate reinforcement/punishment with their responses, assuming more control when frequency is high (e.g, Alloy and Abramson, 1979). Therefore, subjects generally overestimated control under moderate frequency and were relatively more accurate under low frequency.

Predictions from major cognitive models of depression

Beck and Seligman. Both Beck and Seligman predict that depressives will be inaccurate in perceiving environmental stimuli and manifest a negative bias, i.e, filter out the positive and emphasize negative aspects of events. They explain these as results of depressives' past negative experiences, negative schemas, and faulty information processing. Results from the present study gave partial support to these predictions, but only for females. Among females, nondepressives were more accurate than depressives in evaluating punishment percentage.

Both Beck's and Seligman's cognitive models hypothesize that depressives will show a negative evaluation of performance. Beck indicates that depressives view themselves as inadequate, worthless, and unable to emit the

required responses. In addition, they take less credit in reward and assume more blame in punishment than nondepressives. Seligman suggests that depressives are similar to those with personal helplessness who maintain low efficacy but high outcome expectancies. Moreover, both models predict that depressives will have internal, global, and stable attributions in negative outcomes. The present study gives partial support to these predictions. Results showed that female depressives gave themselves less credit than did nondepressives, but these groups did not differ in self-blame. Depressives and nondepressives also did not differ in their efficacy and outcome expectancies and in attributional styles. However, among depressives, low defensives had lower self-efficacy than high defensives. This suggests that only depressed low defensives manifested the negative self-image pattern hypothesized by Beck and Seligman.

Both cognitive models predict depressives to underestimate control. Beck notes that depressives mistakenly view themselves as unable to produce effective responses, whereas Seligman postulates that depressives' experience of past noncontingency leads to helplessness and the expectancy of future noncontingency. Results from the present study showed an interesting pattern on accuracy of judgment of control. When there was no monetary contingency on accuracy, depressed and nondepressed subjects did not

differ, with both overestimating control across situations. When monetary contingency was placed on accuracy, depressives showed an initial increase in overestimation, followed by a gradual decrease to accuracy on the last task in both reward and punishment conditions. Nondepressives showed the opposite reaction. After an initial relatively accurate judgment, they manifested increasing overestimation across situations. Therefore, Beck's and Seligman's predictions were not supported. However, the trend over tasks suggests that depressives might have shown underestimation and nondepressives overestimation if additional tasks had been given.

In Beck's descriptions of depressives' cognitive functioning, he suggests depressives may be too hard on themselves, setting an unattainable criterion for success. The present results, however, showed that both depressives and nondepressives set unrealistically high criteria for success. Thus this pattern of goal setting may not be peculiar to depressives, as Beck suggests.

Alloy and Abramson. In Alloy and Abramson's (1979) study, when there was a monetary contingency on light onset, depressives were accurate in judging control in either zero or 50 percent control situations. They concluded that depressives are "sadder but wiser," i.e., "sadder but more accurate." Based on their findings, they predict depressives to have accurate cognitive processes across

situations, with nondepressives overestimating control in positive outcomes and underestimating in negative outcomes. Present results showed that depressives and nondepressives did not differ in their overall accuracy of judgment of control. However, depressives' were more accurate than nondepressives after two trials with monetary contingency on accuracy.

Alloy and Abramson (1979) propose depressives' lack of a motive to enhance self-esteem as an explanation for their accuracy in judging control. To support this, depressives should fail to credit themselves for success, blame themselves excessively for failure, and set an inappropriately high criterion for success. This study shows that in reward, female depressives did give themselves less credit than female nondepressives. However, in punishment, male nondepressives blamed themselves more than male depressives, and all subjects set unrealistically high criteria for success. Thus, Alloy and Abramson's claim that depressives lack the motive to enhance self-esteem was partially supported for females, but counterindicated for males.

In contrast to Alloy and Abramson, the present study employed a comprehensive cognitive assessment. Results from other areas of cognitive processing did not show depression to be as robust as suggested by Alloy and Abramson. Depressives and nondepressives did not differ in accuracy of

expectancy, perception of environmental stimuli, attribution, and reinforcement value. Thus, the present study provides no basis for agreeing with Alloy and Abramson's sweeping generalization that depressives are "sadder but wiser."

Most results from the present study did not agree with predictions made by Beck and Seligman. One of the reasons may be that since Beck's predictions are based on observations of clients in therapy, his predictions may apply to more severely debilitated depressives seeking help for emotional discomfort. The present study, on the other hand, used mildly depressed college students who are younger, more educated, and better adjusted than those seeking professional help for depression. It is possible that the subjects in this study were not depressed enough to manifest these patterns of cognitive processing characteristic of clinical depressives.

The discrepancy between Seligman's helplessness model of depression and the present findings can be explained by the nature of the task used. Alloy and Abramson (1979) point out that Seligman predicts depressives' negative bias in cognitive processing to occur only for situations in which the required responses are complex, because depressives think they are unable to generate these responses. In the Alloy and Abramson type of task (1979), the physical responses are simple: either pressing or not

pressing a button. Cognitively, this type of task is fairly complex, requiring subjects to infer conditional probabilities of light onset in order to estimate degree of control. Other tasks, such as anagram solving, however, may appear to subjects as more difficult. It may be that the Alloy and Abramson type of task seems simple and easy to perform, so people expect to be able to emit such responses. Therefore, depressives did not underestimate their control on this task.

Recommendations

As indicated earlier, this study presents significant methodological improvements over previous research and provides a more comprehensive picture of depressives' cognitive functioning. However, there are several limitations which reduce its comparability to existing research and its generalizability to clinical populations. The following recommendations are suggested to overcome such limitations in future studies.

1. Similar to other laboratory research on depression, the present study is limited in its generalizability to severe depressives. Existing research is based mostly on mildly depressed college students who are functioning well, as compared to severely depressed patients who require treatment and hospitalization. Despite seven decades of research on depression, only a handful of studies directly assess the cognitive functioning of clinically depressed

psychiatric patients, and no studies have examined these people's judgment of control. It is recommended that researchers should now focus on severely depressed psychiatric patients' cognitive processes. Future studies should use both mildly and severely depressed psychiatric patients to test the predictions made by major models and to detect possible differences between these two groups of depressed patients.

2. The present study improves on Alloy and Abramson's (1979) studies in that it assesses mild depressives' cognitive processes under different degrees of control and frequency of reinforcement. However, the present study is not directly comparable to studies done by Alloy and Abramson because it does not include a zero control situation. Response-outcome noncontingencies are psychologically more ambiguous, threatening, and difficult than other contingencies; and are responsible for people's feelings of helplessness which may produce behavioral, cognitive, and motivational deficits (Seligman, 1975). Future studies should provide subjects with situations in which reinforcement and punishment are given independently of their responses, as well as providing situations with varying degrees of control and frequency.

3. Studies (e.g., Wortman, 1975) indicate that personal involvement and motivation affect task performance. In most societies, money is a powerful external reinforcer. To

compare studies that use money for incentive, the amount offered should be similar. The amount of money used in the present study, a nickel for each reinforcement, may have been too low for subjects to become motivated and ego-involved. Future studies should determine the effects of amount of monetary contingency.

4. This study provides oral feedback on subjects' accuracy of judgment of control after the second task. There are two limitations to this type of feedback. First, it only informs subjects of their accuracy in judgment but not of how much money they are making or losing. Second, it provides delayed feedback as compared to Alloy and Abramson's immediate visual feedback. Future studies should provide immediate feedback on both accuracy and amount of money earned or lost.

APPENDIX A

Instructions to subjects before completion of pre-experiment questionnaires.

"Thank you for participating in our research project. Our purpose is to investigate the problem-solving skills of college students. For the next hour, you will be given four similar tasks. These involve learning how to turn on a green light and determining the amount of control that you have over the green light onset. You will receive research participation credits and a cash reward, the amount of which will be determined by your performance on the four tasks. Before the tasks, we would like you to complete some questionnaires. When filling out the forms, please work as quickly as you can. Do not spend too much time thinking about the items or checking over your answers. Your first impression is most important."

APPENDIX B

Biographical Information Sheet

Code Number:_____ Sex:_____ Age:_____

Ethnic Status:_____ White-American
_____ Black-American
_____ Mexican-American
_____ Oriental-American
_____ Other (Please specify)

Classification:_____ Freshmen
_____ Sophomore
_____ Junior
_____ Senior
_____ Graduate Student

Major:_____ Arts & Science (Please specify)
_____ Business
_____ Music
_____ Fine Arts
_____ Others (Please specify)

Academic Standing: _____ (Overall G.P.A.)

Have you ever participated in experiments in the psychology department?

_____ Yes How many times? _____

_____ No

APPENDIX C

Pre-task instructions : Reward condition

"Thank you for participating in our research project. Our purpose is to investigate the problem-solving skills of college students. For the next hour, you will be given four similar tasks. These involve learning how to turn on a green light and determining the amount of control that you have over green light onset. You will receive research participation credits and a cash reward, the amount of which will be determined by your performance on the four tasks.

Now, please look at these two boxes. This smaller black wooden box here is the box on which you are going to make your responses by either pressing or not pressing the blue button. Now, in this problem-solving experiment, it is your task to turn the green light on and to learn the degree of control you have over whether or not the green light comes on.

Each time the red light comes on, it indicates the start of a new trial, the occasion to do something. After the red light comes on, you have the option of either making a button-press response or not making a button-press response. A button-press response consists of pressing this button with your left thumb once and only once immediately after the red light goes off. Not making a button-press response consists, of course, of doing nothing when the red

light goes off. Please keep your left thumb off the blue button when you are not making a button-press response. If you intend to press the button on a given trial, you must press it within three seconds after the red light goes off, otherwise the trial will be counted as a no-press trial.

So, in this experiment there are only two possibilities as to what you can do on each of the trials: either press the button within three seconds after the red light goes off, or else, just sit back and do not press the button. Any questions so far?

There are four possibilities as to what may happen on any given trial: 1) you press and the green light does come on; 2) you press and the green light does not come on; 3) you don't press and the green light comes on; and 4) you don't press and the green light does not come on. Since you also have to know what happens when you do not press the button, it is to your advantage not to press the button on some trials. Any questions?

You are required to do four similar tasks like this, Tasks 1, 2, 3, and 4, with each task consisting of 20 trials and we are awarding you with money in these tasks. For each of the eighty trials, you can earn a nickel credit every time the green light is on. On each trial on which the green light does not come on, you will not earn anything. So, it is to your advantage to maximize the number of trials in which the green light comes on. Any questions?

At the beginning and at the end of each task, you will be asked to indicate your judgment of control by selecting a number from 0 to 100: 100 if you have complete control over the onset of the green light, 0 if you have no control over the onset of the green light, and somewhere between these extremes if you have some but not complete control over the onset of the green light. Complete control means that the onset of the green light on any given trial is determined by your choice of response, either pressing or not pressing. In other words, whether or not the green light comes on is totally determined by whether you choose to press or to just sit back and not press. No control means that you have found no way to influence in any way the onset of the green light. In other words, the onset of green light has nothing to do with what you do or do not do. Intermediate degrees of control means that your choice of response, either pressing or not pressing, influences the onset of the green light even though it does not completely determine whether the green light comes on or not.

The money you have earned will be distributed after you have completed all four tasks and all the questionnaires. You have to complete all your tasks and questionnaires to claim your money. Should you decide to stop at any time during the experiment, you are allowed to do so. But you cannot claim any money from the experiment although you will still receive your research participation credits.

The experimenter will leave the room when you are ready and he/she will monitor the experiment next door.

In order to participate in this research, we ask you to sign the consent form here. Your identity and any information from you will remain anonymous. There are four booklets of questionnaires in front of you, each marked Task 1, Task 2, Task 3, and Task 4. You will complete page 1 in the corresponding booklet before you start each task, and complete the rest after you finish the task. Check carefully the label of the booklet corresponding to the number of the task you have just done. That is, complete page 1 on booklet labeled Task 1 before you start task 1, and finish the rest of the questionnaires on the same booklet immediately after you have completed task 1. The order of the tasks is always 1, 2, 3, and 4. Do not go back to previous booklets to check for answers. The experimenter will announce the beginning and the end of each task and will remind you to check your booklet. Do you have any questions?

Now, please answer page 1 of the booklet labeled Task 1. Let me know when you are ready to begin the experiment."

APPENDIX D

Pretask instructions: Punishment condition

"Thank you for participating in our research project. Our purpose is to investigate the problem-solving skills of college students. For the next hour, you will be given four similar tasks. These involve learning how to turn on a green light and determining the amount of control that you have over green light onset. You will receive research participation credits and a cash reward, the amount of which will be determined by your performance on the four tasks.

Now, please look at these two boxes. This black box has a green light and a red light. This smaller black wooden box here is the box on which you are going to make your responses by either pressing or not pressing the blue button. Now, in this problem-solving experiment, it is your task to turn the green light on and to learn the degree of control you have over whether or not the green light comes on.

Each time the red light comes on, it indicates the start of a new trial, the occasion to do something. After the red light comes on, you have the option of either making a button-press response or not making a button-press response. A button-press response consists of pressing this blue button with your left thumb once and only once immediately after the red light goes off. Not making a

button-press response consists, of course, of doing nothing when the red light goes off. Please keep your left thumb off the blue button when you are not making a button-press response. If you intend to press the button on a given trial, you must press it within three seconds after the red light goes off, otherwise the trial will be counted as a no-press trial.

So, in this experiment there are only two possibilities as to what you can do on each of the trials: either press the button within three seconds after the red light goes off, or else, just sit back and do not press the button. Any questions so far?

There are four possibilities as to what may happen on any given trial: 1) you press and the green light does come on; 2) you press and the green light does not come on; 3) you don't press and the green light comes on; and 4) you don't press and the green light does not come on. Since you also have to know what happens when you do not press the button, it is to your advantage not to press the button on some trials. Any questions?

You are required to do four similar tasks like this, Tasks 1, 2, 3, and 4, each task consisting of 20 trials and we will give you five dollars credit to start with. For each of the eighty trials, you will lose a nickel in your credit every time the green light is not on. On each trial on which the green light does come on, you will not loss

anything. So, it is to your advantage to maximize the number of trials in which the green light comes on. Any questions?

At the beginning and at the end of each task, you will be asked to indicate your judgment of control by selecting a number from 0 to 100: 100 if you have complete control over the onset of the green light, 0 if you have no control over the onset of the green light, and somewhere between these extremes if you have some but not complete control over the onset of the green light. Complete control means that the onset of the green light on any given trial is determined by your choice of response, either pressing or not pressing. In other words, whether or not the green light comes on is totally determined by whether you choose to press or to just sit back and not press. No control means that you have found no way to influence in any way the onset of the green light. In other words, the onset of green light has nothing to do with what you do or do not do. Intermediate degrees of control means that your choice of response, either pressing or not pressing, influences the onset of the green light even though it does not completely determine whether the green light comes on or not.

The money in your credit, after all the deductions are made, will be distributed after you have completed all your tasks and the questionnaires. You have to complete all four tasks and all questionnaires to claim your money. Should

you decide to stop at any time during the experiment, you are allowed to do so. But you cannot claim any money from the experiment although you will still receive your research participation credits. The experimenter will leave the room when you are ready and he/she will monitor the experiment next door.

In order to participate in this research, we ask you to sign the consent form here. Your identity and any information from you will remain anonymous. There are four booklets of questionnaires in front of you, each marked Task 1, Task 2, Task 3, and Task 4. You will complete page 1 in the corresponding booklet before you start each task, and complete the rest after you finish the task. Check carefully the label of the booklet corresponding to the number of the task you have just done. That is, complete page 1 on booklet labeled Task 1 before you start task 1, and finish the rest of the questionnaires on the same booklet immediately after you have completed task 1. The order of the tasks is always 1, 2, 3, and 4. Do not go back to previous booklets to check for answers. The experimenter will announce the beginning and the end of each task and will remind you to check your booklet. Do you have any questions?

Now, please and answer page 1 of the booklet labeled Task 1. Let me know when you are ready to begin the experiment."

APPENDIX E

Informed Consent

I hereby give consent to Dr. Critelli to supervise the following investigational procedure:

to perform four problem-solving tasks and allow the use of the information in research.

I have (seen, heard) a clear explanation and understand the nature and purpose of the procedure or treatment; possible appropriate alternative procedures that would be advantageous to me (him, her); and the attendant discomforts or risks involved and the possibility of complications which might arise.

I have (seen, heard) a clear explanation and understand the benefits to be expected. I understand that the procedure or treatment to be performed is investigational and that I may withdraw my consent for my (his, her) status. With my understanding of this, having received this information and satisfactory answers to the questions I have asked, I voluntarily consent to the procedure or treatment designated in Paragraph 1 above.

_____
Date

SIGNED: _____ _____
Witness Subject

Instructions to persons authorized to sign:

If the subject is not competent, the person responsible shall be the legal appointed guardian or legally authorized representative.

If the subject is a minor under 18 years of age, the person responsible is the mother or father or legally appointed guardian.

If the subject is unable to write his name, the following is legally acceptable: John H. (His X mark) Doe and two (2) witnesses.

APPENDIX F

Pre-experiment Questionnaires

Instructions: Please fill out the following questions as accurately as possible and answer all questions.

1. Please rate the degree of control that you expect your responses (pressing and not pressing) will have over green light onset.

   Use a scale of 0 to 100%. Remember 0% means no control, 100% means complete control, and percentages between 0 and 100 indicate corresponding degrees of partial control.

   _____%

2. If you make an optimal sequence of responses on this task (pressing and not pressing), what % of the time do you believe the green light will come on?

   _____%

3. What do you feel is the likelihood of your being able to make an optimal sequence of responses on this task?

   Use a scale of 0 to 100%. Remember 0% indicates no possibility at all, 100% means total certainty, and percentages between 0 and 100 indicate corresponding degrees of likelihood.

   _____%

APPENDIX G

Judgment Scales - Form A (Reward condition)

Instructions: Please fill out the following questions as accurately as possible and answer all questions. Remember all questions refer to the task you have just completed.

1. Please rate the degree of control your responses (pressing and not pressing) had over the onset of the green light.
   Use a scale of 0 to 100%. Remember 0% means no control, 100% means complete control, and percentages between 0 and 100 indicate corresponding degrees of partial control.

   _____%

2. What degree of control do you feel you should have attained to a make successful performance?
   Use a scale of 0 to 100%.

   _____%

3. If you had made an optimal sequence of responses (pressing and not pressing), what % of the time do you think the light would have come on?

   _____%

4. What was the likelihood that you made the optimal sequence of responses?
   Use a scale of 0 to 100%. Remember 0% indicates no possibility at all, 100% means total certainty, and percentages between 0 and 100 indicate corresponding degrees of likelihood.

   _____%

5. If you had responded totally randomly, what % of times do you believe the green light would have come on?

   _____%

6. Please estimate the overall percentage of trials on which the green light came on.

   _____%

7. Please estimate the percentage of trials on which the green light came on after you pressed the button.

_____ %

8. Please estimate the percentage of trials on which the green light came on after you did not press the button.

_____ %

9. Based on your performance on this task, how much credit do you feel you deserve?
Use a scale of 0 to 100%. 0% means no credit given, 100% means complete credit given, and percentages between 0 and 100 indicate corresponding degree of credit deserved.

_____%

10. The money I was offered had no influence on my interest in doing the task.

1 2 3 4 5 6 7
strongly disagree strongly agree

11. I would not have been as motivated to do the task if it weren't for the money offered me.

1 2 3 4 5 6 7
strongly disagree strongly agree

APPENDIX H

Judgment Scales - Form B (Punishment condition)

Instructions: Please fill out the following questions as accurately as possible and answer all questions. Remember all questions refer to the task you have just completed.

1. Please rate the degree of control your responses (pressing and not pressing) over the onset of the green light.
   Use a scale of 0 to 100%. Remember 0% means no control, 100% means complete control, and percentages between 0 and 100 indicate corresponding degree of partial control.

   _____%

2. What degree of control do you feel you should have attained to make a successful performance?
   Use a scale of 0 to 100%.

   _____%

3. If you had made an optimal sequences of responses (pressing and not pressing), what % of the time do you think the light would have come on?

   _____%

4. What was the likelihood that you made the optimal sequence of responses?
   Use a scale of 0 to 100%. Remember 0% indicates no possibility at all, 100% means total certainty, and percentages between 0 and 100 indicate corresponding degrees of likelihood.

   _____%

5. If you had responded totally randomly, what % of of times do you believe the green light would come on?

   _____%

6. Please estimate the overall percentage of trials on which the green light did not come on.

   _____%

7. Please estimate the percentage of trials on which the green light onset did not come on after you pressed the button.

_____%

8. Please estimate the percentage of trials on which the green light did not come after you did not press the button.

_____ %

9. Based on your performance on this task, how much blame do you feel you deserve?
Use a scale of 0 to 100%. 0% means no blame given, 100% means complete blame given, and percentages between 0 and 100 indicate corresponding degree of blame deserved.

_____%

10. The money I was offered had no influence on my interest in doing the task.

1 2 3 4 5 6 7
strongly disagree strongly agree

11. I would not have been as motivated to do the task if it weren't for the money offered me.

1 2 3 4 5 6 7
strongly disagree strongly agree

APPENDIX I

Instructions: Please draw two circles, the sizes of a nickel and a fifty-cent-coin, in the space below.

APPENDIX J (Form A- Reward Condition)

Instructions: Answer the following questions using the scales provided. If you feel one end of the scale best describes your impression, circle the number corresponding to this end. Remember as you move towards the center, it means your impression becomes more neutral. Remember all questions refer to the task you have just completed.

1. Did you gain money because you tried especially hard or because you are always good at these kinds of tasks?

1	2	3	4	5	6	7
Tried hard						Always good

2. Did you gain money because you tried especially hard or because you are always lucky at these kinds of tasks?

1	2	3	4	5	6	7
Tried hard						Always lucky

3. Did you gain money because you are always lucky at these tasks or because these tasks are always easy?

1	2	3	4	5	6	7
Always lucky						Always easy

4. Did you gain money because you are always good at these kinds of tasks or because these tasks are always easy?

1	2	3	4	5	6	7
Always good						Always easy

APPENDIX K (Form B - Punishment condition)

Instructions: Answer the following questions using the scales provided. If you feel one end of the scale best describes your impression, circle the number corresponding to this end. Remember as you move towards the center, it means your impression becomes more neutral. Remember all questions refer to the task you have just completed.

1. Did you lose money because you did not try especially hard or because you are always bad at these kinds of tasks?

1	2	3	4	5	6	7
Did not try hard						Always bad

2. Did you lose money because you did not try especially hard or because you are always unlucky at these kinds of tasks?

1	2	3	4	5	6	7
Did not try hard						Always unlucky

3. Did you lose money because you are always unlucky at these kinds of tasks or because these tasks are always difficult?

1	2	3	4	5	6	7
Always unlucky						Always difficult

4. Did you lose money because you are always bad at these kinds of tasks or because these tasks are always difficult?

1	2	3	4	5	6	7
Always bad						Always Difficult

APPENDIX L

Post-task instructions: Reward condition

"In order to encourage accuracy in your judgment of control, you can earn an additional $.50 if you are accurate in your end-of-task judgment of control for each of the remaining tasks. We define accuracy as being within ten percentage points of the actual control. In other words, if you judge the degree of control accurately at the end of task 2, you earn an extra $.50, another $.50 for task 3, and another $.50 for task 4. Alternatively, if you are inaccurate in your judgment of control on these tasks, you will not earn the extra money. Please note that your judgment of control will not affect the money you have earned every time the green light comes on. To summarize, you can earn money in two ways: to make the green light come on and to judge your control accurately. The experimenter will tell you whether you do or do not earn this extra money after you complete the questionnaires for the current task and before the beginning of the next task. Any questions? If no, please proceed to page 1 of Task 2 and let me know when you have finished."

APPENDIX M

Post-task instructions: Punishment condition

"In order to encourage accuracy in your judgment of control, you will lose an additional $.50 if you are inaccurate in your end-of-task judgment of control for each of the remaining tasks. We define accuracy as being within ten percentage points of the actual control. In other words, if you judge the degree of control inaccurately at the end of task 2, you lose an extra $.50, another $.50 for task 3, and another $.50 for task 4. Alternatively, if you are accurate in your judgment of control on these tasks, you will not lose the extra money. Please note that your judgment of control will not affect the money you have lost every time the green light did not come on. To summarize, you can lose money in two ways: when the green light do not come on and your judgment of control is inaccurate. The experimenter will tell you whether you do or do not lose this extra money after you complete the questionnaires for the current task and before the beginning of the next task. Any questions? If no, please proceed to page 1 of Task 2 and let me know when you have finished."

APPENDIX N

Instructions to subjects after completion of all tasks:

"We would like to get your impression of the experiment. Please work as quickly as you can through these questionnaires. Remember your first impression is the best answer. Do not spend too much time thinking about the item or checking over your answer."

APPENDIX O

Instructions: Please answer all questions as accurately as possible.

1. What do you think are the purposes or hypotheses of this study?

2. What responses did you feel the experimenter wanted you to make?

3. What are the factors affecting the green light onset?

4. To what extent were you trying to be accurate in your judgment of control over green light onset?

1	2	3	4	5	6	7
Did not try hard						Tried very hard

APPENDIX P

Table 1

Names and Definitions of Major Variables

Variables	Definition
Expectancy of Control	Pre-task estimation of control
Accuracy of Expectancy	Expectancy of control - actual control
Efficacy Expectancy	Pre-task estimation of the possibility of making an optimal set of responses
Outcome Expectancy	Pre-task estimation of light onset during optimal responses
Estimated Maximal Control	Post-task estimation of light onset during optimal responses
Actual Maximal Control	Larger number of each sequence of control. For example, in (80-20), actual maximal control is 80%.
Accuracy of Maximal Control	Estimated maximal control - Actual maximal control
Accuracy of Judgment of Control without Reinf for accuracy	Post-task judgment of control for the first task - actual control for the first task
Accuracy of Judgment of Control	Post-task judgment of control - actual control
Self-correction	Absolute value of accuracy of judgment of control for the last task - absolute value of accuracy of judgment of control for the first task
Accuracy of Total Reinf or Pun	Post-task estimation of total reinf (i.e., light onsets in reward) or pun (i.e., instances of light not coming on in punishment) - actual reinf or pun

Variables	Definition
Accuracy of Reinf or Pun during Button-Press	Post-task estimation of reinforcement or punishment during button-press - actual reinforcement or punishment during press
Accuracy of Reinf or Pun during No Press	Post-task estimation of reinforcement or punishment during no button press- actual reinf or punishment during no press
Subjective Criterion for Success	Estimated maximal control
Deviation from Subj Criterion for Success	Criterion for success - estimated maximal control
Objective Criterion for Success	Actual maximal control
Deviation from Obj Criterion for Success	Criterion for success - actual maximal Control
Post- to Pre-task Mood Changes	Post-task mood - Pre-task mood
Post- to Pre-task Changes on Self-esteem	Post-task self-esteem - Pre-task self-esteem

Note: Reinf = reinforcement; Pun = Punishment

Table 2

Means and Standard Deviations Across Tasks

Male Nondepressives in Reward Condition

Variable N=4	low defensives M	low defensives SD	high defensives M	high defensives SD
Expectancy of Control	59.38	6.33	52.50	14.97
Accuracy of Expectancy of Control	24.38	6.33	17.50	14.77
Efficacy Expectancy	59.69	5.81	49.69	10.02
Outcome Expectancy	66.86	15.30	55.63	10.28
Overall Judgment of Control	55.94	8.00	43.13	12.14
Accuracy of Judgment of Control for 1st task	47.50	22.17	-2.50	41.73
Accuracy of Judgment of Control for 2nd task	3.75	9.47	17.50	26.30
Accuracy of Judgment of Control for 3rd task	21.25	18.88	11.25	37.28
Accuracy of Judgment of Control for 4th task	11.25	21.75	6.25	32.76
Overall accuracy of Judgment of Control	20.94	8.00	8.13	12.14
Self-correction	36.25	7.50	43.75	28.40
Likelihood of Success	52.50	7.71	36.81	21.07
Accuracy of maximal Control	9.69	22.39	-14.38	15.33
Accuracy of % Reinf	-.81	13.51	-4.69	7.10
Accuracy of % Reinf During Press	4.13	5.24	-3.25	7.76
Accuracy of % Reinf During No Press	-8.69	6.14	-19.13	8.99
Random Responses	46.25	9.24	43.75	13.50
Credit given	61.88	7.25	53.69	4.38
Money earned	2.63	.45	2.57	.42

Variable N=4	low defensives M	low defensives SD	high defensives M	high defensives SD
Criterion of Success	69.06	12.31	64.06	17.60
Deviation Subj Success	-5.63	12.01	13.44	19.88
Deviation Obj Success	4.06	12.31	-.94	17.60
Stability	7.94	1.39	7.50	.46
Locus of Control	6.88	1.05	8.19	.32
Money on Task Interest	6.06	1.13	4.44	.62
Nickel Size	14.06	2.28	17.44	2.63
Half-dollar Size	21.94	3.97	24.81	7.36
Post Anxiety	3.81	3.40	6.44	1.43
Post Depression	7.00	7.00	12.31	2.87
Post Hostility	4.69	3.76	6.00	2.44
Change Anxiety	-2.00	4.55	2.00	2.00
Change Depression	-.75	4.88	.00	1.83
Change Hostility	-.25	3.20	1.25	2.06
Post Self-esteem	166.50	12.77	166.50	21.55
Change Self-esteem	5.00	12.52	-1.25	14.64

Male Depressives in Reward Condition

Variable N=4	low defensives M	low defensives SD	high defensives M	high defensives SD
Expectancy of Control	56.88	3.31	57.50	11.86
Accuracy of Expectancy of Control	21.88	3.31	22.50	11.86
Efficacy Expectancy	54.69	6.95	80.94	12.39
Outcome Expectancy	54.06	6.24	55.63	5.82
Overall Judgment of Control	49.56	7.04	50.63	9.92
Accuracy of Judgment of Control for 1st task	9.50	27.04	20.00	25.82
Accuracy of Judgment of Control for 2nd task	18.75	18.88	41.25	29.55
Accuracy of Judgment of Control for 3rd task	29.25	23.92	1.25	32.24
Accuracy of Judgment of Control for 4th task	.75	16.60	.00	20.00
Overall accuracy of Judgment of Control	14.56	7.04	15.63	9.92
Self-correction	33.75	17.50	30.00	11.55
Likelihood of Success	52.81	12.81	63.75	22.80
Accuracy of maximal Control	-12.19	3.87	-17.81	14.52
Accuracy of % Reinf	4.31	3.69	-.94	9.76
Accuracy of % Reinf During Press	-7.06	6.27	-4.06	8.98
Accuracy of % Reinf During No Press	-7.50	16.62	-23.13	8.93
Random Responses	49.06	16.37	51.25	5.86
Credit given	55.63	9.53	72.19	14.66
Money earned	2.75	.47	2.59	.54

Variable N=4	low defensives M	low defensives SD	high defensives M	high defensives SD
Criterion of Success	61.56	14.08	68.75	23.94
Deviation Subj Success	8.75	10.95	21.56	34.42
Deviation Obj Success	-3.44	14.08	3.75	23.94
Stability	6.38	.97	11.50	2.03
Locus of Control	7.25	1.40	6.75	2.19
Money on Task Interest	4.44	.77	5.97	.94
Nickel Size	16.63	5.23	15.88	2.83
Half-dollar Size	28.38	4.14	30.94	3.03
Post Anxiety	4.31	1.48	8.44	1.68
Post Depression	9.19	4.97	14.63	2.89
Post Hostility	6.75	1.74	10.50	1.68
Change Anxiety	-3.50	2.65	-1.75	1.26
Change Depression	-1.25	5.38	-1.75	6.55
Change Hostility	3.50	3.42	2.25	2.63
Post Self-esteem	139.75	31.86	135.50	57.68
Change Self-esteem	-3.00	23.11	-12.50	24.15

Male Nondepressives in Punishment Condition

Variable N=4	low defensives M	low defensives SD	high defensives M	high defensives SD
Expectancy of Control	56.56	12.56	55.00	17.91
Accuracy of Expectancy of Control	21.56	12.56	20.00	17.91
Efficacy Expectancy	53.44	21.78	55.94	15.32
Outcome Expectancy	55.31	20.83	51.88	15.50
Overall Judgment of Control	50.31	14.98	51.25	8.35
Accuracy of Judgment of Control for 1st task	47.50	11.90	11.25	34.74
Accuracy of Judgment of Control for 2nd task	1.25	13.15	7.50	35.00
Accuracy of Judgment of Control for 3rd task	20.00	27.99	17.50	18.93
Accuracy of Judgment of Control for 4th task	-7.50	37.59	28.75	30.65
Overall accuracy of Judgment of Control	15.31	14.98	16.25	8.35
Self-correction	55.00	42.23	45.00	19.58
Likelihood of Success	44.69	19.48	52.05	21.05
Accuracy of maximal Control	-10.63	19.16	.31	14.16
Accuracy of % Punish	-6.44	8.26	-11.56	7.24
Accuracy of % Punish During Press	-10.19	4.67	-13.13	14.34
Accuracy of % Punish During No Press	-22.56	1.03	-11.56	11.88
Random Responses	38.44	8.74	40.00	7.36
Blame given	29.44	29.77	31.25	28.76
Money taken away	2.63	.51	2.98	.10

Variable N=4	low defensives M	low defensives SD	high defensives M	high defensives SD
Criterion of Success	80.31	15.42	65.94	15.15
Deviation Subj Success	25.94	9.54	.63	17.12
Deviation Obj Success	15.31	15.42	.94	15.15
Stability	8.13	.92	8.00	1.63
Locus of Control	8.31	.94	8.00	1.63
Money on Task Interest	4.59	2.26	6.00	1.36
Nickel Size	14.25	2.38	12.88	3.89
Half-dollar Size	22.38	2.84	25.25	1.85
Post Anxiety	3.69	1.14	3.56	1.90
Post Depression	6.81	2.32	6.88	5.99
Post Hostility	4.75	.96	6.62	5.19
Change Anxiety	-2.00	6.98	1.00	2.45
Change Depression	.25	4.57	1.75	2.22
Change Hostility	-.25	2.50	4.00	6.78
Post Self-esteem	168.50	8.35	205.25	20.25
Change Self-esteem	4.25	7.93	8.75	7.54

Male Depressives in Punishment Condition

Variable N=4	low defensives M	low defensives SD	high defensives M	high defensives SD
Expectancy of Control	39.38	19.33	62.19	31.32
Accuracy of Expectancy of Control	4.38	19.33	17.19	31.32
Efficacy Expectancy	43.13	15.46	62.50	32.22
Outcome Expectancy	60.00	12.37	73.75	24.94
Overall Judgment of Control	40.00	10.75	40.94	23.23
Accuracy of Judgment of Control for 1st task	.00	49.67	-2.50	27.54
Accuracy of Judgment of Control for 2nd task	13.75	30.38	36.25	31.98
Accuracy of Judgment of Control for 3rd task	6.25	17.02	-12.50	56.79
Accuracy of Judgment of Control for 4th task	.00	16.33	2.50	29.86
Overall accuracy of Judgment of Control	5.00	10.75	5.94	23.23
Self-correction	45.00	23.81	35.00	35.12
Likelihood of Success	47.19	20.11	50.63	22.97
Accuracy of maximal Control	-4.06	26.33	3.75	12.33
Accuracy of % Punish	2.06	5.58	-7.56	20.35
Accuracy of % Punish During Press	-32.38	9.17	-7.00	20.15
Accuracy of % Punish During No Press	-17.88	12.91	-16.19	15.34
Random Responses	39.67	10.07	32.69	11.32
Blame given	9.50	2.88	16.88	10.73
Money taken away	2.82	.56	3.16	.65

Variable N=4	low defensives M	low defensives SD	high defensives M	high defensives SD
Criterion of Success	71.88	19.08	70.00	13.99
Deviation Subj Success	10.94	13.97	1.25	16.52
Deviation Obj Success	6.88	19.08	5.00	13.99
Stability	9.00	.74	9.19	1.30
Locus of Control	8.44	1.09	8.94	1.45
Money on Task Interest	5.19	1.42	5.97	1.47
Nickel Size	14.38	1.44	14.13	4.33
Half-dollar Size	23.44	3.20	26.17	5.61
Post Anxiety	10.13	2.10	8.13	2.82
Post Depression	19.38	4.88	14.56	5.25
Post Hostility	11.25	3.32	8.00	2.79
Change Anxiety	-.75	3.78	-3.75	2.63
Change Depression	-2.75	1.71	-5.25	8.42
Change Hostility	.00	4.32	-5.00	7.26
Post Self-esteem	136.25	42.02	134.00	30.77
Change Self-esteem	-3.00	12.36	10.00	27.65

Female Nondepressives in Reward Condition

Variable N=8	low defensives M	low defensives SD	high defensives M	high defensives SD
Expectancy of Control	41.03	19.03	53.28	18.11
Accuracy of Expectancy of Control	6.03	19.03	18.28	18.11
Efficacy Expectancy	48.53	3.30	53.44	12.76
Outcome Expectancy	54.94	16.45	57.28	13.80
Overall Judgment of Control	47.13	12.13	48.97	8.65
Accuracy of Judgment of Control for 1st task	11.38	19.18	13.75	27.35
Accuracy of Judgment of Control for 2nd task	15.88	35.86	8.38	20.45
Accuracy of Judgment of Control for 3rd task	-6.88	36.64	23.13	38.17
Accuracy of Judgment of Control for 4th task	28.13	38.63	10.63	21.29
Overall accuracy of Judgment of Control	12.13	12.13	13.97	8.65
Self-correction	39.25	23.30	25.63	17.41
Likelihood of Success	48.09	9.04	50.00	14.45
Accuracy of maximal Control	1.66	15.56	-7.97	10.15
Accuracy of % Reinf	9.31	9.00	.84	9.96
Accuracy of % Reinf During Press	-3.66	7.31	-8.91	17.03
Accuracy of % Reinf During No Press	-8.78	10.58	-12.03	11.22
Random Responses	52.13	7.31	42.34	14.38
Credit given	66.56	19.66	66.25	17.97
Money given	2.43	.45	2.75	.55

Variable N=8	low defensives M	low defensives SD	high defensives M	high defensives SD
Criterion of Success	74.06	24.90	76.66	19.17
Deviation Subj Success	7.41	22.54	19.63	26.04
Deviation Obj Success	9.06	24.90	11.66	19.17
Stability	6.72	1.53	7.44	1.90
Locus of Control	7.60	1.69	7.78	1.19
Money on Task Interest	4.91	1.37	5.84	1.07
Nickel Size	16.38	3.26	18.16	1.85
Half-dollar Size	28.88	5.01	28.00	3.94
Post Anxiety	4.69	3.02	3.28	2.36
Post Depression	9.09	4.84	7.94	5.21
Post Hostility	6.44	2.68	4.84	2.22
Change Anxiety	1.50	3.67	.63	2.77
Change Depression	.75	8.23	1.38	4.50
Change Hostility	.75	4.71	1.25	1.58
Post Self-esteem	165.00	26.49	177.38	21.78
Change Self-esteem	-.63	19.79	1.50	16.93

Female Depressives in Reward Condition

Variable N=8	low defensives M	low defensives SD	high defensives M	high defensives SD
Expectancy of Control	48.91	11.33	42.50	8.43
Accuracy of Expectancy of Control	13.91	11.33	7.50	8.43
Efficacy Expectancy	45.00	8.84	45.47	12.52
Outcome Expectancy	54.69	14.59	46.19	6.00
Overall Judgment of Control	48.44	12.12	35.63	13.77
Accuracy of Judgment of Control for 1st task	21.25	35.93	13.13	32.06
Accuracy of Judgment of Control for 2nd task	18.75	40.95	8.13	35.50
Accuracy of Judgment of Control for 3rd task	16.25	28.25	3.75	31.48
Accuracy of Judgment of Control for 4th task	-5.00	32.84	-22.50	36.15
Overall accuracy of Judgment of Control	13.44	12.12	.63	13.77
Self-correction	56.25	25.60	60.63	24.41
Likelihood of Success	48.91	17.03	41.72	11.12
Accuracy of maximal Control	-7.03	14.94	-8.28	12.46
Accuracy of % Reinf	2.69	12.58	-.05	9.27
Accuracy of % Reinf During Press	-2.66	13.69	-4.28	8.79
Accuracy of % Reinf During No Press	-9.13	11.33	-17.97	10.09
Random Responses	47.77	7.88	39.97	13.61
Credit given	57.75	16.59	47.81	24.02
Money earned	2.52	.24	2.30	.40

Variable N=8	low defensives M	low defensives SD	high defensives M	high defensives SD
Criterion of Success	74.22	13.26	62.81	13.23
Deviation Subj Success	16.25	17.80	6.09	19.80
Deviation Obj Success	9.22	13.26	-2.19	13.23
Stability	7.03	.70	6.72	1.84
Locus of Control	8.06	1.23	7.25	1.81
Money on Task Interest	5.69	1.18	5.88	1.16
Nickel Size	16.56	1.67	17.25	2.73
Half-dollar Size	28.28	2.92	28.41	6.56
Post Anxiety	9.09	4.20	7.84	4.18
Post Depression	16.16	7.31	13.75	6.08
Post Hostility	8.69	4.23	8.31	2.63
Change Anxiety	.50	6.09	.13	2.48
Change Depression	.63	6.26	-2.00	4.57
Change Hostility	.13	5.19	1.00	2.07
Post Self-esteem	143.38	28.67	138.88	31.63
Change Self-esteem	4.25	17.65	2.75	20.67

Female Nondepressives in Punishment Condition

Variable N=8	low defensives M	low defensives SD	high defensives M	high defensives SD
Expectancy of Control	40.50	18.53	52.34	9.17
Accuracy of Expectancy of Control	5.47	18.53	17.34	9.17
Efficacy Expectancy	47.19	23.30	46.88	11.22
Outcome Expectancy	64.38	20.78	51.88	8.07
Overall Judgment of Control	35.78	17.49	49.13	13.15
Accuracy of Judgment of Control for 1st task	9.38	31.67	7.50	26.60
Accuracy of Judgment of Control for 2nd task	-18.13	18.11	11.25	43.98
Accuracy of Judgment of Control for 3rd task	-9.38	25.13	30.63	22.43
Accuracy of Judgment of Control for 4th task	21.25	34.41	7.13	12.98
Overall accuracy of Judgment of Control	.78	17.49	14.13	13.13
Self-correction	39.38	20.78	17.13	17.21
Likelihood of Success	46.44	18.03	45.00	11.26
Accuracy of maximal Control	4.84	18.51	-11.88	11.16
Accuracy of % Punish	-5.91	5.97	-7.34	16.68
Accuracy of % Punish During Press	-18.16	10.95	-12.72	20.60
Accuracy of % Punish During No Press	-17.69	21.91	-14.88	15.60
Random Responses	47.81	7.72	46.72	12.30
Blame given	20.63	18.74	21.56	19.96
Money taken away	2.95	.28	2.78	.36

Variable N=8	low defensives M	low defensives SD	high defensives M	high defensives SD
Criterion of Success	67.28	16.45	61.09	18.08
Deviation Subj Success	-2.56	21.45	7.97	10.56
Deviation Obj Success	2.28	16.45	-3.90	18.08
Stability	9.03	1.15	8.63	1.02
Locus of Control	8.84	1.21	8.53	.75
Money on Task Interest	5.92	1.56	5.30	1.67
Nickel Size	17.00	1.98	17.31	3.32
Half-dollar Size	28.65	2.64	28.63	5.76
Post Anxiety	8.34	3.68	4.41	3.93
Post Depression	14.59	6.47	9.22	7.02
Post Hostility	8.19	4.33	6.19	3.96
Change Anxiety	2.00	4.96	2.00	6.48
Change Depression	4.13	7.08	3.13	10.04
Change Hostility	.75	2.05	2.13	5.38
Post Self-esteem	168.00	30.48	183.75	13.40
Change Self-esteem	4.88	10.70	1.88	13.38

Female Depressives in Punishment Condition

Variable N=8	low defensives M	low defensives SD	high defensives M	high defensives SD
Expectancy of Control	39.38	18.92	53.13	14.70
Accuracy of Expectancy of Control	4.38	18.92	18.13	14.70
Efficacy Expectancy	45.00	11.48	48.75	17.87
Outcome Expectancy	52.81	8.20	56.00	16.05
Overall Judgment of Control	37.03	19.00	48.28	17.42
Accuracy of Judgment of Control for 1st task	-13.13	38.07	20.63	24.70
Accuracy of Judgment of Control for 2nd task	15.63	24.70	20.00	28.03
Accuracy of Judgment of Control for 3rd task	3.75	33.46	8.75	31.93
Accuracy of Judgment of Control for 4th task	-2.50	46.83	3.75	22.64
Overall accuracy of Judgment of Control	2.03	19.00	13.28	17.42
Self-correction	54.38	33.11	23.11	18.50
Likelihood of Success	49.69	17.81	44.22	10.90
Accuracy of maximal Control	-6.72	15.60	-10.78	25.97
Accuracy of % Punish	-9.69	11.91	-19.47	13.99
Accuracy of % Punish During Press	-8.13	14.73	-20.31	11.51
Accuracy of % Punish During No Press	-14.22	16.02	-6.72	14.53
Random Responses	47.03	10.98	47.19	23.88
Blame given	22.50	27.10	33.22	21.03
Money taken away	2.96	.54	2.90	.40

Variable N=8	low defensives M	low defensives SD	high defensives M	high defensives SD
Criterion of Success	63.28	21.26	81.41	20.33
Deviation Subj Success	5.00	21.89	27.19	27.61
Deviation Obj Success	-1.72	21.26	16.41	20.33
Stability	8.47	1.20	7.75	1.83
Locus of Control	8.28	1.15	8.59	1.36
Money on Task Interest	5.73	1.60	6.45	1.00
Nickel Size	17.09	2.24	16.09	2.86
Half-dollar Size	27.22	4.18	26.78	6.91
Post Anxiety	9.78	4.52	10.19	4.27
Post Depression	17.97	8.12	18.22	7.98
Post Hostility	9.75	4.70	8.44	4.45
Change Anxiety	-2.50	5.63	.75	3.02
Change Depression	-4.00	7.64	1.88	4.42
Change Hostility	-1.38	5.40	-.25	3.20
Post Self-esteem	139.50	37.99	152.38	42.64
Change Self-esteem	10.13	10.25	5.50	21.09

Table 3

Means and Standard Deviations for Moderate and Low control

Moderate Control in Reward Condition

Variable N=24	Nondepressed M	Nondepressed SD	Depressed M	Depressed SD
Accuracy of Expectancy	2.37	18.23	-.52	15.81
Efficacy Expectancy	54.56	11.75	51.46	16.18
Outcome Expectancy	60.48	17.43	52.40	11.69
Accuracy of Judgment	2.17	14.51	-8.94	14.55
Likelihood of Success	47.90	13.89	49.77	21.52
Accuracy of Max Control	-6.67	19.02	-16.77	13.03
Accuracy of % Reinf	4.50	11.86	2.27	11.29
Accuracy of % Reinf Press	-.54	11.82	-2.52	11.49
Accuracy of % No Press	-10.31	13.84	-8.96	18.94
Random Responses	43.73	13.25	45.50	13.94
Credit given	65.50	17.88	53.81	19.60
Dev Subj Success	12.38	26.60	11.88	21.22
Dev Obj Success	5.71	18.42	-4.90	16.93
Stability	7.31	1.56	7.69	2.39
Locus of Control	7.63	1.18	7.23	1.87
Money on Task Interest	5.39	1.27	5.55	1.30
Nickel Size	16.79	3.01	16.96	2.83
Half-dollar size	26.25	5.50	28.77	4.58
Post Anxiety	4.58	2.87	8.02	3.88
Post Depression	9.27	5.24	14.19	6.26
Post Hostility	5.69	2.86	8.52	3.17

Moderate Control in Punishment Condition

Variable N=24	Nondepressed M	Nondepressed SD	Depressed M	Depressed SD
Accuracy of Expectancy	-2.50	16.78	-3.44	26.87
Efficacy Expectancy	49.58	18.05	48.13	20.88
Outcome Expectancy	56.04	18.50	61.92	19.70
Accuracy of Judgment	-3.85	22.39	-9.06	23.02
Likelihood of Success	46.77	20.88	46.04	23.08
Accuracy of Max Control	-10.94	21.97	-12.71	24.81
Accuracy of % Punish	-6.88	19.27	-8.29	28.19
Accuracy of % Press	-11.58	26.11	-15.77	30.59
Accuracy of % No Press	-11.90	25.94	-12.71	20.13
Random Responses	41.35	14.43	43.92	21.13
Blame given	23.73	23.11	23.96	22.78
Dev Subj Success	7.46	23.28	13.23	32.04
Dev Obj Success	-3.48	21.09	.52	25.77
Stability	8.50	1.15	8.54	1.50
Locus of Control	8.48	.99	8.65	1.40
Money on Task Interest	5.40	1.76	5.79	1.48
Nickel Size	15.98	3.07	16.21	3.41
Half-dollar size	27.10	4.54	26.29	5.30
Post Anxiety	5.54	3.71	9.50	3.91
Post Depression	10.10	6.43	17.77	6.84
Post Hostility	6.33	3.53	8.79	4.21

Low Control in Reward Condition

Variable N=24	Nondepressed M	Nondepressed SD	Depressed M	Depressed SD
Accuracy of Expectancy	27.79	19.81	30.00	11.80
Efficacy Expectancy	49.88	12.97	54.79	18.92
Outcome Expectancy	55.17	17.16	52.04	14.56
Accuracy of Judgment	29.25	13.64	27.96	16.81
Likelihood of Success	47.27	15.69	49.06	17.66
Accuracy of Max Control	.90	17.05	-3.65	16.17
Accuracy of % Reinf	.44	12.70	.60	12.50
Accuracy of % Reinf Press	-7.46	16.88	-4.23	15.48
Accuracy of % No Press	-13.25	14.85	-18.79	14.97
Random Responses	49.25	11.79	46.35	13.29
Credit given	61.56	19.74	58.96	23.01
Dev Subj Success	8.25	21.98	12.92	26.45
Dev Obj Success	9.15	22.74	9.27	18.38
Stability	7.27	1.57	7.44	2.29
Locus of Control	7.65	1.43	7.65	1.52
Money on Task Interest	5.28	1.33	5.63	1.12
Nickel Size	16.73	2.86	16.48	3.21
Half-dollar size	27.25	5.67	28.77	4.72
Post Anxiety	4.15	2.77	7.48	3.75
Post Depression	8.52	5.14	13.67	6.25
Post Hostility	5.40	2.55	8.56	3.17

Low Control in Punishment Condition

Variable N=24	Nondepressed M	Nondepressed SD	Depressed M	Depressed SD
Accuracy of Expectancy	31.56	16.97	28.96	19.73
Efficacy Expectancy	49.58	19.23	49.58	21.53
Outcome Expectancy	57.19	16.51	55.21	17.44
Accuracy of Judgment	24.31	14.14	22.19	21.66
Likelihood of Success	46.48	16.23	48.75	22.08
Accuracy of Max Control	2.81	17.68	1.25	22.96
Accuracy of % Punishment	-7.96	11.31	-12.98	11.94
Accuracy of % Press	-16.77	13.88	-15.48	16.13
Accuracy of % No Press	-21.19	13.30	-12.29	19.71
Random Responses	47.81	9.84	43.02	14.10
Blame given	24.63	24.15	21.98	22.49
Dev Subj Success	5.00	19.82	12.81	23.63
Dev Obj Success	7.81	20.43	14.06	22.94
Stability	8.65	1.35	8.33	1.57
Locus of Control	8.54	1.31	8.38	1.19
Money on Task Interest	5.62	1.61	6.05	1.29
Nickel Size	15.94	3.62	15.42	1.63
Half-dollar size	26.96	4.89	26.15	5.42
Post Anxiety	5.38	3.95	9.85	3.74
Post Depression	10.33	7.06	17.71	7.20
Post Hostility	7.04	4.76	10.10	5.44

Table 4

Means and Standard Deviations for Moderate and Low Frequency

Moderate Frequency in Reward Condition

Variable N=24	Nondepressed M	Nondepressed SD	Depressed M	Depressed SD
Accuracy of Expectancy	7.90	16.89	6.46	16.71
Efficacy Expectancy	51.13	9.93	52.40	18.58
Outcome Expectancy	54.90	14.94	49.54	12.29
Accuracy of Judgment	22.81	16.17	12.15	21.66
Likelihood of Success	57.19	15.75	54.17	18.47
Accuracy of Max Control	-8.69	18.58	-17.92	15.14
Accuracy of % Reinf	3.90	12.75	1.83	11.12
Accuracy of % Reinf Press	-6.25	14.67	-8.21	12.64
Accuracy of % No Press	-17.51	13.62	-20.08	15.61
Random Responses	52.67	12.35	47.40	14.90
Credit given	72.19	17.96	61.96	23.40
Dev Subj Success	7.50	26.22	7.81	23.33
Dev Obj Success	-1.19	18.16	-10.10	19.68
Stability	7.29	1.69	7.40	2.67
Locus of Control	7.35	1.44	7.41	2.08
Money on Task Interest	5.28	1.21	5.56	1.21
Nickel Size	16.54	2.76	16.45	2.98
Half-dollar size	26.58	5.54	28.73	4.63
Post Anxiety	4.48	2.74	7.73	6.53
Post Depression	8.77	4.94	13.83	6.53
Post Hostility	5.56	2.68	8.56	3.32

Moderate Frequency in Punishment Condition

Variable N=24	Nondepressed M	Nondepressed SD	Depressed M	Depressed SD
Accuracy of Expectancy	10.21	21.96	6.56	23.92
Efficacy Expectancy	47.92	21.09	46.04	19.99
Outcome Expectancy	55.31	20.43	56.88	17.73
Accuracy of Judgment	11.67	21.36	7.71	20.77
Likelihood of Success	56.58	18.54	50.52	20.76
Accuracy of Max Control	-16.56	16.42	-15.52	20.42
Accuracy of % Punishment	-27.25	15.80	-30.69	15.64
Accuracy of % Press	-31.96	23.53	-30.88	24.94
Accuracy of % No Press	-35.56	25.65	-34.00	26.45
Random Responses	48.54	13.40	48.19	16.08
Blame given	23.42	21.51	23.27	23.32
Dev Subj Success	1.42	25.22	12.29	25.82
Dev Obj Success	-15.15	22.18	-3.23	17.61
Stability	8.58	1.23	8.46	1.54
Locus of Control	8.46	1.15	8.52	1.24
Money on Task Interest	5.32	1.78	5.91	1.39
Nickel Size	15.85	3.23	15.81	3.16
Half-dollar size	26.21	4.26	26.69	5.79
Post Anxiety	5.15	3.82	9.60	3.86
Post Depression	9.54	6.89	17.44	7.18
Post Hostility	6.48	4.26	9.21	4.47

Low Frequency in Reward Condition

Variable N=24	Nondepressed M	Nondepressed SD	Depressed M	Depressed SD
Accuracy of Expectancy	22.27	19.49	22.60	13.05
Efficacy Expectancy	53.31	11.08	53.33	17.28
Outcome Expectancy	60.75	16.98	54.69	11.78
Accuracy of Judgment	4.27	14.07	6.56	18.82
Likelihood of Success	37.98	18.53	44.79	19.64
Accuracy of Max Control	2.92	20.76	-2.08	17.95
Accuracy of % Reinf	1.04	13.81	1.29	10.16
Accuracy of % Reinf Press	-1.83	15.14	1.23	14.44
Accuracy of % No Press	-6.04	19.02	-9.44	17.60
Random Responses	40.31	15.73	43.83	13.39
Credit given	54.88	21.45	51.23	22.02
Dev Subj Success	13.13	30.28	17.60	22.91
Dev Obj Success	16.04	29.81	15.22	18.69
Stability	7.29	1.50	7.73	2.01
Locus of Control	7.92	1.43	7.42	1.54
Money on Task Interest	5.39	1.39	5.68	1.18
Nickel Size	16.98	3.25	16.88	2.95
Half-dollar size	26.92	5.44	28.81	4.79
Post Anxiety	4.25	2.95	7.83	3.86
Post Depression	9.02	5.40	14.00	5.85
Post Hostility	5.52	2.66	8.52	2.98

Low Frequency in Punishment Condition

Variable N=24	Nondepressed M	Nondepressed SD	Depressed M	Depressed SD
Accuracy of Expectancy	18.85	18.13	18.96	21.01
Efficacy Expectancy	51.25	17.88	51.67	19.96
Outcome Expectancy	57.92	17.81	60.25	19.25
Accuracy of Judgment	8.79	14.73	5.42	20.95
Likelihood of Success	36.67	17.00	44.27	19.44
Accuracy of Max Control	8.44	20.01	4.06	24.32
Accuracy of % Punishment	12.40	13.34	9.73	19.44
Accuracy of % Press	3.60	18.72	-.33	20.51
Accuracy of % No Press	2.48	19.04	9.00	16.67
Random Responses	40.63	12.19	38.75	21.18
Blame given	24.94	27.94	22.67	21.14
Dev Subj Success	11.04	19.10	13.75	26.54
Dev Obj Success	19.48	17.91	17.81	24.38
Stability	8.56	1.16	8.42	1.44
Locus of Control	8.56	1.17	8.50	1.28
Money on Task Interest	5.69	1.61	5.94	1.34
Nickel Size	16.06	3.42	15.81	2.74
Half-dollar size	27.85	5.07	25.75	4.90
Post Anxiety	5.77	3.89	9.75	3.81
Post Depression	10.90	7.03	18.04	6.90
Post Hostility	6.90	4.07	9.69	4.52

Table 5

Intercorrelations Among Major Variables

Variables	Expectancy and Attribution				
	Acc of Expect	Efficacy Expect	Outcome Expect	Stable	Locus of cont
Age	NS	NS	NS	NS	NS
GPA	NS	NS	NS	NS	NS
Experiment	-.24**	-.26***	-.28***	NS	NS
BDI	NS	NS	NS	NS	NS
Defensiveness	.26***	.17*	NS	NS	NS
Pre Esteem	NS	NS	NS	NS	NS
Post Esteem	NS	NS	NS	NS	NS
Pre Anxiety	NS	NS	NS	NS	NS
Pre Depression	NS	NS	NS	NS	NS
Pre Hostility	NS	NS	NS	NS	NS
Acc of Expect	1.00****	.62****	.39***	NS	NS
Efficacy Exp	.62****	1.00****	.41****	-.17*	.19*
Outcome Exp	.39***	.41****	1.00****	NS	NS
Acc of Control	.72****	.49****	.30***	NS	-.22*
Likeli of Succ	.53****	.64****	.33***	NS	NS
Acc of Max Control	NS	NS	.66****	NS	NS
Self-correction	.20*	NS	NS	NS	NS
Acc % Reinf/punish	NS	NS	NS	-.21*	NS
Acc % Press	NS	NS	NS	NS	-.19*
Acc % No Press	NS	NS	NS	-.27***	NS

Variable	Acc of Expect	Efficacy Expect	Outcome Expect	Stable	Locus of Con
Random Response	NS	.23**	.17*	NS	NS
Money earned/taken	NS	NS	NS	.30***	.19*
Credit given	NS	NS	NS	NS	NS
Blame given	NS	NS	.24*	-.27*	NS
Dev Subj Success	NS	NS	-.28***	NS	NS
Dev Obj Success	.27***	.19*	.29*	NS	NS
Stability	NS	-.17*	NS	1.00****	.24**
Locus of Control	NS	-.17*	NS	.24**	1.00****
Money Task Interest	NS	NS	NS	NS	NS
Nickel size	NS	NS	NS	NS	NS
Half-dollar size	NS	NS	NS	NS	NS
Post Anxiety	NS	NS	NS	NS	NS
Post Depression	NS	NS	NS	NS	NS
Post Hostility	NS	NS	NS	NS	NS
Change Esteem	NS	-.24*	NS	NS	NS
Change Anxiety	NS	NS	NS	NS	NS
Change Depression	NS	NS	NS	NS	NS
Change Hostility	NS	NS	NS	NS	NS

Note: * = $p < .05$; ** = $p < .01$; *** = $p < .005$;
**** = $p < .001$; NS = Nonsignificant

	Judgment of Control			
Variable	Acc of Control	Likelihood of Success	Acc of Max Control	Self Correction
Age	NS	NS	.32***	NS
GPA	NS	NS	NS	NS
Experiment	-.22**	NS	NS	NS
BDI	NS	NS	NS	NS
Defensiveness	NS	NS	NS	NS
Pre Esteem	-.18*	NS	NS	NS
Post Esteem	NS	NS	NS	NS
Pre Anxiety	-.26**	NS	NS	NS
Pre Depression	-.25**	NS	NS	NS
Pre Hostility	-.25**	NS	NS	NS
Acc of Expect	.72****	.53****	NS	.20*
Efficacy Exp	.49****	.64****	NS	NS
Outcome Exp	.30***	.33****	.66****	NS
Acc of Control	1.00****	.55****	NS	.22*
Likeli of Success	.55****	1.00****	.21*	NS
Acc of Max Control	NS	.21*	1.00****	NS
Self-correction	.22*	NS	NS	1.00****
Acc % Reinf/punish	.18*	NS	NS	NS
Acc % Press	NS	NS	NS	NS
Acc % No Press	NS	-.17*	NS	NS

Variable	Acc of Control	Likelihood of Success	Acc of Max Control	Self Correction
Random Response	.26***	-.25**	.37****	NS
Money earned/taken	NS	NS	NS	NS
Credit given	.33**	.29*	NS	NS
Blame given	NS	NS	NS	NS
Dev Subj Success	.21*	NS	-.58****	NS
Dev Obj Success	.38****	.27***	.26***	NS
Stability	NS	NS	NS	NS
Locus of Control	-.22*	NS	NS	NS
Money Task Interest	NS	NS	NS	NS
Nickel size	NS	NS	NS	-.17*
Half-dollar size	NS	NS	NS	-.29**
Post Anxiety	NS	NS	NS	NS
Post Depression	NS	NS	NS	NS
Post Hostility	NS	NS	NS	NS
Change Esteem	NS	-.17*	NS	NS
Change Anxiety	-.19*	.19*	NS	NS
Change Depression	-.19*	-.18*	NS	NS
Change Hostility	NS	-.19*	NS	NS

Note: * = $p < .05$; ** = $p < .01$; *** = $p < .005$;
**** = $p < .001$; NS = Nonsignificant

Perception of Environment

Variable	Acc % Light	Acc % Light Press	Acc % No press	Random Responses
Age	NS	NS	NS	NS
GPA	NS	NS	NS	NS
Experiment	.17*	NS	NS	NS
BDI	NS	NS	NS	NS
Defensiveness	-.18*	NS	NS	NS
Pre Esteem	NS	NS	NS	NS
Post Esteem	NS	NS	NS	NS
Pre Anxiety	NS	NS	NS	NS
Pre Depression	NS	NS	NS	-.17*
Pre Hostility	NS	NS	NS	NS
Acc of Expect	NS	NS	NS	NS
Efficacy Exp	NS	NS	NS	.23**
Outcome Exp	NS	NS	NS	.17*
Acc of Control	.18*	NS	NS	.26***
Likeli of Success	NS	NS	-.17*	-.25**
Acc of Max Control	NS	NS	NS	.37****
Self-correction	NS	NS	NS	NS
Acc % Reinf/punish	1.00****	.46****	.26***	NS
Acc % Press	.46****	1.00****	NS	NS
Acc % No Press	.26***	NS	1.00****	NS

Variable	Acc % Light	Acc % Light Press	Acc % No press	Random Responses
Random Responses	NS	NS	NS	1.00****
Money earned/taken	-.24**	-.22**	NS	NS
Credit given	NS	NS	.26*	.30*
Blame given	NS	NS	NS	NS
Dev Subj Success	NS	NS	NS	NS
Dev Obj Success	NS	NS	NS	-.17*
Stability	-.21*	NS	-.27***	NS
Locus of Control	NS	-.19*	NS	NS
Money Task Interest	NS	NS	NS	NS
Nickel size	NS	NS	NS	.28***
Half-dollar size	NS	NS	NS	.24**
Post Anxiety	-.19*	-.24**	NS	NS
Post Depression	NS	NS	NS	NS
Post Hostility	NS	NS	NS	NS
Change Esteem	-.21*	NS	NS	NS
Change Anxiety	-.24**	-.27***	NS	.19*
Change Depression	-.25**	-.24**	NS	.25**
Change Hostility	-.23**	-.16*	NS	.27***

Note: * = $p < .05$; ** = $p < .01$; *** = $p < .005$;
**** = $p < .001$; NS = Nonsignificant

Evaluation of Performance

Variable	Money Earned/Taken	Credit Given	Blame Given	Dev Subj Success	Dev Obj Success
Age	NS	NS	NS	NS	NS
GPA	NS	NS	NS	-.21*	NS
Experiment	NS	NS	NS	NS	-.27***
BDI	NS	-.28*	NS	NS	NS
Defensiveness	NS	NS	NS	NS	NS
Pre Esteem	NS	NS	NS	NS	.17*
Post Esteem	NS	NS	NS	NS	NS
Pre Anxiety	.18*	NS	NS	NS	NS
Pre Depression	NS	-.26*	NS	NS	NS
Pre Hostility	NS	NS	NS	NS	NS
Acc of Expect	NS	NS	NS	NS	.27***
Efficacy Exp	NS	NS	NS	NS	.19*
Outcome Exp	NS	NS	.24*	.28***	.29***
Acc of Control	NS	.33**	NS	.21*	.38****
Likeli of Success	NS	NS	NS	NS	.27***
Acc of Max Control	NS	NS	NS	-.58****	.26***
Self-correction	NS	NS	NS	NS	NS
Acc % Reinf/punish	-.24**	NS	NS	NS	NS
Acc % Press	-.22**	NS	NS	NS	NS
Acc % No Press	NS	.26*	NS	NS	NS

Variable	Money Earned/taken	Credit Given	Blame Given	Dev Subj Success	Dev Obj Success
Random Response	.24**	.30	NS	NS	NS
Money earned/taken	1.00****	NS	NS	NS	NS
Credit given	NS	1.00****	NS	NS	NS
Blame given	NS	NS	NS	NS	NS
Dev Subj Success	NS	NS	NS	1.00****	.65****
Dev Obj Success	NS	NS	NS	.65***	1.00****
Stability	.30****	NS	NS	NS	NS
Locus of Control	.19*	NS	NS	NS	NS
Money Task Interest	NS	NS	NS	NS	NS
Nickel size	-.27**	NS	NS	NS	NS
Half-dollar size	NS	NS	NS	NS	NS
Post Anxiety	NS	NS	NS	NS	NS
Post Depression	NS	NS	NS	NS	NS
Post Hostility	NS	NS	NS	NS	NS
Change Esteem	NS	-.21*	NS	NS	NS
Change Anxiety	NS	NS	NS	NS	NS
Change Depression	NS	NS	NS	NS	NS
Change Hostility	NS	NS	NS	NS	NS

Note: * = $p < .05$; ** = $p < .01$; *** = $p < .005$;
**** = $p < .001$; NS = Nonsignificant

Reinforcement Value and Self-esteem

Variable	Nickel Size	Half-Dol Size	Money Task	Post SE	Change SE
Age	-.23**	.20*	.21**	NS	NS
GPA	NS	NS	NS	-.18*	NS
Experiment	NS	NS	NS	NS	NS
BDI	NS	NS	.19*	.58****	NS
Defensiveness	NS	NS	NS	.28***	NS
Pre Esteem	NS	NS	NS	.90****	NS
Post Esteem	NS	NS	NS	1.00****	.32****
Pre Anxiety	NS	NS	NS	-.51****	NS
Pre Depression	NS	NS	NS	-.51****	NS
Pre Hostility	NS	NS	.18*	-.35****	NS
Acc of Expect	NS	NS	NS	NS	NS
Efficacy Exp	NS	NS	NS	NS	-.24**
Outcome Exp	NS	NS	NS	NS	NS
Acc of Control	NS	NS	NS	NS	NS
Likeli of Success	NS	NS	NS	NS	NS
Acc of Max Control	NS	NS	NS	NS	NS
Self-correction	-.17*	-.29***	NS	NS	NS
Acc % Reinf/punisH	NS	NS	NS	NS	NS
Acc % Press	NS	NS	NS	NS	NS
Acc % No Press	NS	NS	NS	NS	NS

Variable	Nickel Size	Half-Dol Size	Money Task	Post SE	Change SE
Random Response	.28***	NS	NS	NS	NS
Money earned/taken	-.27***	NS	NS	NS	NS
Credit given	NS	NS	NS	NS	NS
Blame given	NS	NS	NS	NS	-.39***
Dev Subj Success	NS	NS	NS	NS	NS
Dev Obj Success	NS	NS	NS	NS	NS
Stability	NS	NS	NS	NS	NS
Locus of Control	NS	NS	NS	NS	NS
Money Task Interest	NS	NS	1.00****	NS	NS
Nickel size	1.00****	.63****	NS	NS	NS
Half-dollar size	.63****	1.00****	NS	NS	NS
Post Anxiety	NS	NS	NS	-.47****	NS
Post Depression	NS	NS	NS	-.44****	NS
Post Hostility	NS	NS	NS	-.29***	NS
Change Esteem	NS	NS	NS	.32****	1.00****
Change Anxiety	.20*	NS	-.17*	NS	NS
Change Depression	NS	NS	-.24**	.19*	NS
Change Hostility	.25***	NS	-.17*	NS	NS

Note: * = $p < .05$; ** = $p < .01$; *** = $p < .005$; **** = $p < .001$; NS = Nonsignificant

	Mood					
Variable	Pre Anx	Pre Dep	Pre Host	Post Anx	Post Dep	Post Host
Age	NS	NS	NS	NS	.19*	NS
GPA	NS	NS	NS	NS	.20*	NS
Experiment	NS	NS	NS	NS	NS	NS
BDI	.59****	.66****	.58****	.60****	.61***	.51****
Defensiveness	-.24***	NS	-.17*	NS	-.18*	-.19*
Pre Esteem	-.58****	.55****	-.38****	-.47****	-.42***	-.28***
Post Esteem	-.51****	-.51****	-.35****	-.47****	-.44***	-.29***
Pre Anxiety	1.00****	.86****	.76****	.61****	.60***	.52****
Pre Depression	.86****	1.00****	.84****	.64****	.71****	.58****
Pre Hostility	.76****	.84****	1.00****	.59****	.64****	.63****
Acc of Expect	NS	NS	NS	NS	NS	NS
Efficacy Expect	NS	NS	NS	NS	NS	NS
Outcome Expect	NS	NS	NS	NS	NS	NS
Acc of Control	-.26***	-.25**	-.25**	NS	NS	NS
Likeli of Success	NS	NS	NS	NS	NS	NS
Acc of Max Control	NS	NS	NS	NS	NS	NS
Self-correlation	NS	NS	NS	NS	NS	NS
Acc % Reinf/punish	NS	NS	NS	NS	NS	NS
Acc % Press	NS	NS	NS	NS	NS	NS
Acc % No Press	NS	NS	NS	NS	NS	NS

Variable	Pre Anx	Pre Dep	Pre Host	Post Anx	Post Dep	Post Host
Random Responses	NS	-.17*	NS	NS	NS	NS
Money earned/taken	.18*	NS	NS	NS	NS	NS
Credit given	NS	-.26*	NS	NS	NS	NS
Blame given	NS	NS	NS	NS	NS	NS
Dev Subj Success	NS	NS	NS	NS	NS	NS
Dev Obj Success	NS	NS	NS	NS	NS	NS
Stability	NS	NS	NS	NS	NS	NS
Locus of Control	NS	NS	NS	NS	NS	NS
Money on Task Interest		NS	.18*	NS	NS	NS
Nickel Size	NS	NS	NS	NS	NS	NS
Half-Dollar Size	NS	NS	NS	NS	NS	NS
Post Anxiety	.61****	.64****	.59****	1.00****	.93****	.82****
Post Depression	.60****	.71****	.64****	.93***	1.00****	.83****
Post Hostility	.52****	.58****	.63****	.82****	.83***	1.00****
Change Esteem	NS	NS	NS	NS	NS	NS
Change Anxiety	-.50****	-.56***	-.44****	.17*	.14*	NS
Change Depression	-.58***	-.38***	-.33****	.21**	.17*	NS
Change Hostility	-.33***	-.33***	-.44****	NS	NS	.33****

Note: * = $p < .05$; ** = $p < .01$; *** = $p < .005$;
**** = $p < .001$; NS = Nonsignificant

Mood Changes, BDI, and Defenses

Variable	Change Anx	Change Dep	Change Host	BDI	Defenses
Age	NS	NS	NS	NS	NS
GPA	NS	NS	NS	NS	-.22**
Experiment	-.19*	-.21**	-.20*	NS	NS
BDI	-.21**	NS	NS	1.00****	-.18*
Defensiveness	NS	NS	NS	-.18*	1.00****
Pre Esteem	.25***	.20*	NS	-.60****	.31***
Post Esteem	.19*	NS	NS	-.58****	.28***
Pre Anxiety	-.50****	-.58****	-.33****	.59****	-.24**
Pre Depression	-.56****	-.38****	-.33****	.66****	NS
Pre Hostility	-.44****	-.33****	-.44****	.58****	-.17*
Acc of Expect	NS	NS	NS	NS	.26***
Efficacy Expect	NS	NS	NS	NS	.17*
Outcome Expect	NS	NS	NS	NS	NS
Acc of Control	-.19*	-.19*	NS	NS	NS
Likeli of Success	-.18*	.19*	NS	NS	NS
Acc of Max Control	NS	NS	.19*	NS	NS
Self-correlation	NS	NS	NS	NS	NS
Acc % Reinf/punish	-.25**	-.24**	-.23**	NS	-.18*
Acc % Press	-.24**	-.27***	-.16*	NS	NS
Acc % No Press	NS	NS	NS	NS	NS

Variable	Change Anx	Change Dep	Change Host	BDI	Defense
Random Responses	.25**	.19*	.27***	NS	NS
Money earned/taken	NS	NS	NS	NS	NS
Credit given	NS	NS	NS	-.28*	NS
Blame given	NS	NS	NS	NS	NS
Dev Subj Success	NS	NS	NS	NS	NS
Dev Obj Success	NS	NS	NS	NS	NS
Stability	NS	NS	NS	NS	NS
Locus of Control	NS	NS	NS	NS	NS
Money on Task	-.24**	-.17*	-.17*	.19*	NS
Nickel Size	NS	.20*	.25**	NS	NS
Half-Dollar Size	NS	NS	NS	NS	NS
Post Anxiety	.17*	.21**	NS	NS	NS
Post Depression	.14*	.17*	NS	-.18*	-.18*
Post Hostility	NS	NS	.33****	-.19*	-.19*
Change Esteem	NS	NS	NS	NS	NS
Change Anxiety	.79****	1.00****	.52****	NS	NS
Change Depression	1.00****	.79****	.65****	NS	NS
Change Hostility	.65****	.52****	1.00****	NS	NS

Note: * = $p < .05$; ** = $p < .01$; *** = $p < .005$; **** = $p < .001$; NS = Nonsignificant

Table 6

Summaries of Mood X Defensiveness X Sex X Problem ANOVAs

Variable df=(1,80)	Mean Square Error	Main Effects Mood	Defense	Sex	Probl
Accuracy of Expectancy of Control	250.18	NS	3.92*	6.11**	NS
Efficacy Expectancy	220.28	NS	NS	9.36**	NS
Outcome Expectancy	201.67	NS	NS	NS	NS
Overall accuracy of Judgment of Control	201.40	NS	NS	NS	NS
Accuracy of Control on 1st Task	938.13	NS	NS	NS	NS
Accuracy of Control on 2nd Task	926.00	5.22*	NS	NS	NS
Accuracy of Control on 3rd Task	988.49	NS	NS	NS	NS
Accuracy of Control on 4th Task	948.50	8.68***	NS	NS	NS
Self-correction	853,81	NS	NS	4.92*	NS
Likelihood of Success	248.01	NS	NS	NS	NS
Accuracy of maximal Control	274.36	NS	NS	NS	NS
Accuracy of % Reinf/ punishment	128.19	NS	6.15*	NS	22.56****
Accuracy of % Reinf/ punish during Press	168.91	NS	NS	NS	18.80****
Accuracy of % During No Press	180.80	NS	NS	NS	NS
Random Responses	157.60	NS	NS	NS	NS
Credit/blame given	389.18	NS	NS	NS	76.33****

Variable df=(1,80)	Mean Square Error	Main Effects Mood	Defen	Sex	Probl
Deviation Subj Success	421.01	NS	NS	NS	NS
Deviation Obj Success	326.33	NS	NS	NS	NS
Stability	1.94	NS	NS	5.21*	15.37****
Locus of Control	1.78	NS	NS	NS	NS
Money on Task Interest	1.81	NS	NS	NS	NS
Nickel Size	7.92	NS	NS	11.20****	NS
Half-dollar Size	22.98	NS	NS	6.61**	NS
Post Anxiety	185.98	30.18****	NS	NS	NS
Post Depression	613.85	24.60****	NS	NS	NS
Post Hostility	201.98	14.82****	NS	NS	NS
Change Anxiety	19.28	4.71*	NS	4.33*	NS
Change Depression	39.14	5.96*	NS	NS	NS
Change Hostility	16.82	NS	NS	NS	NS
Post Self-esteem	926.75	28.23****	NS	NS	NS
Change Self-esteem	271.01	NS	NS	NS	NS

Note: * = $p < .05$; ** = $p < .01$; ** = $p < .005$;
**** = $p < .001$; NS = Nonsignificant

Variable df=(1,80)	4-way AXBXCXD	3-way interactions AXBXC	AXBXD	AXCXD	BXCXD
Accuracy of Expectancy of Control	NS	NS	NS	NS	NS
Efficacy Expectancy	NS	NS	4.51*	NS	NS
Outcome Expectancy	NS	NS	NS	NS	NS
Overall accuracy of Judgment of Control	NS	NS	NS	NS	NS
Accuracy of Control on 1st Task	NS	NS	NS	NS	NS
Accuracy of Control on 2nd Task	NS	NS	NS	NS	NS
Accuracy of Control on 3rd Task	NS	NS	NS	NS	NS
Accuracy of Control on 4th Task	NS	NS	NS	NS	NS
Self-correction	NS	NS	NS	NS	NS
Likelihood of Success	NS	NS	NS	NS	NS
Accuracy of maximal Control	NS	NS	NS	NS	NS
Accuracy of % Reinf/ punishment	NS	NS	NS	NS	NS
Accuracy of % Reinf/ punish during press	NS	6.68**	NS	NS	NS
Accuracy of % During No Press	NS	NS	NS	NS	NS
Random Responses	NS	NS	NS	NS	NS
Credit/blame given	NS	NS	NS	6.40**	NS

Variable df=(1,80)	4-way AXBXCXD	3-way interactions AXBXC	AXBXD	AXCXD	BXCXD
Deviation Subj Success	NS	NS	NS	NS	5.52*
Deviation Obj Success	NS	NS	NS	NS	NS
Stability	5.24*	10.02***	NS	NS	NS
Locus of Control	NS	NS	NS	NS	NS
Money on Task Interest	6.37**	NS	NS	NS	NS
Nickel Size	NS	NS	NS	NS	NS
Half-dollar Size	NS	NS	NS	NS	NS
Post Anxiety	NS	NS	NS	NS	NS
Post Depression	NS	NS	NS	NS	NS
Post Hostility	NS	NS	NS	NS	NS
Change Anxiety	NS	NS	NS	NS	NS
Change Depression	NS	NS	NS	NS	NS
Change Hostility	NS	NS	NS	NS	NS
Post Self-esteem	NS	NS	NS	NS	NS
Change Self-esteem	NS	NS	NS	NS	NS

Note: A = Mood; B = Defenses; C = Sex; D = Problem
* = $p < .05$; ** = $p < .01$; *** = $p < .005$;
**** = $p < .001$; NS = Nonsignificant

Variable df=(1,80)	2-way interactions AXB	AXC	AXD	BXC	BXD	CXD
Accuracy of Expectancy of Control	NS	NS	NS	NS	NS	NS
Efficacy Expectancy	NS	NS	NS	NS	NS	NS
Outcome Expectancy	NS	NS	NS	NS	NS	NS
Overall accuracy of Judgment of Control	NS	NS	NS	NS	6.08**	NS
Accuracy of Control on 1st Task	NS	NS	NS	3.87*	NS	NS
Accuracy of Control on 2nd Task	NS	NS	NS	NS	NS	NS
Accuracy of Control on 3rd Task	NS	NS	NS	5.00*	NS	NS
Accuracy of Control on 4th Task	NS	NS	NS	NS	NS	NS
Self-correction	NS	NS	NS	NS	NS	NS
Likelihood of Success	NS	NS	NS	NS	NS	NS
Accuracy of maximal Control	NS	NS	NS	NS	NS	NS
Accuracy of % Reinf/ punishment	NS	5.22*	NS	NS	NS	NS
Accuracy of % Reinf/ punish During Press	NS	NS	NS	NS	NS	NS
Accuracy of % During No Press	NS	NS	NS	NS	6.34**	NS
Random Responses	NS	NS	NS	NS	NS	4.51*
Credit/blame given	NS	NS	NS	NS	NS	NS

Variable df=(1,80)	2-way interactions AXB	AXC	AXD	BXC	BXD	CXD
Deviation Subj Success	NS	NS	NS	NS	NS	NS
Deviation Obj Success	NS	NS	NS	NS	NS	NS
Stability	NS	6.26*	NS	5.57*	5.66*	4.76*
Locus of Control	NS	NS	NS	NS	NS	NS
Money on Task Interest	NS	NS	NS	NS	NS	NS
Nickel Size	NS	NS	NS	NS	NS	NS
Half-dollar Size	NS	4.82*	NS	NS	NS	NS
Post Anxiety	NS	NS	NS	NS	NS	NS
Post Depression	NS	NS	NS	NS	NS	NS
Post Hostility	NS	NS	NS	NS	NS	NS
Change Anxiety	NS	NS	NS	NS	NS	NS
Change Depression	NS	NS	NS	NS	NS	NS
Change Hostility	NS	NS	4.19*	NS	NS	NS
Post Self-esteem	NS	NS	NS	NS	NS	NS
Change Self-esteem	NS	NS	NS	NS	NS	NS

Note: A = Mood; B = Defenses; C = Sex; D = Problem
* = $p < .05$; ** = $p < .01$; *** = $p < .005$;
**** = $p < .001$; NS = Nonsignificant

Table 7

Summaries of Mood X Problem X Control ANOVAs

Variable df=(1,92)	Mean Square Error	Main Effects Control	Mood	Problem
Accuracy of Expectancy	156.79	286.64****	NS	NS
Efficacy Expectancy	124.31	NS	NS	NS
Outcome Expectancy	150.99	NS	NS	NS
Accuracy of Judgment	231.46	211.47****	NS	NS
Likelihood of Success	256.35	NS	NS	NS
Accuracy of Max Control	195.17	36.00****	NS	NS
Accuracy of % Reinf/punish	236.15	NS	NS	21.48****
Accuracy of % Press	366.57	NS	NS	16.46****
Accuracy of % No Press	303.51	4.63*	NS	NS
Random Responses	92.06	4.64*	NS	NS
Credit/blame given	173.21	NS	NS	76.66****
Dev Subj Success	311.81	NS	NS	NS
Dev Obj Success	260.55	20.74****	NS	NS
Stability	.49	NS	NS	10.30****
Locus of Control	.43	NS	NS	13.42****
Money on Task Interest	.25	NS	NS	NS
Nickel Size	1.92	NS	NS	NS
Half-dollar Size	4.11	NS	NS	NS
Post Anxiety	1.37	NS	28.28****	4.46*
Post Depression	2.74	NS	24.34****	4.07*
Post Hostility	3.40	NS	15.37****	NS

Variable df=(1,92)	Interactions AXB	AXC	BXC	AXBXC
Accuracy of Expectancy	NS	NS	NS	NS
Efficacy Expectancy	NS	NS	NS	NS
Outcome Expectancy	NS	NS	NS	NS
Accuracy of Judgment	NS	NS	NS	NS
Likelihood of Success	NS	NS	NS	NS
Accuracy of Max Control	NS	NS	NS	NS
Accuracy of Reinf/punish	NS	NS	NS	NS
Accuracy of Press	NS	NS	NS	NS
Accuracy of % No Press	NS	NS	NS	NS
Random Responses	NS	4.71*	NS	NS
Credit/blame	NS	NS	NS	NS
Dev Subj Success	NS	NS	NS	NS
Dev Obj Success	NS	NS	NS	NS
Stability	NS	NS	NS	NS
Locus of Control	NS	NS	NS	NS
Money on Task Interest	NS	NS	NS	NS
Nickel Size	NS	NS	NS	NS
Half-dollar Size	NS	NS	NS	NS
Post Anxiety	NS	NS	NS	NS
Post Depression	NS	NS	NS	NS
Post Hostility	NS	NS	4.56*	NS

Note: A = Mood; B = Problem; C = Control
* = $p < .05$; ** = $p < .01$; *** = $p < .005$
**** = $p < .001$; NS = Nonsignificant

Table 8

Summaries of Mood X Problem X Frequency ANOVAs

Variable df=(1,92)	Mean Square Error	Main Effects Frequency	Mood	Problem
Accuracy of Expectancy	193.46	41.23****	NS	NS
Efficacy Expectancy	98.44	4.45*	NS	NS
Outcome Expectancy	141.47	6.11**	NS	NS
Accuracy of Judgment	291.27	8.84**	NS	NS
Likelihood of Success	208.97	43.05****	NS	NS
Accuracy of Max Control	189.40	82.16****	NS	NS
Accuracy of % Reinf/punish	150.92	116.84****	NS	22.50****
Accuracy of % Press	351.25	54.55****	NS	7.58**
Accuracy of % No Press	418.62	76.28****	NS	NS
Random Responses	144.21	23.03****	NS	NS
Credit/blame given	230.30	9.58***	NS	77.02****
Dev Subj Success	361.16	5.83*	NS	NS
Dev Obj Success	268.42	108.48****	NS	NS
Stability	.48	NS	NS	10.30***
Locus of Control	.74	NS	NS	13.54****
Money on Task Interest	.24	4.76*	NS	NS
Nickel Size	1.55	NS	NS	NS
Half-dollar Size	3.66	NS	NS	NS
Post Anxiety	1.64	NS	28.18****	4.32*
Post Depression	4.08	4.15*	24.34****	4.10*
Post Hostility	1.42	NS	15.37****	NS

Variable df=(1,92)	Interactions AXB	AXC	BXC	AXBXC
Accuracy of Expectancy	NS	NS	NS	NS
Efficacy Expectancy	NS	NS	NS	NS
Outcome Expectancy	NS	NS	NS	NS
Accuracy of Judgment	NS	NS	NS	NS
Likelihood of Success	NS	7.93**	NS	NS
Accuracy of Max Control	NS	NS	4.66*	NS
Accuracy of % Reinf/punish	NS	NS	8.75**	NS
Accuracy of % Press	NS	NS	23.28****	NS
Accuracy of % No Press	NS	NS	24.88****	NS
Random Responses	NS	NS	NS	NS
Credit/blame given	NS	NS	10.90****	NS
Dev Subj Success	NS	NS	NS	NS
Dev Obj Success	NS	NS	NS	5.40*
Stability	NS	NS	NS	NS
Locus of Control	NS	NS	NS	NS
Money on Task Interest	NS	NS	NS	NS
Nickel Size	NS	NS	NS	NS
Half-dollar Size	NS	NS	NS	4.46*
Post Anxiety	NS	NS	NS	NS
Post Depression	NS	NS	NS	NS
Post Hostility	NS	NS	NS	NS

Note: A = Mood; B = Problem; C = Frequency
* = $p < .05$; ** = $p < .01$; *** = $p < .005$;
***** = $p < .001$; NS = Nonsignificant

Appendix Q

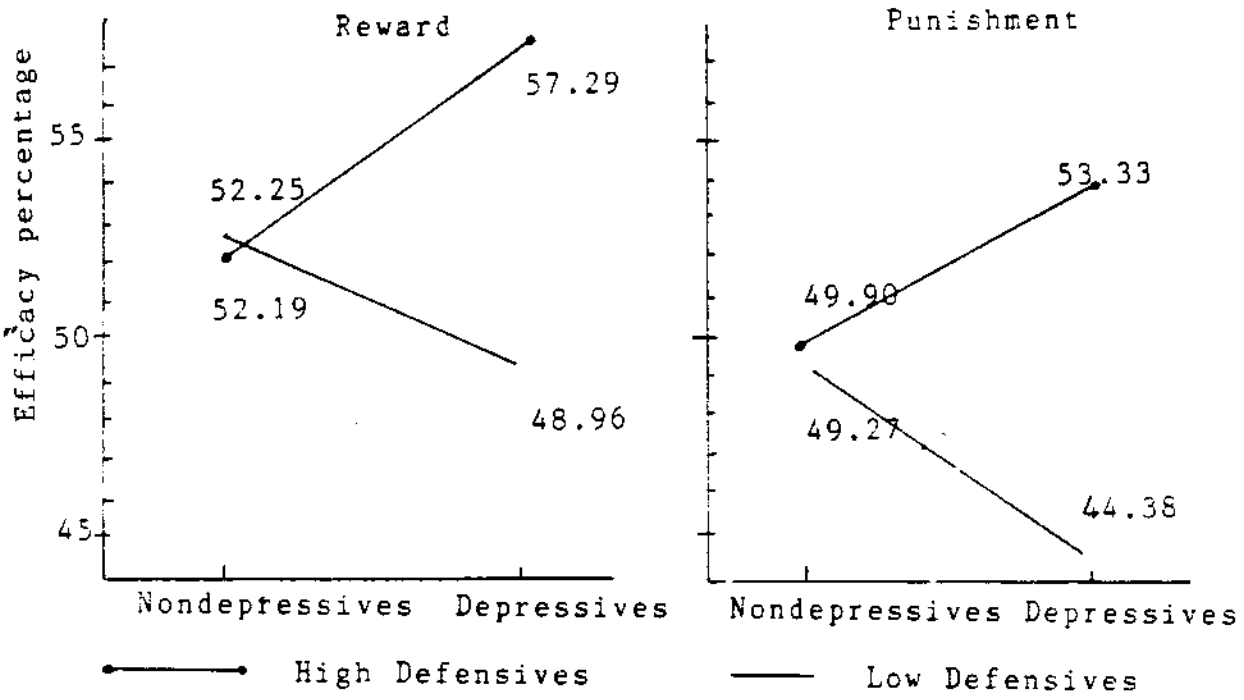

Figure 1. Mood X defensiveness X problem type 3-way interaction for efficacy expectancy.

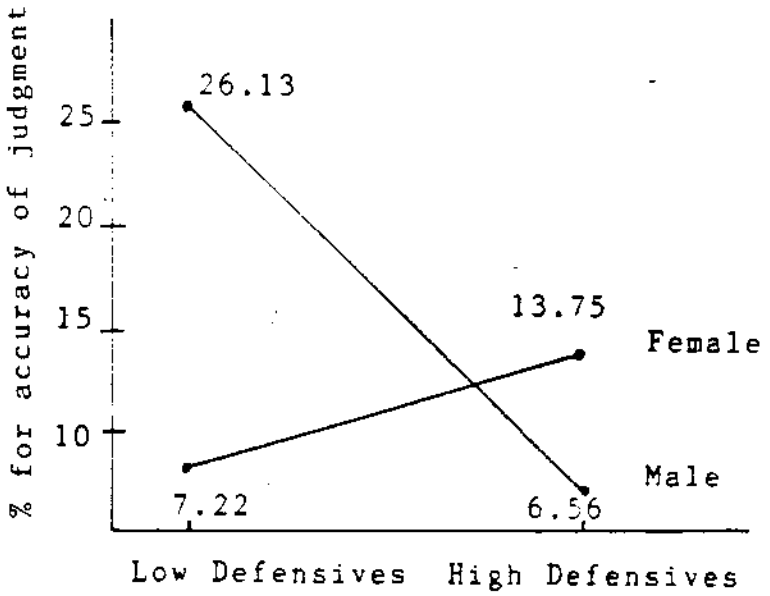

Figure 2. Defensiveness X sex 2-way interaction for accuracy of judgment of control without monetary reinforcement on accuracy.

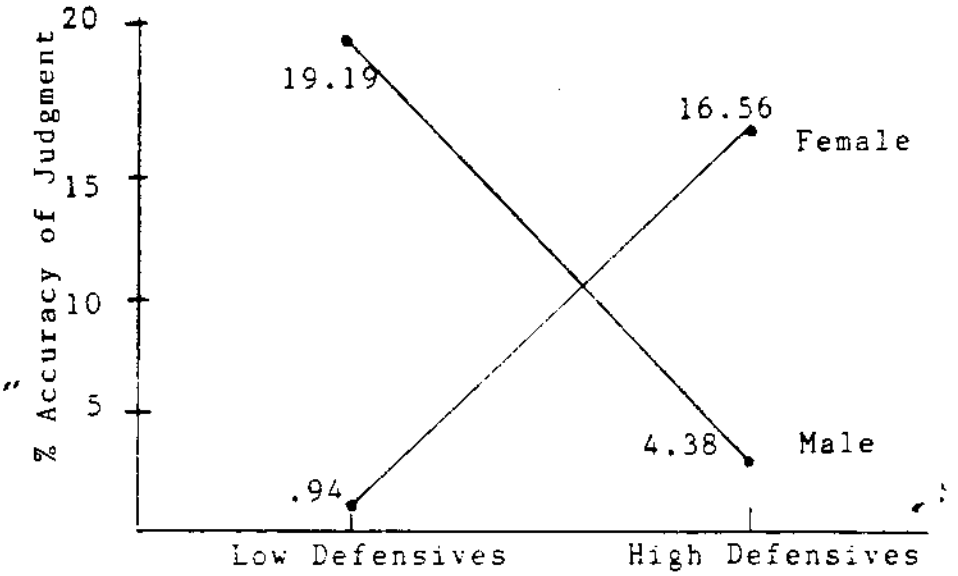

Figure 3. Defensiveness X sex 2-way interaction for accuracy of judgment of control with monetary reinforcement.

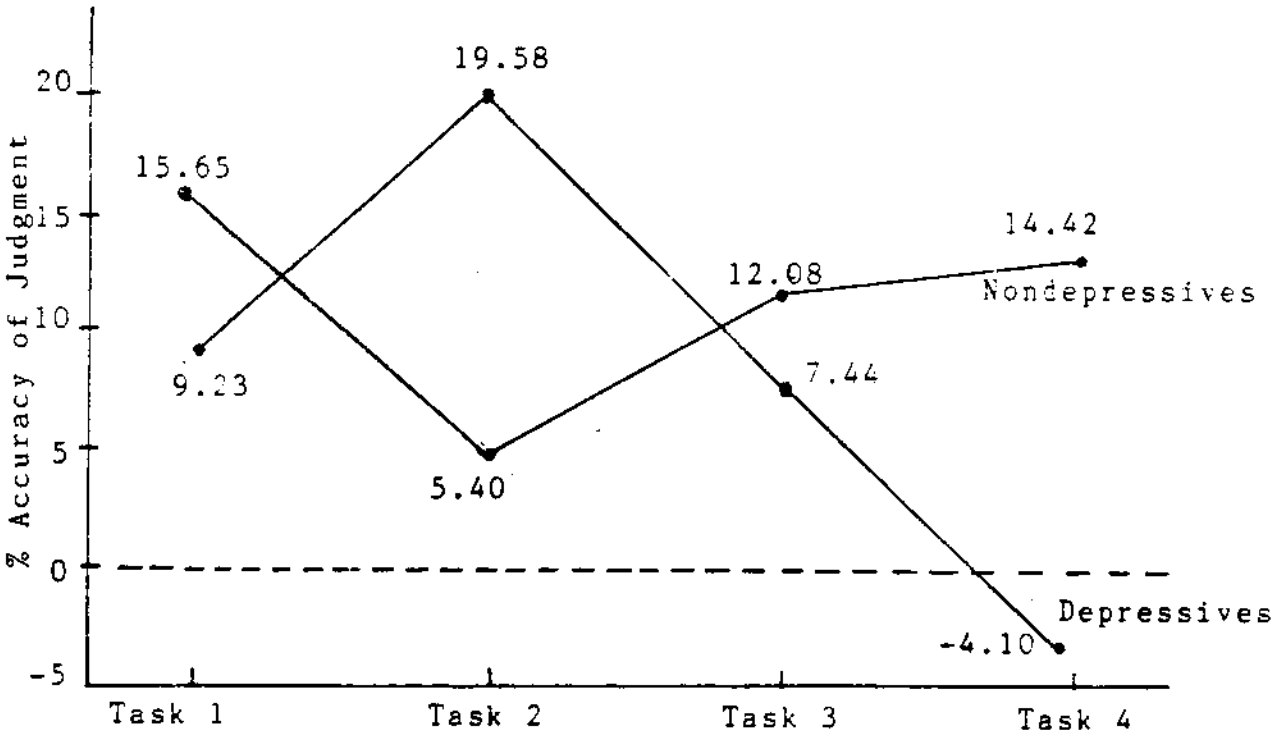

Figure 4. Accuracy of judgment of control across four tasks.

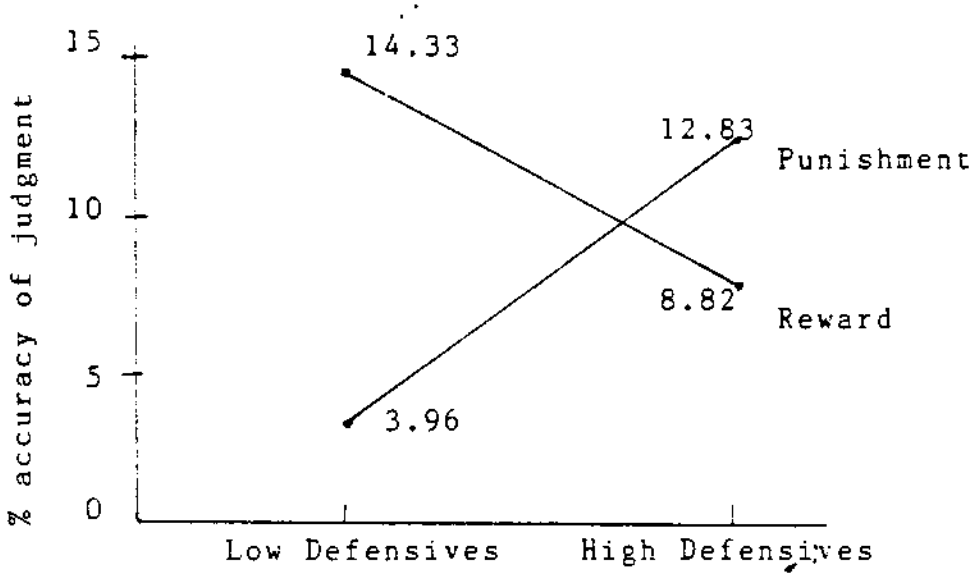

Figure 5. Defensiveness X problem type 2-way interaction for overall accuracy of judgment of control.

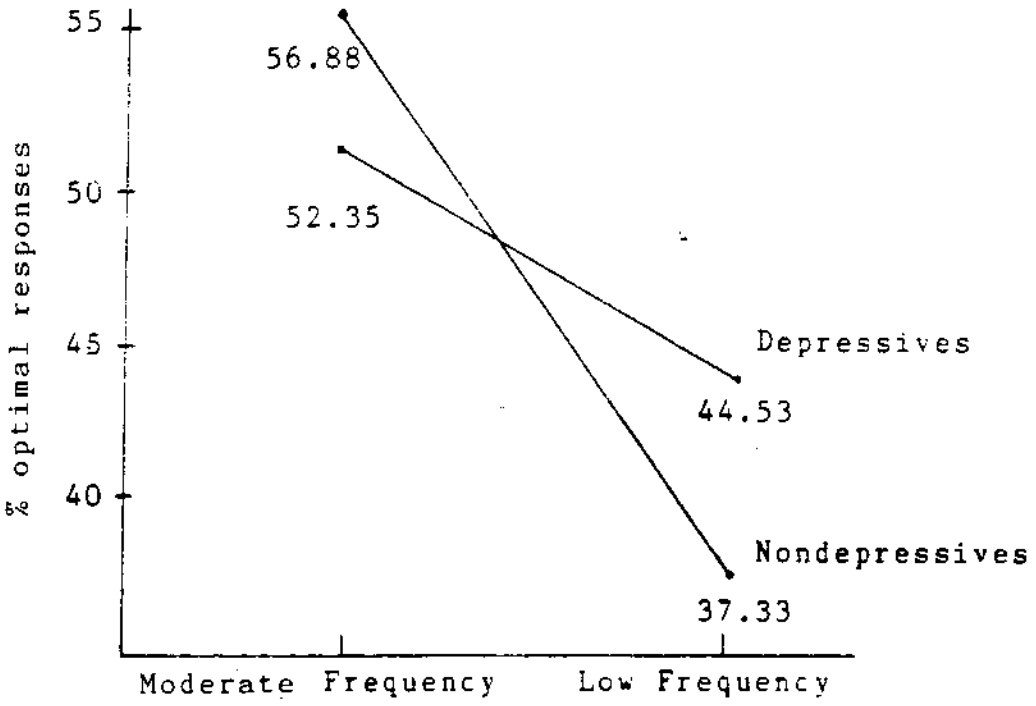

Figure 6. Mood X frequency 2-way interaction for likelihood of optimal responses.

Appendix Q - Continued

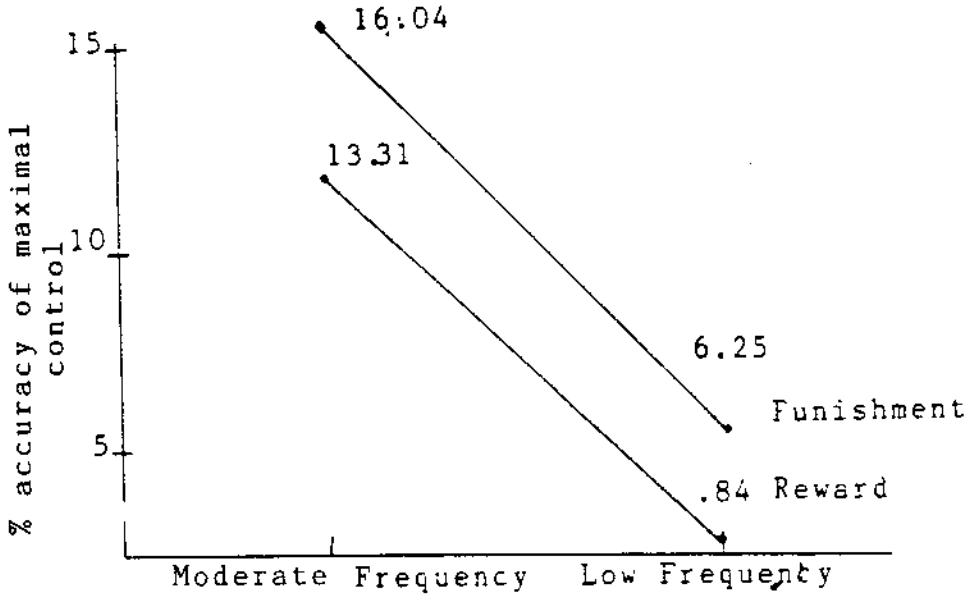

Figure 7. Problem type X frequency 2-way interaction for accuracy of estimation of maximal control.

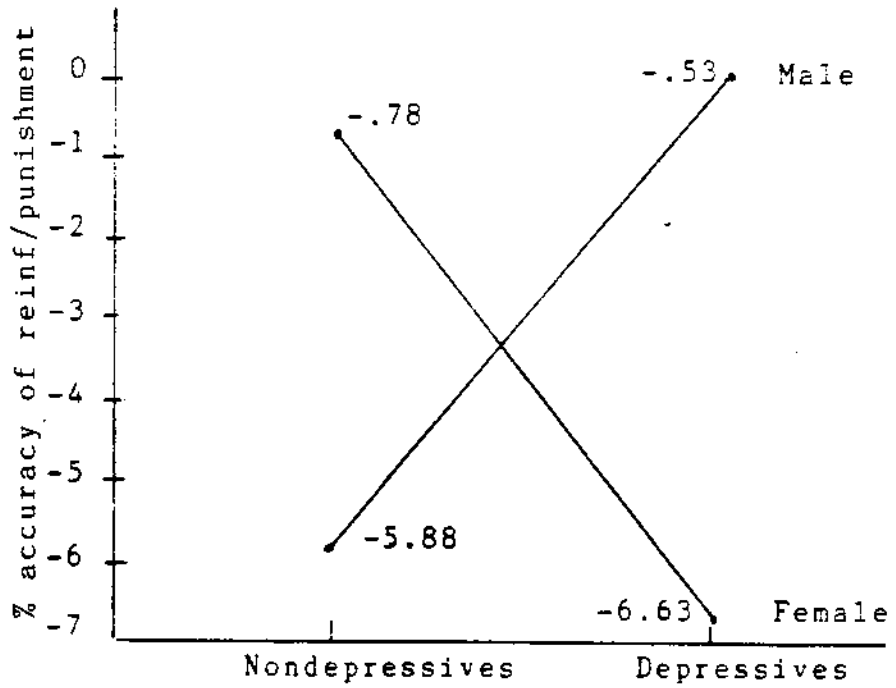

Figure 8. Mood X sex 2-way interaction for accuracy of estimation of reinforcement/punishment.

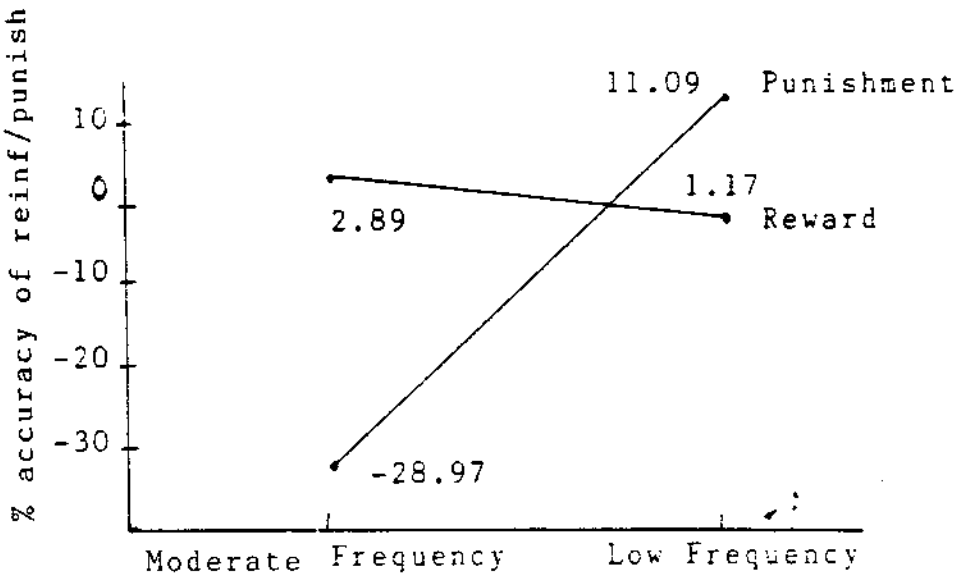

Figure 9. Problem type X frequency 2-way interaction for accuracy of estimation of reinforcement/punishment.

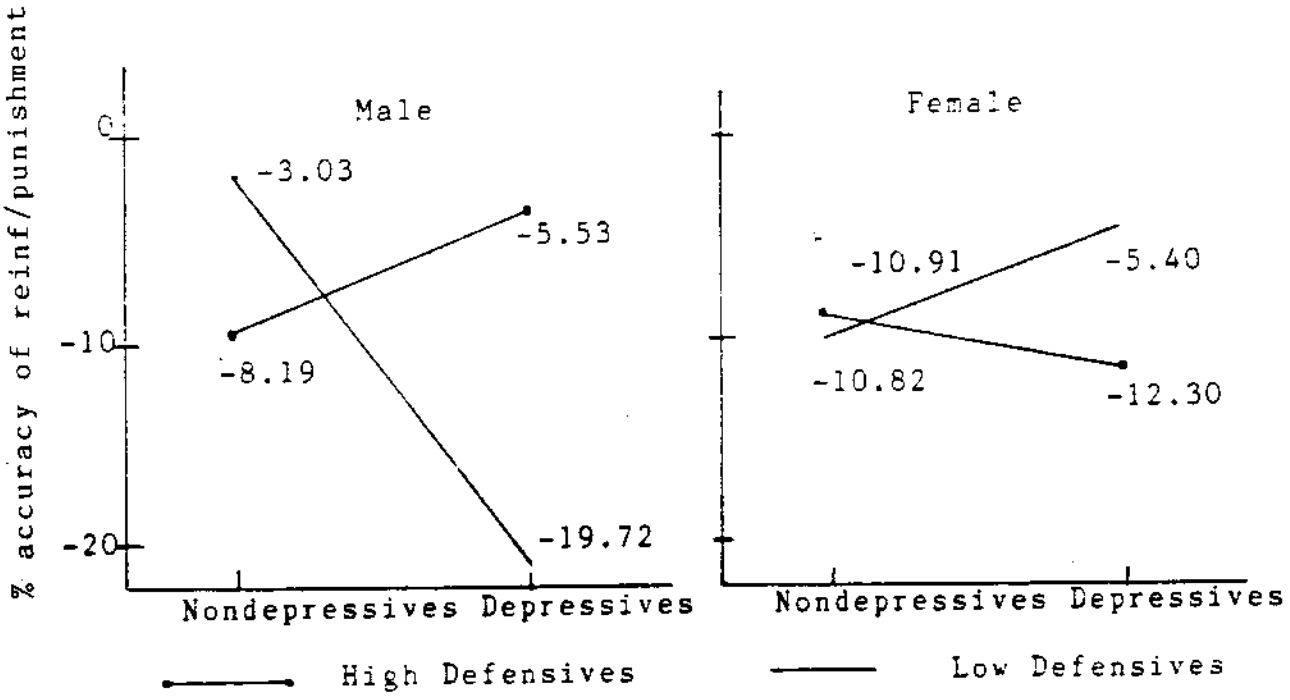

Figure 10. Mood X defensiveness X sex 3-way interaction for accuracy of reinforcement/punishment during button-pressing.

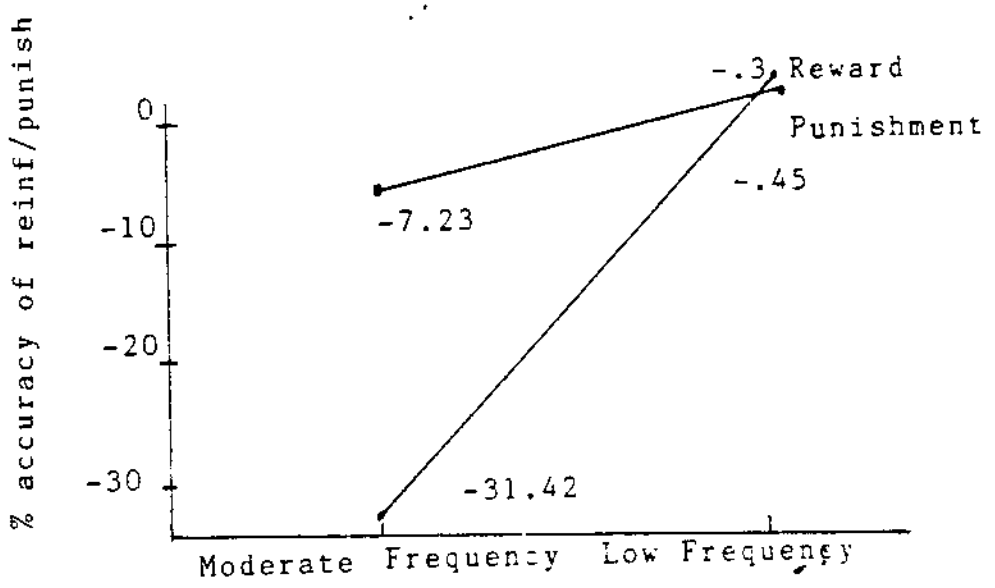

Figure 11. Problem type X frequency 2-way interaction for accuracy of reinforcement/punishment during button-press.

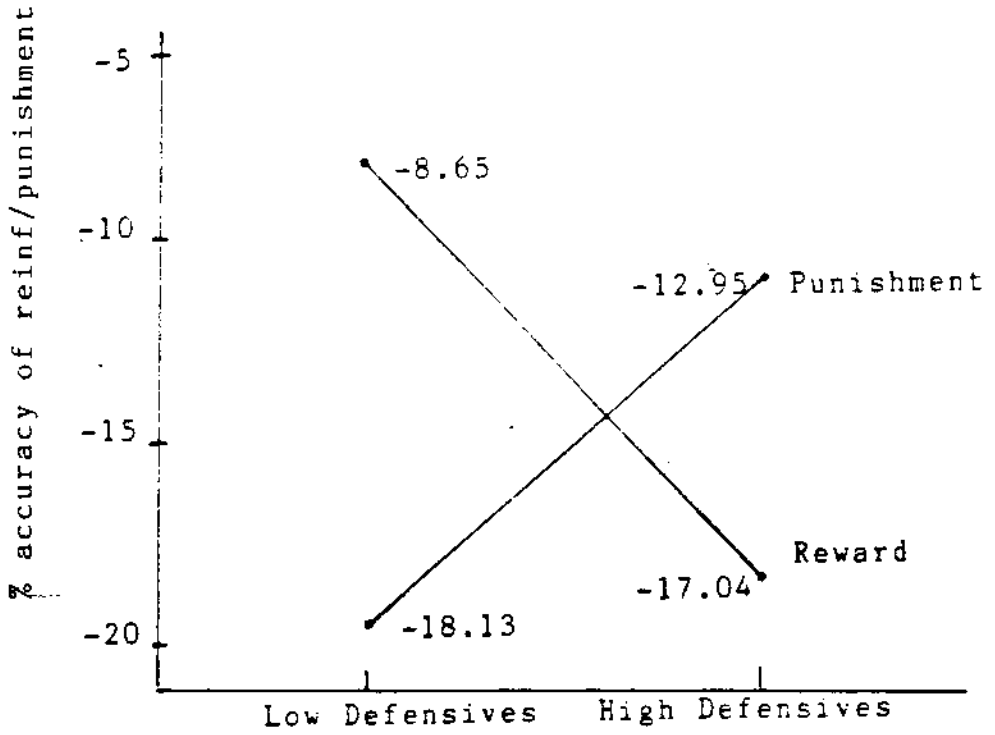

Figure 12. Defensiveness X problem type 2-way interaction for accuracy of reinforcement/punishment during no button-press.

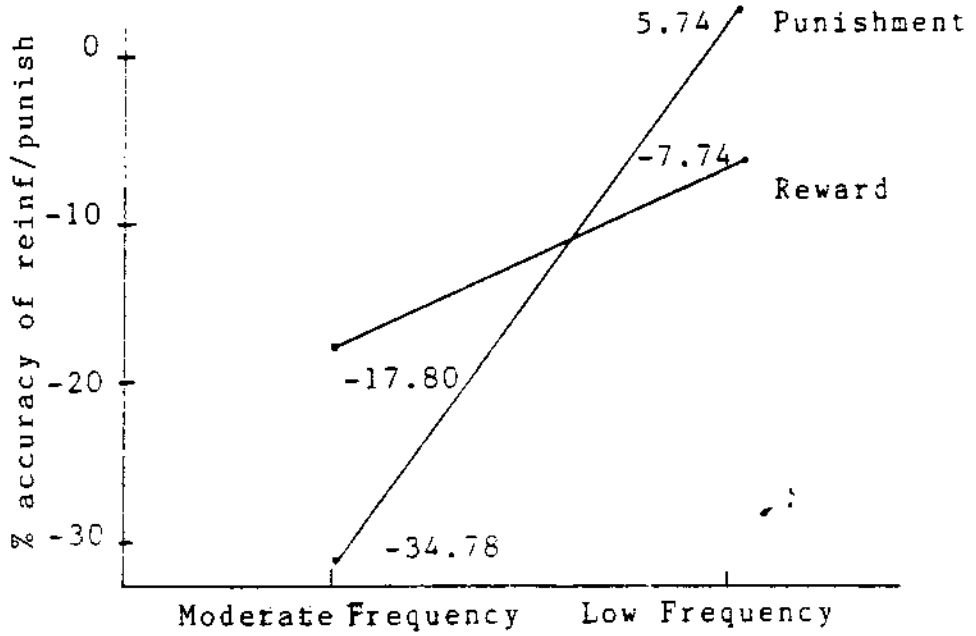

Figure 13. Problem type X frequency 2-way interaction for accuracy of reinforcement/punishment during no-button-press.

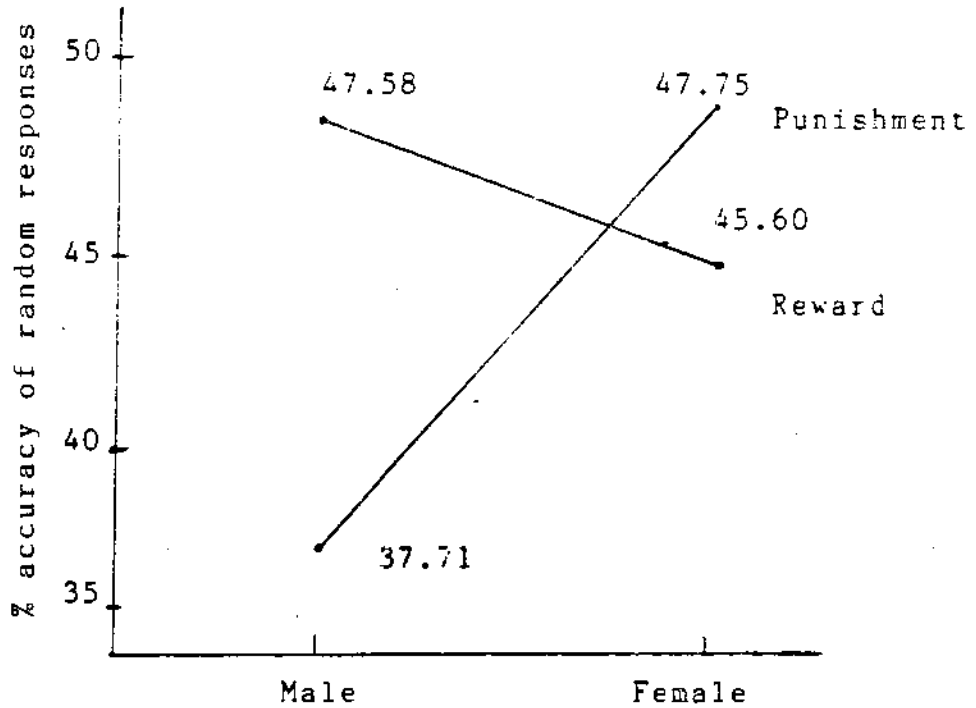

Figure 14. Sex X problem type 2-way interaction for estimation of random responses.

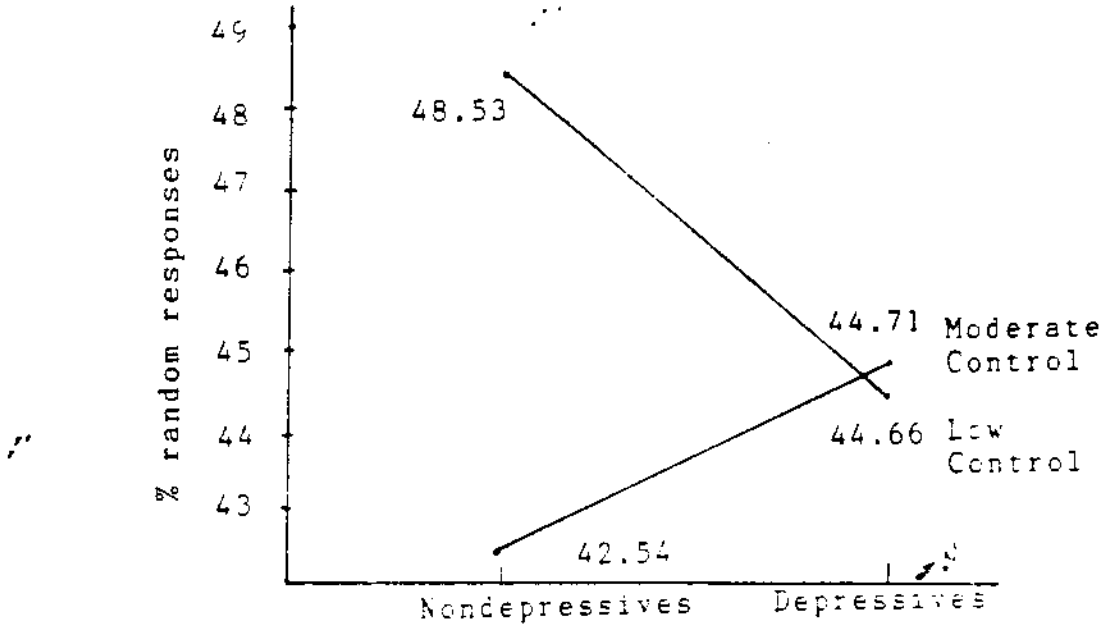

Figure 15. Mood X control 2-way interaction for estimation of random responses.

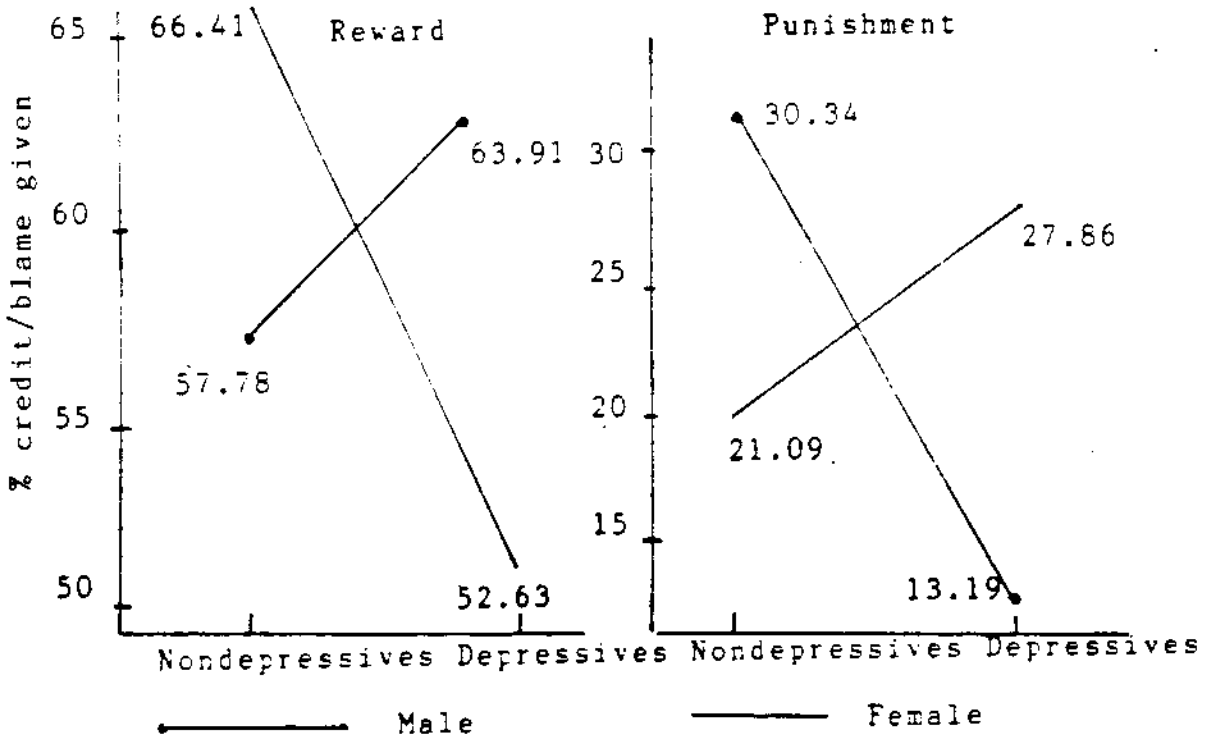

Figure 16. Mood X sex X problem type 3-way interaction for amount of credit/blame given.

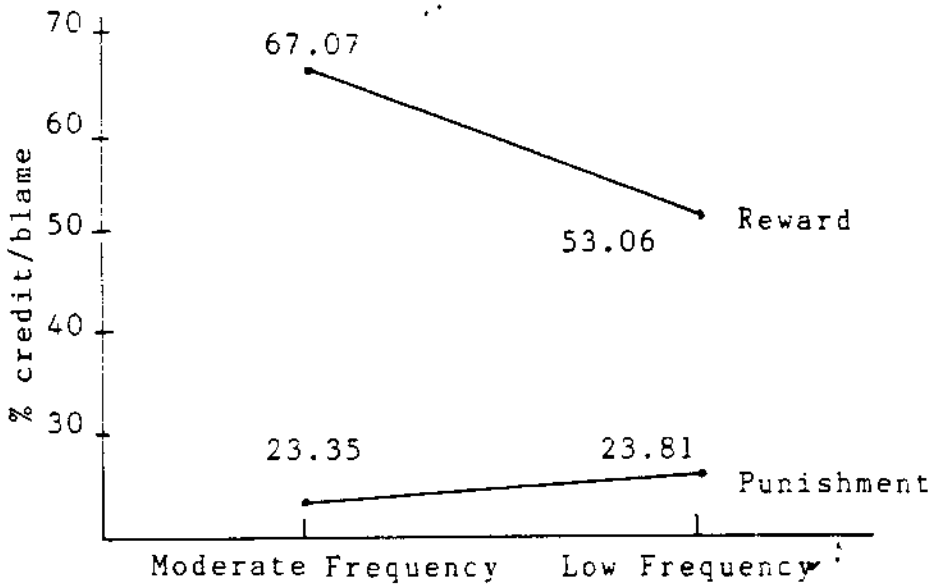

Figure 17. Problem type X frequency 2-way interaction for amount of credit/blame given.

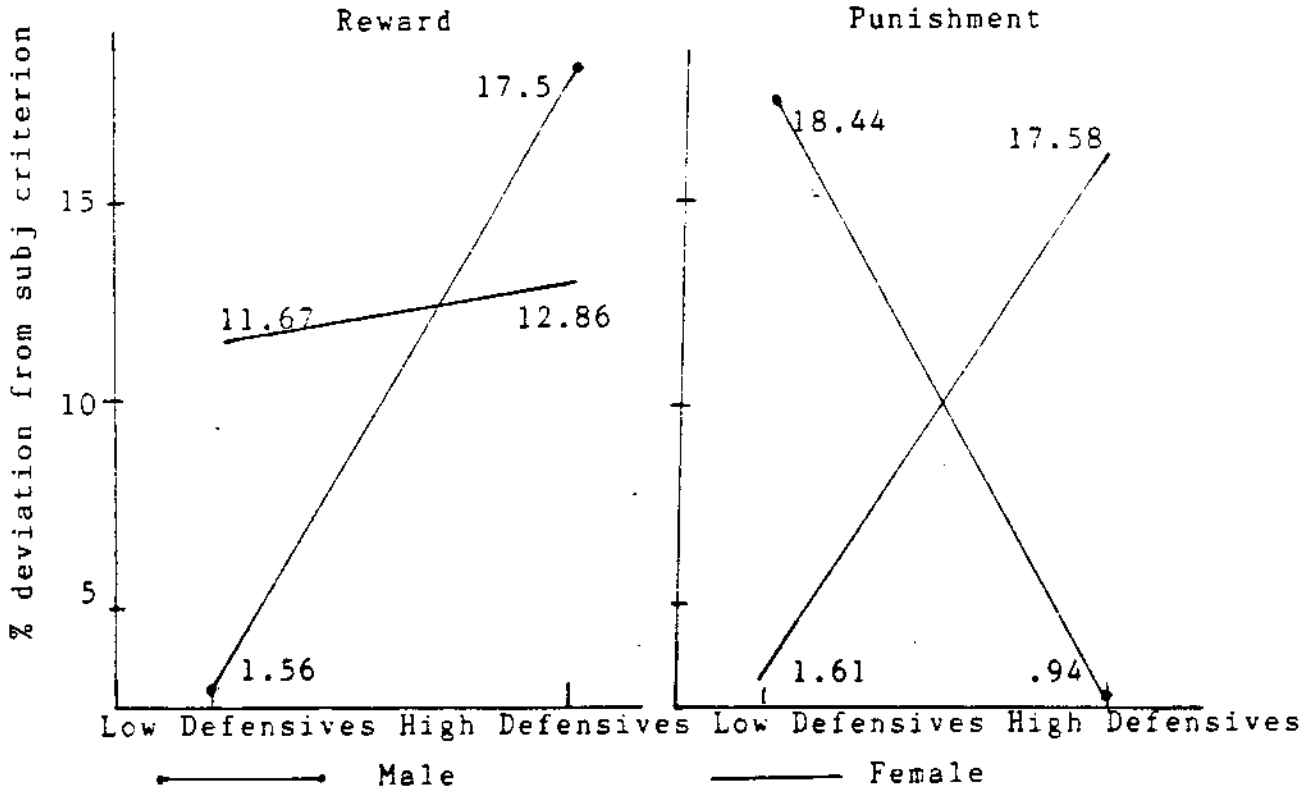

Figure 18. Defensiveness X sex X problem type 3-way interaction for deviation from subjective criterion for success.

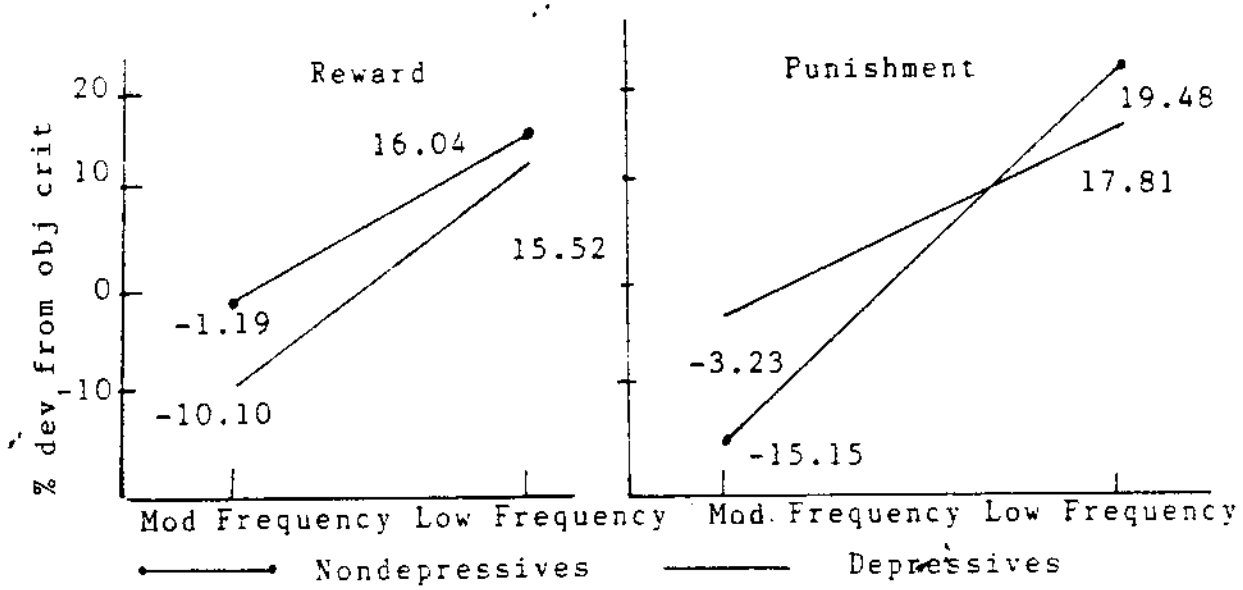

Figure 19. Mood X problem type X frequency 3-way interaction for deviation from objective criterion for success.

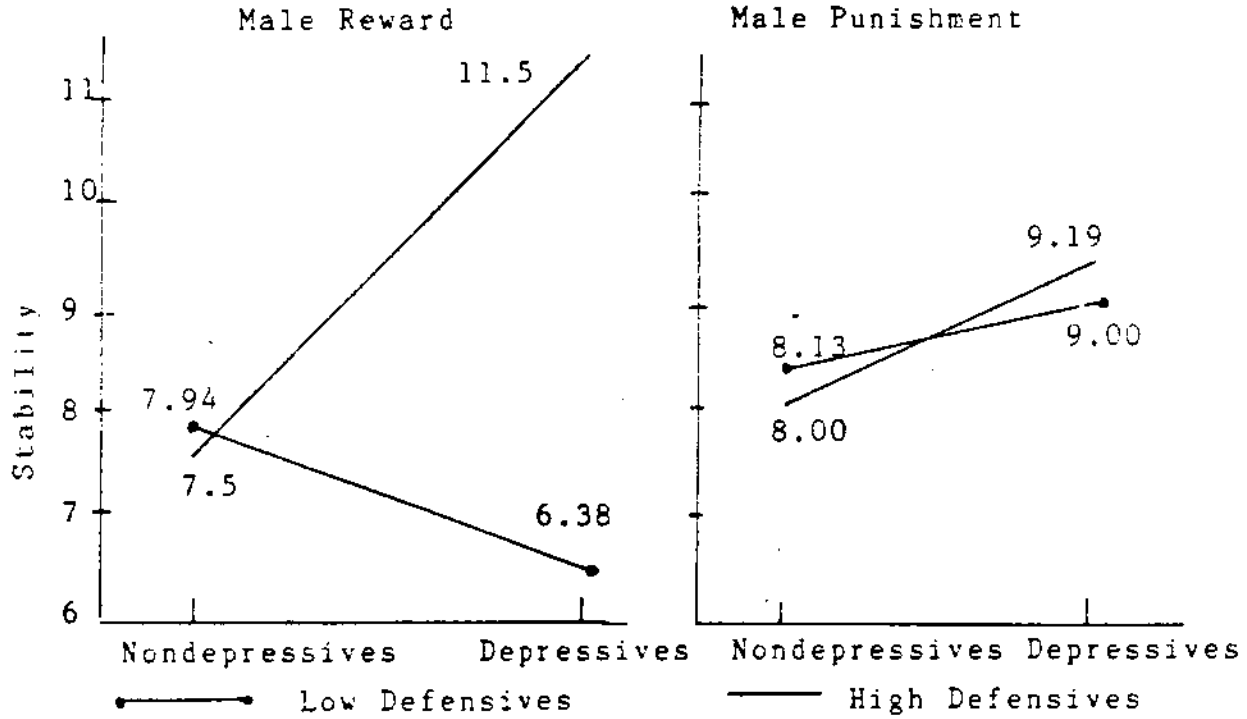

Figure 20. Mood X defensiveness X sex X problem type 4-way interaction for stability of attribution for males.

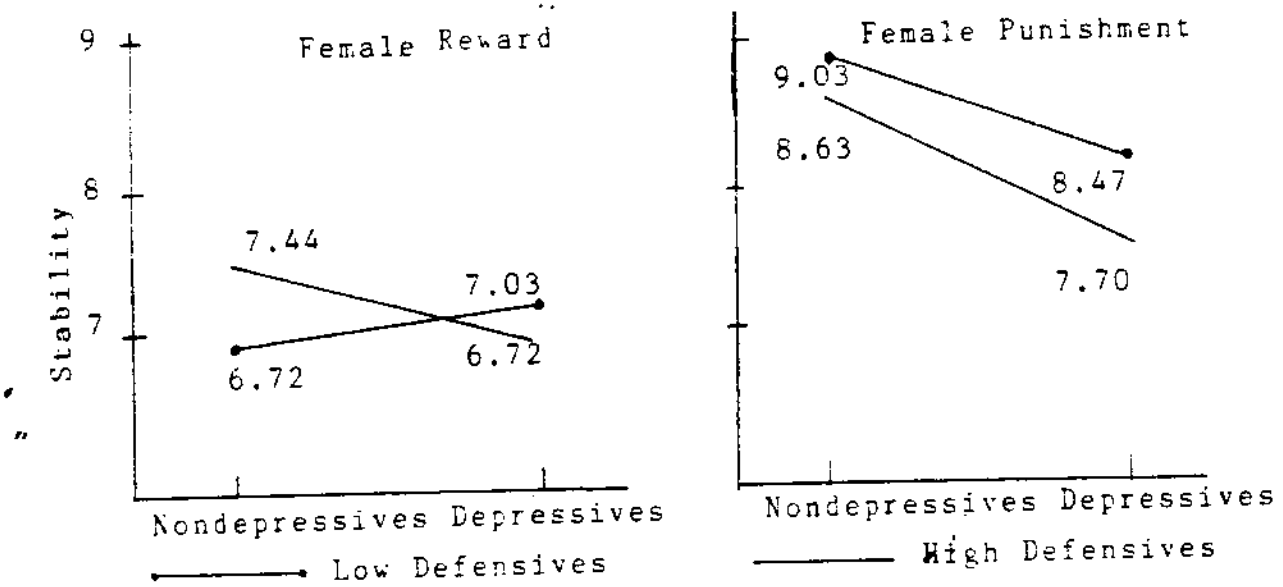

Figure 21. Mood X defensiveness X sex X problem type 4-way interaction for stability of attribution for females.

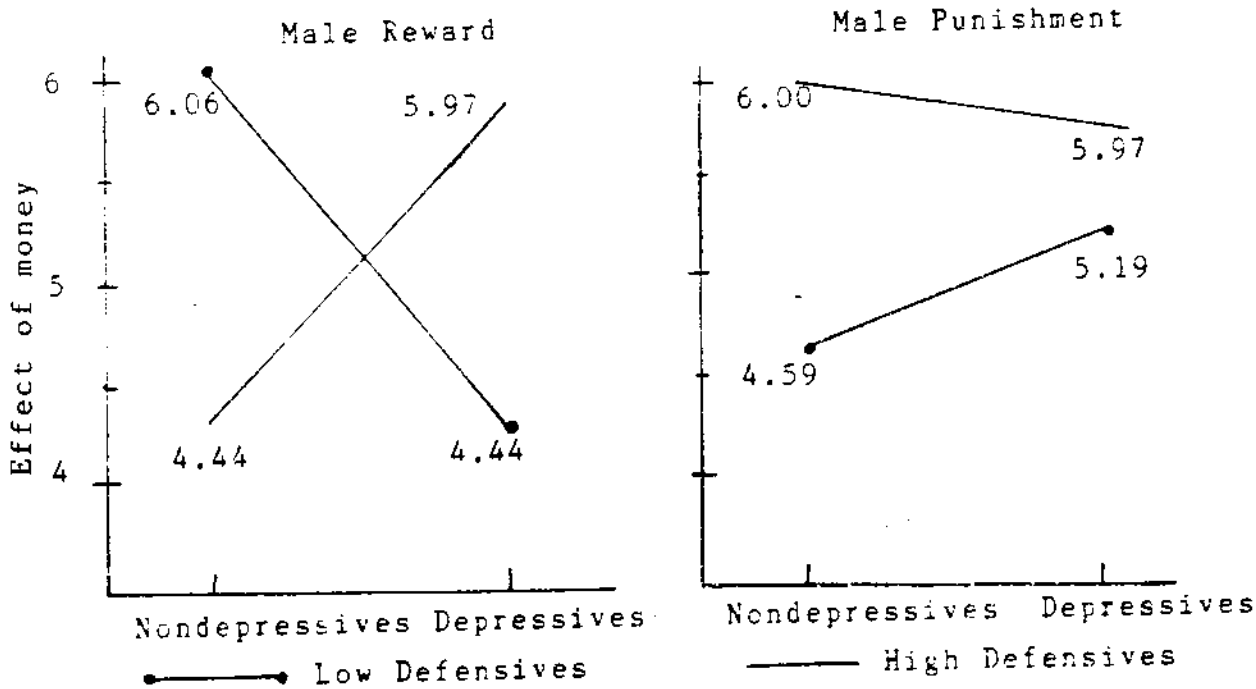

Figure 22. Mood X defensiveness X sex X problem type 4-way interaction for effect of money on task interest and motivation for males.

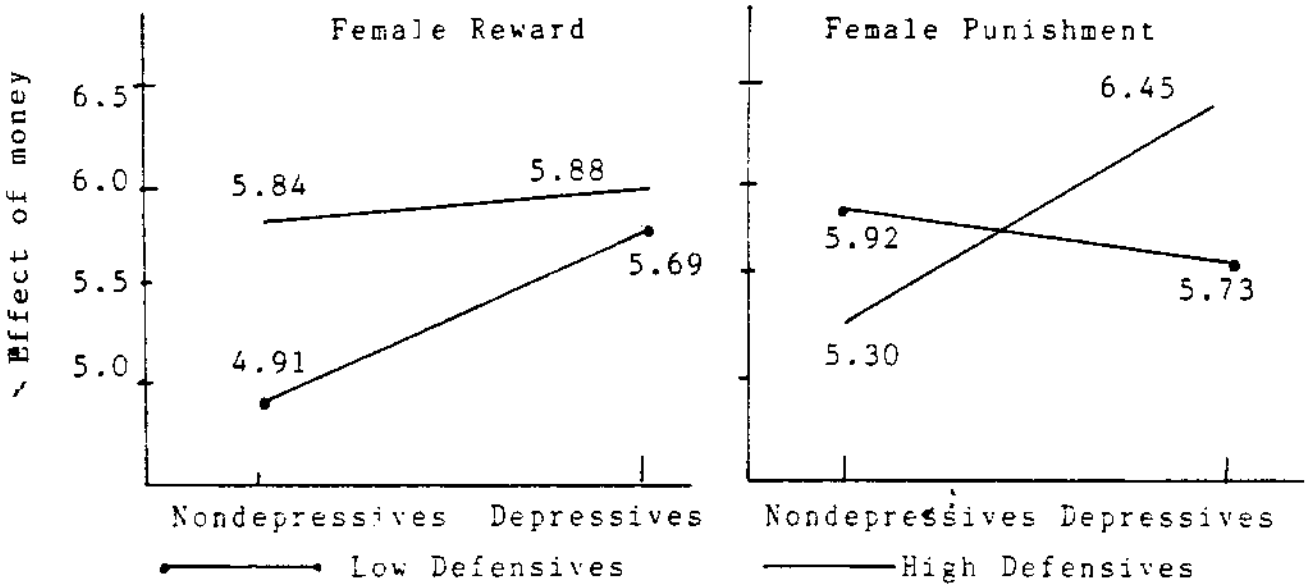

Figure 23. Mood X defensiveness X sex X problem type 4-way interaction for effect of money on task interest and motivation for females.

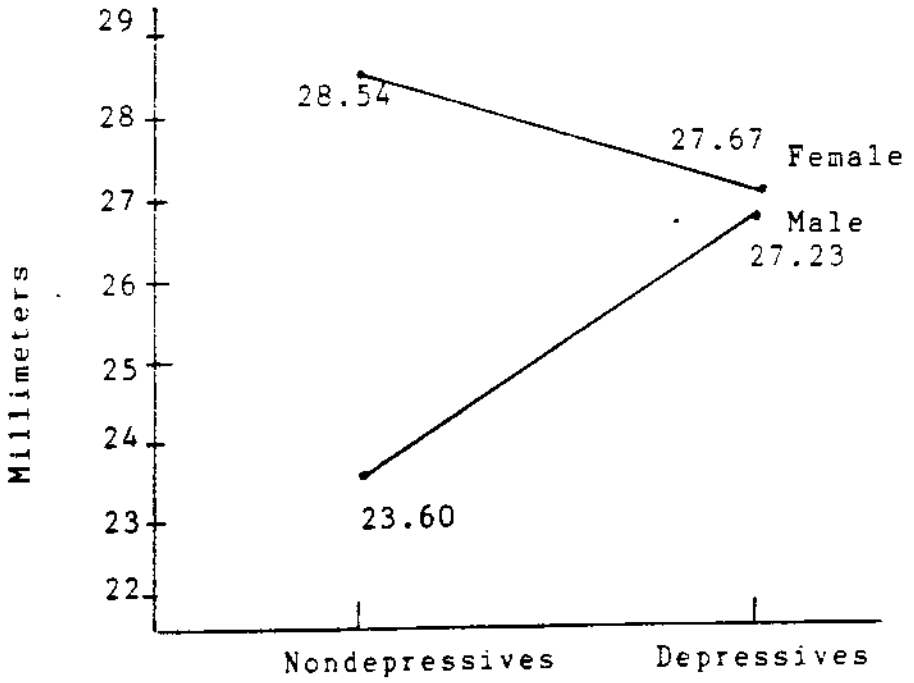

Figure 24. Mood X sex 2-way interaction for estimation of half-dollar coin size.

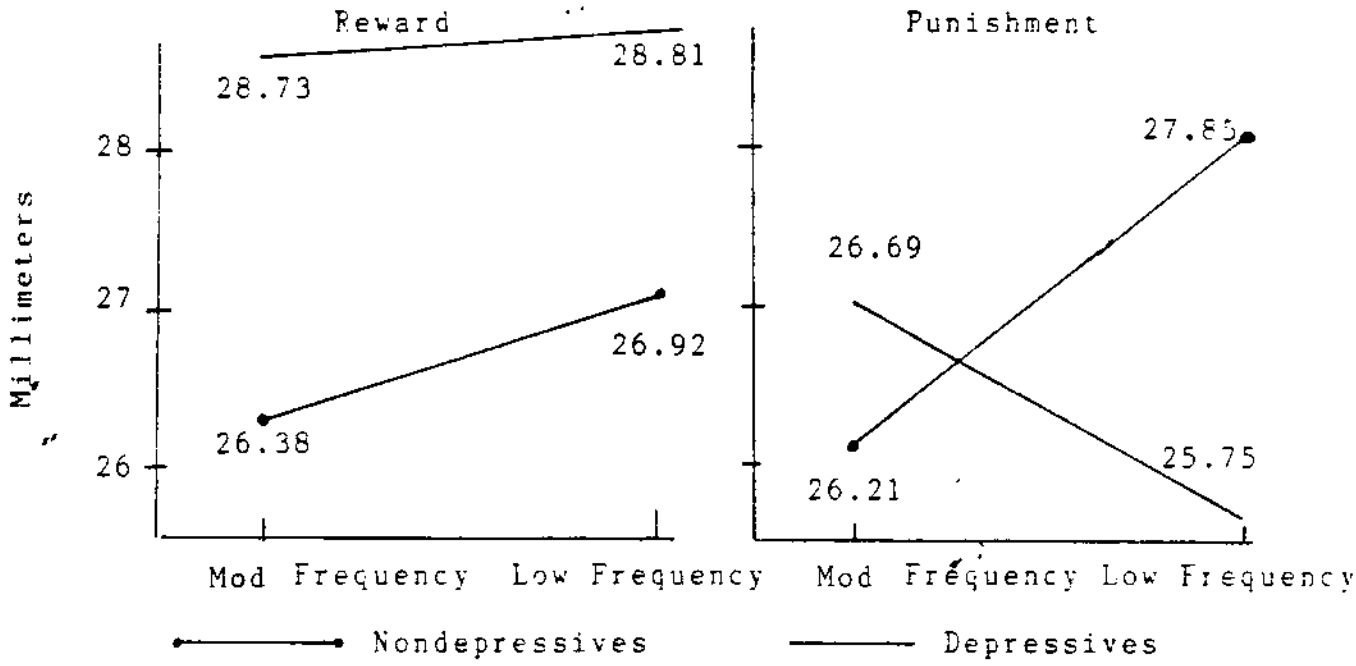

Figure 25. Mood X problem type X frequency 3-way interaction for estimation of half-dollar coin size.

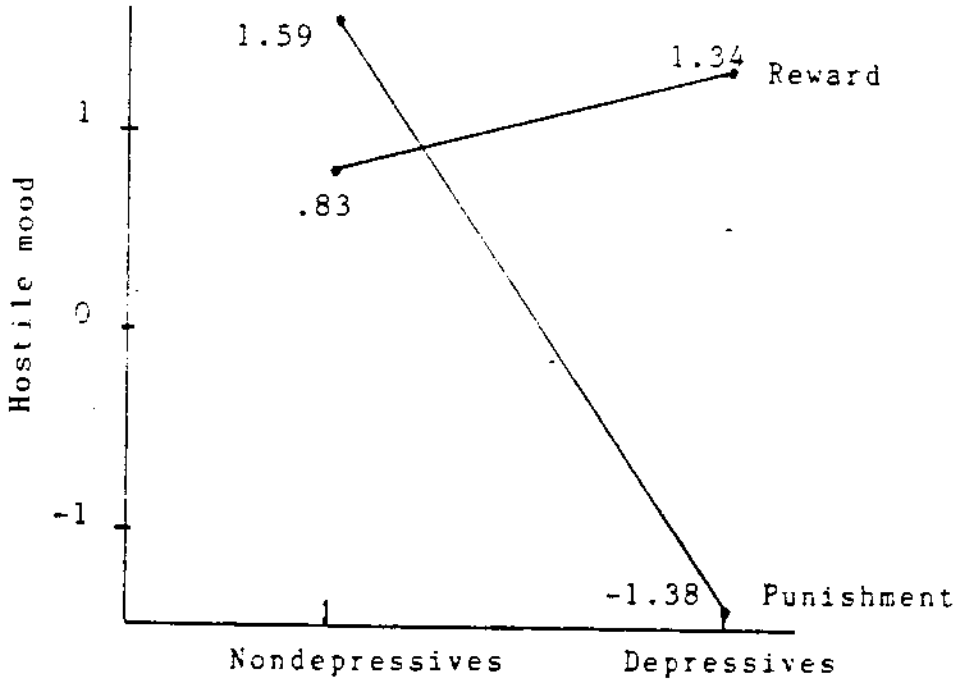

Figure 26. Mood X problem type 2-way interaction for changes in hostile mood.

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