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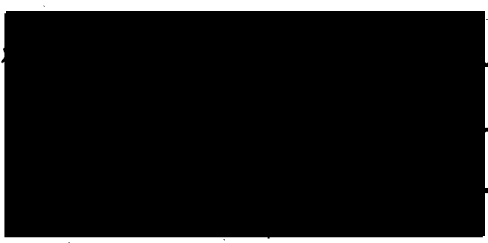
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AN INVESTIGATION OF THE RELATIONSHIP BETWEEN CONTROL  
DEPRIVATION AND PREDICTION-ENHANCING RESPONSES

by

Lynne Robinson

B.Sc. (Hons), University of Victoria, 1975

THESIS SUBMITTED IN PARTIAL FULFILLMENT OF  
THE REQUIREMENTS FOR THE DEGREE OF

MASTER OF ARTS

in the Department

of

Psychology



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An Investigation of the Relationship Between Control Deprivation  
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## ABSTRACT

This study examined the possibility that deficits found in learned helplessness studies may be due to subjects' attempts to regain a sense of control through prediction of outcome. It is argued that subjects, in the studies in this field, are usually only able to increase such prediction by attributions to severely limited ability and by passivity in an ensuing task. It was expected that subjects exposed to unsolvable problems would rate their ability to do a second task lower than subjects exposed to solvable problems and would increase the predictability of their performance on the second task by taking more information before recording a solution to a problem. Locus of control and self-esteem were expected to mediate effects.

Undergraduates ( $n = 89$ ) were assigned to groups based on gender and locus of control. Self-esteem was also measured. One half of the subjects of each group were given solvable and one half given unsolvable problems. As predicted, subjects given unsolvable problems rated their ability to do the second task significantly lower than subjects given solvable problems. Unexpectedly, subjects given unsolvable problems did not take more information on the second task. Subjects low in self-esteem solved more problems correctly after exposure to unsolvable problems than after exposure to solvable problems. The reverse of this effect occurred for high self-esteem subjects.

These results are discussed in terms of frustration and of the effects of uncertainty on behaviour. It is suggested that

the questions and the sequence of questions asked subjects may  
be important variables in studies of this kind.

## DEDICATION

This thesis is lovingly dedicated to Marion Jean Robinson  
who had in such abundance:

The courage to change the things that can be changed,  
The serenity to accept the things that can't be  
changed.

And the wisdom to know the difference.

and to Marc P. Boutin in gratitude for so many things.



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## A. INTRODUCTION

M.E.P. Seligman (1975) published a book expounding his conception of the relationship between what he called learned helplessness, and depression. The basic experimental design that Seligman used was as follows. Subjects, whether animal or human, were exposed to one of two initial conditions (the "training task"). In one condition, subjects were able to control some event in the environment (e.g. turn off a noxious stimulus, get true feedback for performance on a task). In the other condition, subjects were not able to control the event (e.g. cessation of noxious stimuli was independent of the subjects' responding, feedback was false). There was usually a third condition as well to control for the effects of the aversive stimulus, but this is often omitted in studies where no aversive stimulus is used.

Thus Seligman and others presented two groups of subjects with a situation in which the subjects were led to believe that they could control outcomes by their own responses. However, for only one group of subjects was it true that outcomes were contingent on responses (the C group). For the other group of subjects, outcomes were, in fact, not contingent on responses (NC group). Seligman argued that the experience of

noncontingency (i.e. lack of control of outcomes) led to motivational , cognitive, and affective deficits on an ensuing task, the "test task".

Buchwald, Coyne, and Cole (1978), have argued, based on their survey of the literature, that "interference on subsequent tasks is seldom found when subjects have been told that aversive stimulation is inevitable but it is often found when subjects are made to fail on the treatment task" (p. 185) whether the failure is failure to escape aversive stimulation or to solve problems. (See Gatchel, 1980, for a discussion of the effects of inevitable aversive stimulation.) Furthermore , it seems that non-contingent success, as a rule, does not lead to interference (e.g. Benson & Kennelly, 1976). Berglas and Jones' (1978) however, found self-handicapping in males after non-contingent success.

Despite Abramson, Seligman, and Teasdale's (1978) reformulation of the helplessness model of depression, incorporating attribution theory to account for the generalization and stability of helplessness and for loss of self-esteem, the basic model of helplessness remained. Cognitive and motivational deficits were still postulated as an invariant result of the experience of NC, regardless of attribution (Abramson, Garber, & Seligman, 1980). Abramson, Garber, and Seligman (1980) defined the motivational deficit as "retarded initiation of voluntary responses" and the cognitive deficit as "difficulty in learning that responses produce outcomes" (p.4)

(i.e. "giving up"). In practice these deficits have been operationalized as decreased performance on the test task (e.g. Hiroto and Seligman, 1975, measured response latencies, mean trials to criterion and number of failed questions on a second task). Buchwald, Coyne, and Cole (1978) point out that these variables do not necessarily measure motivational or cognitive deficits of the kind postulated by Seligman (1975).

Decreased performance has not always been found on a second task after failure (e.g. Frankel & Snyder, 1978; & Kernis, Zuckerman, Cohen, & Spadafora, 1982). This suggests that the postulated deficits are not an invariant result of the experience of failure per se, but that decreased performance may serve some purpose for the subject. A number of alternative explanations for the deficits found in learned helplessness studies have been advanced. It is clear that, given situational and personality variables, the alternatives need not be exclusive. Wortman and Brehm (1975) suggest that there may be a trivial explanation for learned helplessness; ruminating on explanations for previous performance, hostility towards the experimenter, disbelief that the second task is soluble. Note that Hiroto and Seligman's NC (failure), subjects in the 1975 study felt that the first task was insoluble, relative to C (success) subjects. Wortman and Brehm further suggest that generalization from one task to a very similar task in very similar circumstances is not inappropriate. They also argue that "reactance", an attempt to regain control, may lead to the

enhanced performance sometimes found after non-contingency (e.g. Roth & Bootzin, 1974; Roth & Kubal, 1975; Tennen & Eller, 1977). They suggest that reactance may result from relatively low amounts of helplessness training while helplessness may result from high amounts of helplessness training. The importance of the outcome to the subject determines the degree of either reactance or helplessness, with the effect increasing with increasing importance. Roth (1980) specifies moderator variables which she believes may account for variations in response to non-contingency. These are prior expectancy, amount of exposure to NC, importance and valence of outcomes to subjects, attributions, threat value of loss of control for the subject, and similarity of various aspects of the experimental situation. Carver (1979) argues that failure leads to decreased effort when subjects are "self-aware" but no decrease in effort when they are not. Frankel and Snyder (1978) propose that helpless behaviour after the experience of failure serves the purpose of protecting self-esteem, by allowing subjects to claim, should they fail on the test task, that they "were not trying". Kernis et al. (1982) found evidence for an integration of the latter two theories, with protection of self-esteem through "helplessness" taking place only in the "self-aware" subject. Rothbaum, Weisz, and Snyder (1982) note however, that subjects in the failure condition in Frankel and Snyder's 1978 study did not attribute their performance to lack of effort as would be expected by the egotism model and suggest that "helplessness"



allows subjects to avoid the disappointment of further failure to control outcomes. It is this last possibility that will be examined in this thesis.

### Secondary control

Rothbaum et al. (1982) argue that there are two types of control, "primary control" which is control over events in the external world, the usual meaning of control, and "secondary control" which is control over the meaning of events for oneself and therefore over one's reactions. These two types of control are called "changing the world" and "changing the self" (p. 5), respectively, by Rothbaum et al. and may be seen as similar to Freud's (1948) concept of alloplastic and autoplatic change. Rothbaum et al. point out that the two types of control are related as well to Piaget's assimilation and accommodation. They call their concept the "two-process model".

As an example of the difference between these two types of control, they describe primary and secondary control operating in attempts to predict. The individual exerting primary control will exhibit the following behaviour: "Attempt to predict events so as to succeed at them. Active behavior and attributions to the self's effort and ability are likely, especially in tasks of moderate difficulty". The individual exerting secondary control will "Attempt to predict events so as to avoid disappointment. Passive and withdrawn behavior, especially in tasks of moderate difficulty. Active, persistent behavior in extremely easy or

difficult situations. Attributions to severely limited ability are likely" (p. 12).

Disappointment can be conceived of as consisting of two elements. The first is the element of failure to attain a desired outcome and the second is the element of surprise at that failure. The first element of disappointment, failure to attain a desired outcome, can be seen as a failure of primary control but the second element, the unexpectedness of failure, can be seen as a failure of secondary control, specifically a failure to predict the outcome and a concomitant failure to prepare emotionally for it. It is this "unexpectedness" that, Rothbaum et al. argue, subjects in the failure condition attempt to control in helplessness experiments. By "giving up" (not trying) on the test task, subjects are able to predict their poor performance and avoid the disappointment of unexpected failure. This rationale accounts for Frankel and Snyder's (1978) results. They found that subjects in the failure condition told that the test task problems were "difficult" did better than failure subjects told the problems were moderately difficult, and better than success subjects told the problems were difficult. Rothbaum et al. argue that subjects told the task is difficult need not fear failure since the presumption is that all subjects will do badly on the task.

They suggest that there are at least three types of secondary control: predictive control which is an attempt to avoid disappointment through attributions to severely limited

ability, illusory control which is a belief in the possibility of aligning oneself with chance, and vicarious control which is control through identification with, not manipulation of, powerful others. Each can be seen as offering meaning for events (interpretive control), although, it may be suggested, operating in different ways. Rothbaum et al. believe that certain types of individuals are particularly likely to use secondary methods of control and that the same individuals will tend to use all types of secondary control.

It is important here to consider how desirable control is. Seligman and S. Miller (1979) contend that "the fact that the struggle for control is such a commonplace phenomenon in the real world, coupled with the fact that we generally find choice of control in the laboratory, should lead us to believe that it is a basic want" (p. 356).

#### Evidence for secondary control

Are subjects in fact helpless? Do they give up attempts to control, as learned helplessness theorists argue, or do they, as Rothbaum et al. suggest, replace one mode of control with another but continue with attempts to control? Such a concept of secondary control does not correspond well with any of the usual ways of conceptualizing control since the subject does not perceive him/her self as being able to change any event in the external world, either the situation or the outcome. Yet s/he can change the situation conceptually, change the way that it is

understood. "Stone walls do not a prison make" (Lovelace, 1968) or, as Seligman and S. Miller (1979) point out, sometimes one can redefine the agenda, as the individual who accepts his/her own death does. The outcome is immutable but the way in which one finds meaning in the event, through stoic indifference, devaluation, etc., can be altered.

Janis (1981) summarizes the results of several studies (Epstein & Clark, 1970, Lazarus and Alfert, 1964, Staub and Kellett, 1972) by the statement that this research found that a subject is "less likely to display strong emotional reactions ...when confronted with an unpleasant event if he previously has been exposed to a preparatory communication that predicted the disagreeable experience." (p. 47) and further notes that such preparations can have positive long-term effects, particularly a "gain in perceived control over distressing environmental events" (p. 48). Averill (1973) argues that there may be three types of control; behavioural (direct action on the environment), decisional (having choices), and cognitive (interpretation of events). He points out that whether personal control is stress reducing or stress inducing depends upon the type of response made and its context and not simply upon its effect on the stimulus. S. Miller (1981) makes a similar argument vis-a-vis predictability. In her extended analysis of predictability, she outlines situations in which predictability may be expected to be stress reducing and summarizes evidence that prediction of 'kind of event' reduces the impact of the

event itself.

Rothbaum et al. (1982) adduce further evidence that finding meaning in events allows individuals a sense of control. They point to Frankl's (1963) discussion of the importance of meaning. They cite Alloy and Abramson (1979); Diener and Dweck (1978); Coyne, Metalsky, and Lavelle (1980); and Pittman and Pittman (1980) as providing evidence that, after failure, subjects make increased attempts to explain their failure and fewer attempts to generate problem-solving hypotheses. They refer to Silver and Wortman's (1980) review of naturalistic studies. Silver and Wortman state that "after a crisis occurs, respondents seem compelled to make sense out of their experiences" (p. 317) and that the ability to find meaning in an event is important for adjustment. This latter conclusion, Silver and Wortman acknowledge, is based on limited evidence. Rothbaum et al. summarize evidence that "individuals are particularly likely to select negative incentives that they previously believed were inevitable" (p. 26) and note that Lefcourt (1976) found externals prone to derogate the unattainable.

Specifically in relation to predictive control, they point to studies which support Mettee's (1971) hypothesis that individuals accept success when later disappointment is not possible (Brickman, Linsenmeier, & McCareins, 1976; Maracek & Mettee, 1972; Mettee, 1971). They summarize Wortman, Costanzo, and Witt's (1973) findings as follows: "subjects who thought

they might be tested further were less likely to perceive themselves as capable than were subjects led to believe there would be no further testing" (p. 13). They point to evidence that individuals low in self-esteem or exposed to failure prefer and work harder on very difficult or very easy tasks. Moreover, individuals low in self-esteem prefer evaluators who provide primarily negative feedback. Rothbaum et al. interpret subjects' behaviour in these varied situations as attempts to avoid the disappointment of unfulfilled expectations and thus to regain a sense of control.

Other evidence is Metalsky, Abramson, Seligman, Semmel, and Peterson's (1982) finding that stability attributions for negative events were associated with depression after a high grade (suggesting that rising expectations which may not be fulfilled are disturbing). Swann, Stephenson, and Pittman (1981) provide more direct evidence of subjects' increased efforts to improve prediction after a learned helplessness manipulation. They gave subjects either C or NC feedback on the training task, then told them they were to interview another "subject". Subjects in the NC condition were more likely both to ask to see diagnostic answers given by their putative interviewees and to choose more diagnostic questions to ask. Swann et al. note that "rather than risk a further demonstration of their inability to exert control, participants who have been deprived of control simply withdraw effort" (p. 641) and suggest that the test task in this study provided a means for subjects to reassert control

without risking failure.

It seems then, that "control" may be exercised by subjects in many different ways and it is important, as Folkman (1984) notes, to know what the subject is controlling. Moreover, the recent reformulations and discussions of the learned helplessness model make it increasingly clear that it is necessary to include in any discussion of control a consideration of a number of variables which may affect the individual's perception of control and ensuing behaviour. These variables may include the attributions subjects make, the specifics of the situation(s) in which the study takes place, and person variables, including generalized expectancies.

#### Attributions

Attribution theory suggests that "the search for understanding is the (or a) basic 'spring of action'" (Weiner, 1982, p. 164, italics original). Several revised models of learned helplessness postulate that attributions for non-contingency mediate the behaviour that results from that experience (Abramson, Seligman, & Teasdale, 1978; I. Miller & Norman, 1979; Roth, 1980), with attributions leading to expectancies (Abramson, Seligman, & Teasdale; I. Miller & Norman). Weiner (1982) summarizes the evidence that attributional activity increases after failure and unexpected events. Attributions and expectancies are clearly linked but the relationship between the two is not yet entirely clear. Hollon

and Garber (1980) define attributions as "causes one assigns to an event" (p. 178) and expectations as "a person's subjective estimate that a given event is likely to occur" (p. 179). They point out that "attributions may or may not contribute to the formulation of expectations, but it is the expectation which most directly produces the concurrent affect and subsequent behaviour", that expectations are "endpoints of a cognitive causal chain" which refer to future events while attributions refer to past events (p. 177). It seems therefore, that while attributions are important for understanding how an individual responds to a given event, expectations will most likely predict future behaviour. Moreover, Hollon and Garber note that one can have expectancies for predictability as well as controllability, arguing that the former has implications for affect, the latter for motivation and behaviour. It may be that expectancies for predictability can influence motivation and behaviour equally to expectancies for control.

Rothbaum et al.(1982) discuss predictive control in terms of attributions and expectations, pointing out that attributions to limited ability with a concomitant lowered expectancy for success enables subjects to avoid unpredicted failure. In contradistinction, the egotism model (Frankel & Snyder, 1978) suggests that individuals will not make attributions to limited ability after the training task although they may expect to do poorly on a test task (if they don't "try hard").



Rothbaum et al. note as well that, unlike some theorists (Weiner, 1974), they view an attribution to limited ability as an external attribution since, although the locus is internal, the individual does not expect to be able to control outcomes. Bandura's (1977) distinction between outcome expectancies and efficacy expectancies makes the issue clearer. Subjects may perceive contingency between outcomes and responses (outcome expectancies) but may not see themselves as capable of the appropriate responses (efficacy expectancies). Abramson, Seligman, and Teasdale's (1978) distinction between universal and personal helplessness corresponds to this distinction as well, as they note. In sum, it is increasingly assumed that several cognitive processes, perception, attribution, and expectancy intervene between the experience of failure or non-contingency and the ensuing behaviour. These processes are mediated by the situation itself, generalized expectancies, and variables such as gender, and self-esteem

### Situations

In learned helplessness studies, some subjects are placed in a situation where they are not allowed to control their success or failure at first, then are allowed control. Subjects' decreased performance when contingencies are allowed to vary naturally is seen as giving up of attempts to control (helplessness). Other studies, often with elderly nursing home residents, have examined naturally occurring situations where

control is limited. Some (Schulz & Brenner, 1977; Langer & Rodin, 1976; Schulz, 1976), have found that functioning in these elderly subjects is positively related to the degree of control they perceive themselves as having in the situation they are in.

In general, the perception of the self as being in control has been seen as beneficial. Nonetheless, the assumption that every situation is controllable are not justifiable.

Uncontrollable situations often occur. Institutions such as mental hospitals and nursing homes expect relatively little controlling behaviour from their residents, offer little opportunity for such control, and may fail to reinforce it when it occurs. Barton, Baltes, and Orzech, 1980, found that nurses in a nursing home reinforced primarily dependent rather than independent behaviour. In other situations a high degree of control is expected and offered to participants. Universities and colleges, for example, offer some control over choice of courses, times of courses, and grading. Yet even here, much is out of the student's control, such as content and timing of examinations.

Wortman and Brehm (1975) have pointed out that attempts to maintain control, when it is in fact impossible, are maladaptive. Schulz and Hanusa (1978) also argue that increasing competency or the sense of control in a situation that limits the control possible is harmful. In a competency-enhancing experiment with elderly residents of a nursing home, they found that subjects who received both competency and control enhancing

interventions functioned less well than those who received only one intervention. Janoff-Bulman and Marshall (1978, reported in Rothbaum et al., 1982) found greatest depression and least coping in such residents when they were highly educated and felt that they had had a great deal of control over their lives before entering the home. Further, subjects in Schulz and Hanusa's (1978) study who were able to control visits from university students, deteriorated below the level of subjects who had had visits but no control over them, once the visits ended. Too, Rodin, Rennert, and Solomon (1980) found that subjects allowed to make outcome-relevant choices but who lacked sufficient information to increase the probability of a positive result showed increased stress.

#### Personality variables

Aside from situational variables, personality variables affecting perception of control have also been widely studied. The major variables of interest have been locus of control and Type A and B personalities. Self-esteem and gender have also been examined. Results here have been somewhat contradictory. Internals, by definition individuals who perceive themselves to be in control of outcomes, have generally been considered to be better functioning individuals, in spite of Rotter's (1975) warning to the contrary, in that descriptions of them correspond to positively valued traits. For example, Lefcourt (1976) found that internals are more achieving and more able to delay

reinforcement. Phares (1976) found them to be more independent, and more reliant on their own judgement. Hyer, Matteson, & Siegler (1982) and Fawcett, Stonner, & Zeppelin (1980) found that internality was associated with better functioning in their elderly, institutionalized subjects. Hiroto (1974) found internals to be more resistant to the effects of a learned helplessness manipulation. On the other hand, W. Miller and Seligman (1973) found no differences between internals and externals in a learned helplessness study. Moreover, Gregory, Chartier, and Wright (1979) and Pittman and Pittman (1979) found that internals performed worse than externals, after experiencing a learned helplessness manipulation, when it was made clear to them that they did not control the situation, either by making contingencies more explicit (Gregory, Chartier, & Wright, 1979) or by increased NC trials (Pittman & Pittman, 1979). Layden (1976), cited in Layden (1982), found that subjects who were internal for failure exhibited performance deficits in speed and accuracy after induced failure while subjects external for failure did not show deficits after failure. Felton and Kahana (1974) found, in their study of elderly residents of a nursing home, that externals functioned best.

Similarly, Krantz, Glass, and Snyder (1974) and Glass (1977) found enhanced performance or no effect for Type A's with low levels of aversive stimulation and with low failure but deficits with high levels of aversive stimulation. Conversely,

deficits were found in type B's with low levels of aversive stimulation and no effects with higher levels of stimulation and low failure. In a variation of Berglas and Jones' (1978) study, Weidner (1980) found that Type A's were significantly more likely to choose a performance inhibiting drug after failure than were Type A's after success or Type B's after either success or failure.

Gender differences have been found in learned helplessness and related studies. Dweck and her colleagues (Dweck & Repucci, 1973; Dweck & Bush, 1976) found that girls were more apt to attribute failure to effort if the evaluation was by peers, and to ability if the evaluation was by adults. The results for boys were vice versa, ability attributions for failure were made by boys after evaluation by peers, effort attributions after evaluation by adults. Berglas and Jones (1978) found that significantly more subjects in the NC success group than in the NC no feedback, C success, or C no feedback groups took a drug supposed to interfere with performance on the next test. The effects, however, were largely due to the males in the study. Kimball and Gray (1982) found that female undergraduates had significantly lower expectancies for success on a psychology exam than male undergraduates. Furthermore, when later exams were taken with the same teacher, expectancies for females increased to match those of males, but when different teachers gave the exams, female expectancies did not rise. Dweck, Goetz, and Strauss (1980) found that girls had significantly lower

expectancies for success than boys before the first report card of the school year even though they later received significantly higher grades than the boys. Their expectancies rose to match those of boys after the first report card. She also found that girls' expectancies for success, following induced failure, did not rise when task and evaluator were changed, but boys' did. If Rothbaum et al. (1982) are right and individuals reduce their estimates of their abilities as a means of avoiding disappointment, females may be particularly susceptible to this form of secondary control.

Self-esteem has also been hypothesized to be related to learned helplessness as a dependent variable (Abramson, Seligman, & Teasdale, 1978), as a motivation (Frankel & Snyder, 1978), and as a mediating variable (Layden, 1982; Rothbaum et al., 1982). Abramson, Seligman, and Teasdale argue that self-esteem losses result from personal helplessness (attributing NC internally) as opposed to universal helplessness (attributing NC externally). Contrariwise, Frankel and Snyder argue that helplessness results from attempts to maintain self-esteem. Both models would therefore agree that self-esteem losses result from internal attributions for failure but Frankel and Snyder argue that helplessness results from avoidance of that attribution while Abramson, Seligman, and Teasdale argue that helplessness results from making an attribution to either internal or to external causes. Moreover, according to Frankel and Snyder, external attributions for NC should not result in

helplessness, while according to Abramson, Seligman, and Teasdale they should (the determinants of when and where the helplessness occurs being determined by stability and globality attributions). In a different vein, Layden has summarized research indicating that individuals with low self-esteem are more susceptible to helplessness than individuals with high self-esteem. The former exhibit decreased performance (Cruz Perez, 1973), greater lack of persistence (Shrauger & Rosenberg 1970), and increased generalization of deficits to new tasks (Shrauger & Rosenberg, 1970) after failure, compared to individuals with high self-esteem. She also notes that she found (1976) that "high self-esteem individuals responded to positive outcomes by picking internal causes and negative outcomes by picking external causes" but when low self-esteem subjects "evaluated the same situations, they were less likely to pick internal causes for positive outcomes and were more likely to select internal causes for negative outcomes than were high self-esteem subjects" (p. 66). Subjects who were internal for failure exhibited performance deficits (in speed and accuracy) after induced failure while subjects external for failure did not show deficits after failure. Coyne and Gotlib (1983) note that the only attributional dimension which is consistently related to depression in students is locus, with depressed students making internal attributions for failure.

I. Miller and Norman (1979) suggest other individual differences which may interact with situational variables to

account for varying results in learned helplessness studies. They mention achievement motivation, and mood, as well as gender and prior expectancies. Abramson and Martin (1981) report evidence that very test-anxious students are especially prone to deficits after failure, citing, for example, Lavelle, Metalsky, and Coyne (1979). Note Coyne, Metalsky, and Lavelle's 1980 finding that relaxation exercises with expectations for increased efficiency improved "failed" subjects' performance relative to other failed subjects.

### Interactions

The original investigations of both locus of control and learned helplessness tended to be rather unidimensional, as is natural in the early development of ideas. Now it is increasingly obvious that it is necessary to examine the elements of the situation, the person variables, and the interaction, in order to explain learned helplessness. Situations may be such that efforts to exert control over outcomes are likely to be positively reinforced (e.g. preparation for college exams) or may offer only punishment or withdrawal of rewards for such efforts. Strickland (1972) found that black children were more external than white children and Gurin, Gurin, Lao, and Beattie (1969) point out that for urban blacks to consider themselves as having personal control would be demoralizing since they would so often blame themselves for failure. It is worth noting here that theorists have recently



begun to distinguish locus of control along a number of different dimensions. Paulhus and Christie (1981) suggest that there may be four important dimensions for locus of control; source, target, spheres, and valence. Internals and Type A's appear to be more resistant to learned helplessness effects than externals and Type B's only when the level of failure or aversive stimulation is relatively low, and more susceptible at higher levels. Rothbaum et al. argue that this is because externals tend to use secondary processes of control. They "give up" readily since, for them, this is a means of gaining a sense of predictive control. This, Rothbaum et al. argue, is also true of individuals low in self-esteem or high in failure avoidance or who have experienced recurrent failures. On the other hand, internals and Type A's may tend not to use secondary methods of control. Their natural style is to persist in attempts to actively control outcomes. This method works well when outcomes can, in fact, be controlled but when they cannot, Rothbaum et al. maintain, such individuals truly give up and do not attempt to use secondary methods of control.

#### Adaptiveness of control

Rothbaum et al. (1982) in fact argue that, ideally, individuals use both primary and secondary processes of control. They hypothesize that the truly well-functioning individual is one who persists under circumstances where such persistence has a reasonable chance of success but who withdraws from tasks

which are insoluble. Thus Eitinger (1981) commented, from his experiences in a Nazi concentration camp, that those prisoners who survived both denied the reality of the ever-present threat of death from their captors and persisted in carrying out the many little tasks that prevented death from more controllable camp threats (e.g. picking lice to prevent typhus).

Janoff-Bulman and Brickman (1982) further note that "high expectations will be more advantageous than low expectations only when, as in the (stress) immunization condition of our experiment, people are aware of and accept the fact that some tasks are impossible to accomplish and not worth persisting on" (p. 223). They comment that subjects in helplessness experiments do not recognize the insolubility of the initial, pre-treatment problems until they are told and persist, as a rule, in attempting to solve the insoluble. In fact, Janoff-Bulman and Brickman suggest that the paradox of depressed subjects who do not subscribe to the "illusion of control" (i.e. who correctly perceive reinforcements as non-contingent in helplessness experiments) yet who often exhibit the symptom of self-blame, "precisely defines a condition in which people are continuing to pursue a goal... that seems increasingly remote or helpless to obtain" (sic) (p. 223). In a similar vein, Rotter (1975) pointed out that "Our early hypothesis that locus of control would have a curvilinear relationship to adjustment has not been borne out, but the fault may be in the methods of measurement of the adjustment variable" (p. 61), such as use of self-report methods

which may tap biases in internals towards repression of unpleasant experiences. Moreover, the choice, by experimenters, of situations in which behaviour is to be observed may be biased towards ones in which particular response styles are adaptive (or seen as adaptive by the experimenter). Note Coyne and Gotlib's (1983) comment, re findings of attributional differences between depressed and non-depressed subjects, that there may be inadvertent matching of situations to stereotyped responses of certain types of subjects. Houston (1972) told some subjects that they could avoid shock by good performance, others that shock was unavoidable. The former reported less anxiety but showed increased physiological arousal compared to the latter. Moreover, internals showed more physiological arousal than externals in both conditions but did not express more anxiety. There are biases in evaluation of human behaviour. Type A behaviour, from the point of view of a cardiologist, is maladaptive but from the point of view of a boss, it may be very adaptive. It is clear therefore, that we do not know what is adaptive in dealing with stressful situations.

The question remains, however, as to the legitimacy of conceptualizing control as including control of the self. It is intuitively reasonable. The desirability of, at times, changing the way one thinks about events rather than changing the events themselves is reflected in the old-fashioned apothegm "God grant me the strength to change the things I can, the serenity to accept the things I can't and the wisdom to know the

difference"; in a whole class of cognitive therapies; and in such studies as that of Girodo (1977) reported in Janis (1979). Girodo argued that the important factors in stress inoculation programs were those that led the client to reinterpret the fearful situation. Nonetheless, despite the popular acceptance of the fact that "you've got to know when to hold your cards, you've got to know when to fold them" (in the words of Kenny Rogers' popular song), the "psychology of power" (Seligman & S. Miller, 1979) views "giving up", and passive, withdrawn behaviour as maladaptive even under circumstances which psychologists themselves have engineered to be conducive to such behaviour.

It seems that "control of the world" is generally viewed as desirable and, in fact, "control" usually means "control of the world". Steiner (1979) offers this definition of control: "An outcome is controllable by a person if and only if that individual's voluntary activity can change the probability that the outcome will occur" (p. 13). On the other hand, objective control may not be as important for the individual's well-being as a sense of control (Glass & Singer, 1972; Geer, Davison, & Gatchel, 1970). Moreover, as Abramson and Alloy (1980) point out, "people often err in detecting relationships between their responses and outcomes and/or between events." (p. 113). Phares (1976) summarizes research that indicates subjects see themselves as being in control when positive reinforcement deviates from 50%. Skowronski and Carlston (1982) found that

choice led to an increased perception of control when it led to more positive outcomes than non-choice. Wortman (1975) found that informed choice led to perceptions of increased control. Langer (1975) found that introducing skill elements into a chance task gave subjects an increased sense of control although Abramson and Alloy, 1980, criticize this interpretation of the results, suggesting that the overestimate of success on a chance situation may not be equivalent to a sense of control. Seligman and S. Miller (1979) point out that many terms (choice, competency, control) have been used in the psychology of power and it is not at all clear how they relate to one another.

This leads to the consideration of why control is desirable to subjects. Several theories have been advanced but S. Miller's minimax hypothesis as described in Seligman and S. Miller (1979) seems most plausible. S. Miller suggests that control is important to subjects only to the extent that it maximizes positive outcomes and minimizes negative outcomes. Therefore the hypothesis denies "choice and control have any value above and beyond improving expected outcome" (p. 361, italics original). Skowronski and Carlston (1982) found subjects only preferred choice when they expected a positive outcome based on past success. On the other hand, Brigham (1979) found children would work harder for self-selected reinforcers even when these were the same as those selected by the experimenter. Rothbaum et al.'s concept of secondary control may be analysed in the light of the minimax hypothesis. Secondary control does not involve

any effort on the part of the subject to change an objective outcome. It does imply that, at least in predictive control, subjectively, negative outcomes are minimized through avoidance of disappointment and positive outcomes are maximized through attaining greater than expected outcomes.

There seems then, to be reason to investigate Rothbaum et al.'s contention that subjects exhibiting what has previously been thought of as "giving up" behaviour may actually be attempting to maintain control of the self. Such a hypothesis is consistent with the assumption that subjects attempt to maintain control, yet that control of external events is not always possible and that control serves the function of maximizing (perceived) outcome.

If it is indeed true, not only that people may gain a sense of control through interpretation of events, but also, as Rothbaum et al. suggest, that people differ in their preferred modes of control, then this may have important implications for any therapy or intervention which attempts to modify perceptions of control. They suggest that people seeking secondary control are "typically persons who have experienced recurring prior failure, or chronic disabilities (e.g. the paralysis victims discussed by Bulman and Wortman, 1977, or persons who are characterized by external locus of control, low self-esteem, or high failure avoidance)" (p. 28). Such clients may be receptive to therapies which emphasize the process of control they utilize most and clients who prefer primary control strategies may

benefit less from communications emphasizing reliance on others, "bad luck", avoidance of disappointment, etc. Further, there may be situations where secondary control is called for. It is obviously counter-productive when action and striving will result in success, but it may be of value when the environment is uncontrollable. The well-functioning person will learn to discriminate these situations and will utilize the appropriate process.

Rothbaum et al. argue that by "giving up" after non-contingency, subjects make the outcome more predictable, reducing the possibility of disappointment, and thus feeling a greater sense of control. If this is so, subjects should not show motivational and cognitive deficits, as defined by Abramson, Seligman, and Teasdale (1978), if they are offered an opportunity to make the testing situation more predictable. It is suggested in fact that subjects exposed to failure will show increased motivation (i.e. initiation of voluntary responses) and no cognitive deficit (i.e. no evidence that subjects believe outcomes to be independent of their responses) when this allows them to make the situation more predictable.

Such a situation can be offered to subjects if, instead of using the usual second problem-solving task, with the dependent variables being response latencies and number of successful solutions to the problems, problems of the kind created by Westcott (1968) are used. Each of these problems consists of a series, the last member of which the subject must deduce, on the

basis of clues which are offered sequentially. The subject chooses the number of clues s/he wishes to see (between zero and five) before guessing at the answer. This set of problems offers, as well as measures of response latencies and number of correct responses, another measure, the number of clues used. This type of problem was used in this study. (See Appendix A.)

It was assumed that subjects who had given up would use fewer clues than subjects who had not experienced unsolvable problems. Since they presumably believe outcomes to be independent of their responses, more clues would not help them to do any better than a wild guess. Moreover, subjects who have retarded initiation of voluntary responses would not choose to look at more clues. If, on the other hand, "helplessness" allows subjects to make their performance on the next task more predictable, Westcott's task offered an opportunity to do this without giving up since the more clues taken, the more predictable the correctness of the answer will be. Note that by this logic, it is also possible that increased response latencies represent subjects' attempts to be more sure of solutions before offering them. Gregory (1978) assumed that longer decision time on an angle matching task indicated a belief in control, and found that internals spent more time on a task than externals when failure was punished, replicating, with refinements, Rotter and Mulry's (1965) findings, cited in Gregory.



Furthermore, since each subject rated his/her confidence in his/her response to each question, this information could be compared between subjects in the solvable and unsolvable conditions. Subjects who were made helpless should have, by and large, evinced the lowest confidence possible in their answers ("wild guess"). If, however, they utilized the clues to make their performance more predictable, it was assumed that their confidence level would not be any lower than the subjects in the solvable condition. Last, it was possible to calculate the efficiency of subject's problem-solving, by dividing the number of correct answers by the number of clues used. It may well be that the helplessness effect is one of decreased efficiency rather than decreased motivation. There were then, five dependent measures; response latency, number of clues used, number of correct responses, efficiency, and confidence level.

Aside from the main experimental variable being manipulated (solvability of the training problems) measures of several personality variables were included in this study, namely locus of control and self-esteem. Locus of control has been shown to be related in relatively complex ways to helplessness (Hiroto, 1974; Pittman & Pittman, 1979). Rothbaum et al. suggest that internals may, in fact, become truly helpless after failure while externals utilize secondary control, such as increasing prediction, more readily.

Self-esteem was included as a personality measure although the relationship of self-esteem to the dependent measures was

speculative. It was considered likely that individuals with low self-esteem would use more clues than individuals with high self-esteem since they fear failure more. It was further suggested that in the unsolvable condition this relationship would be stronger.

After the training task, subjects were asked to estimate their ability to do problems of the type given in the test task, and to estimate the percentage of subjects who would do better than they on the task. It is predicted that, as Rothbaum et al. suggest, as a strategy for reducing disappointment on the test task, subjects in the unsolvable condition would have reduced expectancies for success compared to subjects in the solvable condition. This question also offered a test of Frankel and Snyder's (1978) egotism hypothesis. If subjects attempt to protect self-esteem after unsolvable problems, they should rate their ability as high or higher than subjects in the solvable condition. They may expect others to do better than them since they presumably are expending little effort on the tasks. Subjects were also asked to make attributions for their performance on the training task. The response to this question provided more evidence bearing on the validity of the egotism model and the secondary control model. The egotism model suggests subjects in the unsolvable condition would attribute failure to lack of effort, while Rothbaum et al. suggest they would attribute failure to lack of ability.

In summary, then, similar predictions would be made from the Rothbaum et al. model and the reformulated learned helplessness model for the attributions subjects should make after being exposed to the training phase of the procedure. Both models agree that subjects in the unsolvable condition should feel less control, should state that a higher percentage of subjects did better than they and should state that they did less well, compared to subjects in the solvable condition. However, Rothbaum et al. predict that subjects in unsolvable condition will make limited ability attributions as a way of increasing the predictability of the test task. Abramson et al., contrast would suggest that the attributions do not increase the predictability of the test task. Subjects should also provide lower estimates of their ability to do the test task than subjects in the solvable condition . This prediction, while important to the Rothbaum et al. model, does not differentiate the two models, since the learned helplessness model makes no prediction other than that the nature of these attributions will govern the effects of the perception of uncontrollability. Moreover, subjects who perceive themselves as personally helpless might naturally estimate their ability to do a second task lower than subjects who are not helpless, without violating any assumptions of the learned helplessness model. The egotism model, on the other hand, implies that, since subjects are motivated to protect self-esteem, they should not make attributions to limited ability nor should subjects in the

unsolvable condition rate their ability to do the test task lower than subjects in the solvable condition do. This set of predictions then, is important to support the Rothbaum et al. model and differentiates it from the egotism model, but does not distinguish it from the learned helplessness model.

Use of the the Westcott problems was expected to differentially test predictions from the learned helplessness and Rothbaum et al. models. The Rothbaum et al. model postulates that subjects exposed to unsolvable problems give up in order to gain control through making their performance on the next task more predictable. If this is so, these subjects should utilize the opportunity to use the clues for this purpose by taking more clues than subjects in the solvable condition. If, as the learned helplessness model predicts, subjects give up trying to exert control in any way, they should not take more clues. Rothbaum et al's model would not make any predictions about whether subjects would take more time, or solve more problems incorrectly. The learned helplessness model predicts that subjects in the unsolvable condition will take more time and solve more problems incorrectly. This model would also predict that subjects in the unsolvable condition will be less confident about their answers to the individual problems in the test task than subjects in the solvable condition. On the other hand, if Rothbaum et al. are correct, subjects in the unsolvable condition would not necessarily be less confident than subjects in the solvable condition since they will have gained a sense of

predictability. The last set of questions in the study is asked after the test task. Subjects are asked to estimate how well they did on that task. Neither the reformulated learned helplessness model nor the Rothbaum et al. model would suggest a prediction of the responses to this question. However, these two models would differentially predict the response to the next question which asked subjects to state their confidence in their estimates of their performance. If the learned helplessness model is veridical, subjects in the unsolvable condition ought to answer this question more negatively than subjects in the solvable condition. In other words, if these subjects perceive outcome to be non-contingent they should not be sure of their estimate of their performance. Neither the learned helplessness model nor the Rothbaum et al. model would make predictions about subjects' attributions after the training task.

The final set of differential predictions from the Rothbaum et al. model and the learned helplessness model concern the performance of subjects with an external locus of control or with low self-esteem versus those with an internal locus of control or with high self-esteem. The former subjects would more readily perceive the testing situation as uncontrollable. If the learned helplessness model is correct, subjects with low self esteem and externals would be expected to have more severe or at least the same motivational deficit after unsolvable problems than subjects with high self-esteem or internals. They should take fewer clues, more time, and solve the same or fewer

problems. In contrast, Rothbaum et al. similarly hypothesize that these subjects will "give up" attempts to exert direct control more readily than their counterparts after unsolvable problems but that this is, for these people, a way of regaining control through prediction and thus they should tend to take more clues since this allows them to better predict the outcome of their efforts. With the foregoing reasoning in mind, four hypotheses were developed.

#### Hypotheses:

1. Subjects in the unsolvable condition will use more clues than subjects in the solvable condition on the test task.
2. Externals on the personal control subscale will use more clues than internals on that subscale, in the unsolvable condition.
3. Subjects low in self-esteem on the general subscale will use more clues than subjects high in self-esteem on that subscale. The correlation between clue use and self-esteem will be higher in the unsolvable condition than the solvable condition.
4. Subjects in the unsolvable condition will estimate their ability to do the test task lower than subjects in the solvable condition. They will attribute failure on the training task to ability rather than effort.

Overview: Subjects were solicited from undergraduate classes, and were told that the research was on "the relationship of

personality variables to some cognitive skills". Subjects were asked initially to complete the locus of control scale, and, on the basis of their scores on the personal control subscale, and gender, were assigned to groups. Further testing was conducted individually. On arrival at the research space they were told that the experimenter was running two studies, on separate cognitive skills, consecutively. After finishing the self-esteem scale subjects were told that the test they were to take measured an important skill. They were given four problems of the Levine Discrimination Task type, receiving either solvable or unsolvable problems. They then were asked to estimate the percentage of other subjects who did better than they on the test, to evaluate their own performance and make attributions for it and to give their opinion on the relationship of the test to academic achievement. Following this, subjects were taken to another room where the second experimenter asked them to estimate the percentage of other subjects who would do better than them on the "problem solving tasks" and to estimate their own ability. Subjects were given the Westcott problem solving tasks, and finally, asked several debriefing questions, including a question about what affected their performance on the second task. They were then debriefed.

## B. METHOD

### DESIGN

Initially, subjects were assessed for locus of control on the personal control subscale of the locus measure. On the basis of within-sex median splits, they were assigned to male or female internal or external groups. (See Myers, 1966, for a discussion of the relative merits of extreme groups versus random selection designs.) The median for males was 54; for females, 52. Within each of these groups, the first of each pair of subjects to be tested was randomly assigned to the solvable or unsolvable condition and the next was assigned to the remaining condition. A 2 (male versus female) X 2 (external versus internal locus) X 2 (solvable versus unsolvable) fixed effects design with nine subjects per group was thus created.

### SUBJECTS

Subjects were 48 female and 40 male university students, with a mean age of 26 years, 7 months. Subjects were recruited from undergraduate classes and through posters placed around the university. Six female and three male subjects were excused from the study for suspicion about the feedback they received: five females were excused for failure to solve any of the training problems; and one female and one male subject were excused for failure to understand the problem. Each was replaced with the next subject of his/her gender and locus to appear for testing. Analysis was done on the data from 36 males and 36 females.



## MEASURES

Rotter's I-E scale has been the standard measure of locus of control but its unidimensionality has been widely criticized. A number of researchers (Levenson, 1981, Reid & Ware, 1981) have developed new scales intended to measure specific aspects of locus of control. In fact, Paulhus and Christie (1981) have argued that locus of control may be four-dimensional. The four dimensions they suggest are the source of control (e.g. self, others, chance), its valence (whether there is control or not), the sphere of activity in which the control is exerted (personal, interpersonal, sociopolitical), and the target of control (self or others).

The choice of locus of control measure ought then to be governed by the elements of locus of control that are pertinent to the subject under investigation. For this study, with its emphasis on academic achievement and its use of a student population, Paulhus' (1977) Spheres of Control scale (SOC) was chosen, since it subsumes three subscales, each of which measures a different sphere of control. The three subscales measure personal efficacy (Pe), interpersonal control (Ip), and sociopolitical control (Sp). Each subscale consists of 10 questions (based on a 7-point Likert format). Because of the Likert format, subjects have to comprehend only half as many statements as they do in Rotter's scale and thus the test takes less time to administer. Grundberg, Straub, Apple, and Schacter (1978) cited in Paulhus and Christie (1981) found that scores on

the Pe subscale predicted effort on two related measures of skill (button pressing) with correlations of .41,  $p < .03$  and .43,  $p < .02$ . Test-retest reliability over four weeks is .90 for the full scale and alpha reliabilities are .75, .77, .81 for the three subscales (personal, interpersonal, and sociopolitical control, respectively). The correlations of the subscales with social desirability are all below .20 (the correlation of Rotter's I.E. scale with social desirability was  $-.32$  in the same study). Correlations between Rotter's I-E scale and the SOC subscales PE, IP, and SP are  $-.37$ ,  $-.28$ , and  $-.50$  respectively. (The measures are scored in opposite directions). The subscale Pe was used to assign subjects to locus categories.

Subjects were also assessed for self-esteem, using Battle's (1981) Culture-Free Self-Esteem Inventory (CSEI). The CSEI has three subscales, general, social, and personal self-esteem (G, S, P). Subscale G, which appears to assess achievement oriented self-esteem, was assumed to be most predictive of subject's behaviour on these achievement tasks. Test-retest reliability, over four weeks, is .82 for the whole scale, and .82 (G), .56 (S), .78 (P) for the subscales. Alpha reliabilities for the subscales are .78 (G), .57 (S), .72 (P). Intercorrelations among subscales range from .14 to .91 (with the highest being between the general subscale and the total score).

Attribution questions.

At the end of both the training phase and the test phase, subjects completed a series of four questions (from Gong-Guy and

Hammen, 1980), requiring them to attribute their performance on the just finished task to a) internal or external b) stable or unstable c) global or specific and d) controllable or uncontrollable causes. Each dimension was rated on a 7 point scale anchored at each end with statements (e.g. complete control vs. no control at all). The highest score (seven) was assigned to the internal, stable, global, and controllable ends of the dimensions. This attribution measure was chosen since there is increasing concern in the attribution literature with the subjective meaning of causes. Weiner (1982) notes that "the taxonomic placement of a cause depends upon its subjective meaning" (p. 168). Therefore, researchers such as Gong-Guy and Hammen (1980) have used questionnaires which ask subjects to make attributions, not to a limited set of causes, such as ability, effort, etc. but rather on a set of dimensions considered important. Weiner (1982) has postulated and summarizes evidence for three dimensions (locus, stability, and controllability). To these dimensions, Abramson and her colleagues have added a fourth, globality (Abramson et al., 1978).

#### Training phase questions:

At the end of the training task, subjects were also asked to estimate the percentage of other subjects who did better than they on the test, to estimate how well they performed on a 7 point scale (manipulation checks); to state what had affected their performance (a check for suspicion and an attribution

check), and to estimate, in their own opinion, the relationship between the test and academic achievement (a manipulation check).

#### Test phase.

Before beginning the Westcott problems, subjects were asked to estimate their ability to do the problems and the percentage of subjects who would do better on the problems than they.

The test task consisted of 14 problems modelled on those developed by Westcott (1968) to test intuition. Each problem, consisting of a series of clues, was typed on a set of six 125 x 75 mm white index cards. The first card simply showed the five spaces for clues and the space for the answer (plus the first part of the answer for the analogy problems e.g. high/ \_\_\_). Each of the remaining five cards gave another clue plus any previous clues to a maximum of five clues per problem. Seven problems were based on letters and seven on numbers.

The last set of questions subjects were asked consisted of a further request for the subject's estimate of his/her performance, how sure s/he was of the quality of the performance, a question about how the subject decided to stop taking clues and three debriefing questions (from Orne, 1969, and used by Cole and Coyne, 1977):

- a) What do you think this experiment was about?
- b) What do you think we expected to find?
- c) How do you think other subjects will react to this experiment?

In order to elicit any suspicion about the experiment the

following questions were asked:

d)What do you think the relationship is between this last problem solving task and the perceptiveness task?

e)Do you think the computer program is a good way to present problems? (Probed)

#### PROCEDURE

Subjects were initially told that the experimenter was interested in the relationships between personality variables and cognitive skills. They were asked to complete the SOC scale and to return it to the experimenter. On arrival at the testing space, they were told that the experimenter was running two studies on different cognitive skills consecutively. After completing the self-esteem inventory, subjects were told that the object of the first study, perceptiveness, was "an important skill and related to intelligence and academic achievement", a statement similar to that used by Frankel and Snyder (1978). They were then given five problems of the Levine Discrimination Task type, the first of which was a sample. The problems were administered by an Apple IIe computer. The experimenter sat behind the subject after reading instructions based on Hiroto and Seligman's (1975) instructions.

Each problem consisted of a series of 10 five-dimensional patterns similar to those used by Frankel and Snyder (1978). Each pattern had a right and left side. Each side consisted of either one or the other of the values for each of five dimensions: a) one vs. two letters b) x vs. y c) uppercase vs.

lowercase d)one vs. two dashes e)letters to the right vs. to the left of the dashes. There were, therefore, 10 values altogether and two complementary combinations of values in each pattern (e.g. XX- --y).

The subject's task was to deduce which of the 10 values had been chosen as "the target" for a given problem. The target value was the one which always appeared on the side the subject picked when s/he was correct and never appeared on the side the subject picked when s/he was wrong. For each of the 10 trials in a given problem, the subject pressed one of two buttons on a control box, attached to the terminal by a flexible cable indicating a choice of right or left side. As in Hiroto and Seligman (1975), subjects were allowed 10 seconds to respond to each trial before being told by the experimenter that they had to respond. The computer screen then indicated whether the side chosen contained the target or not. At the end of each problem, a message was displayed on the computer screen, listing all 10 values, and asking the subject to indicate which of the 10 values was the target by typing in the number that corresponded to the value. In the unsolvable condition, as each subject responded with the side s/he considered to contain the target value, s/he was given randomized feedback on whether the side chosen was correct, with 50% of subjects' choices being described as "correct" and 50% as "incorrect" in each problem, using four predetermined series (as in Hiroto and Seligman). Each subject in the unsolvable condition was told, for each

problem, that s/he had failed to deduce the target. Subjects in the solvable condition were given contingent feedback on each trial, and were also contingently informed of whether or not their choice of target was correct.

After completion of the "perceptiveness task", subjects were asked to complete the first questionnaire. They were then escorted by the first experimenter to another room and were introduced to the second experimenter who was "conducting the second study" "on problem solving". Two second experimenters were used; one male, (who interviewed 23 males and 24 females) and one female, (who interviewed 13 males and 14 females). The second experimenters were blind to the subjects' locus of control and assignment to experimental condition. Subjects were read instructions for the problem solving tasks by the second experimenter. These instructions were essentially those given by Westcott (1968), with modifications due to an alternate mode of clue presentation and to the inclusion of time as a measure (Westcott's problems were untimed). Subjects were shown a sample problem, and were asked for performance expectations. Timing began when the subject turned the first card of each problem. Timing ended when the subject began to record the answer. Each subject recorded his/her guess about the answer to each problem and his/her confidence about the answer. A maximum time of 120 seconds to respond was allowed and subjects who reached that limit were informed that they must make a guess about the answer. The experimenter recorded the subject's time to answer

each problem and the number of clues used on each problem.

After completion of the problems, subjects were asked to answer another series of attributional questions, performance questions, and debriefing questions. They were then debriefed.



## C. RESULTS

### Manipulation check

In order to conduct the planned analyses, it was first necessary to ensure that the manipulation was effective. Individual analyses of variance were performed on the three measures intended as manipulation checks as well as on the attributional dimension of control, primarily intended as an attribution measure. The latter is included at this point for comparison with studies which used subjects' estimates of control as a manipulation check.

Subjects in the unsolvable condition believed that a greater percentage of other subjects did better than they on the training task (50.71% vs. 30.72%),  $F(1, 62)=20.79, p<.001$ , estimated their performance as poorer (2.17 vs. 5.14),  $F(1, 63)=108.20, p<.001$  and estimated their control over their performance to be less (4.44 vs. 5.72),  $F(1, 64)=10.88, p<.002$ . There was a non-significant tendency for unsolvable condition subjects to deny the supposed "relationship" between the training task and academic achievement (3.39 vs. 4.14),  $F(1, 64)=10.125, p<.072$ . (Note that Danker-Brown and Baucom, 1982, found a similar, but significant effect.) There were no interactions among gender, locus, or solvability factors.

## Expectancies

It was hypothesized that subjects in the unsolvable problems condition would make lower estimates of their ability to do the test task than subjects in the solvable condition did. Univariate anovas indicated that there were significant differences between the solvable and unsolvable groups in their expectations for their performance on the test task. Subjects in the unsolvable group made lower estimates of their ability to do the problems than subjects in the solvable group (4.31 vs. 4.92)  $F(1,64)=7.74, p<.007$  and expected a higher percentage of others to do better than them (44.61% vs. 29.08%)  $F(1,64)=19.76, p<.001$ .

## Attributions, training task

It was also hypothesized that subjects in the unsolvable condition would attribute failure on the training task to ability rather than effort. A Manova was conducted on the four attribution questions asked at the end of the training task. An overall Hotelling's  $T^2$  showed significant differences for solvability,  $T^2(4, 60)=2.64, p<.043$ . Univariate tests revealed that the difference between the solvable and unsolvable groups was due to a difference in perception of control, with unsolvable condition subjects perceiving themselves as having less control than solvable condition subjects, (4.44 vs. 5.72)  $F(1,63)=10.14, p<.002$ . While Hotelling's  $T^2$  was not significant for locus since  $T^2(4,60)=1.73, p>.15$ , a univariate  $F$  indicated

that the difference between internals and externals in their locus attributions was significant, (4.28 vs. 5.09),  $F(1,63)=3.94$ ,  $p<.05$ . Notably there were no significant differences between solvable and unsolvable groups on other attributional dimensions. (See Tables 1 and 2.) This does not, however, support the hypothesis that subjects in the unsolvable condition would make attributions to limited ability since the attribution ratings for both solvable and unsolvable groups hovered around the midpoint of the attribution dimensions, save for the dimension of control where unsolvable subjects clearly felt less in control than solvable subjects. There were no significant effects for gender.

#### Performance on test task

The bulk of the hypotheses in this study concerned clue use as a measure of the hypothesized increased attempts to make test task outcome predictable in the unsolvable condition.

A multivariate analysis of variance, conducted on the five dependent variables, (number of problems solved, RIGHT; total time taken to solve, TIME; sum of confidence ratings for solution, CON; sum of clues used on a problem, CO; RIGHT/CO, EFF) indicated no effect for solvability, locus, or any interactions ( $p$ 's  $>.25$ ). There was a gender effect,  $T^2(1, 64) = 2.78$   $p<.025$ , with male subjects taking more time (584.81" vs. 483.833")  $F(1,64)=6.26$ ,  $p<.01$ , and more clues (44.72 vs. 40.81)  $F(1,64)=4.37$ ,  $p<.04$ , on the test problems than female subjects.

Univariate tests suggested a tendency for a locus X solvability effect on RIGHT and CON;  $F(1, 64) = 2.89, p < .09$  and  $F(1, 64) = 3.61, p < .06$  respectively. It appeared from means that externals solved more problems correctly and were more confident in the unsolvable condition than the solvable condition and solved more problems correctly and were more confident than internals in the unsolvable condition. There was a locus X solvability interaction on EFF,  $F(1, 64) = 2.89, p < .046$ . (See Tables 3 and 4.) Since no overall Hotelling's  $T^2$  was significant for locus or solvability any possible univariate effects are suspect. Therefore these results must be viewed with a great deal of reservation. Nonetheless, the better performance by externals after unsolvable problems accords with the findings of Gregory et al. (1979) and Pittman and Pittman (1979).

#### Post-hoc analyses of variance

Since it is well-accepted that generalized expectancies will have less influence on performance as the number of trials increases (Rotter, 1982), a multivariate analysis of variance was performed on the first five problems of the test task, in order to investigate the possibility of changes in effects over the problem set. The only significant overall Hotelling's  $T^2$  was for gender,  $T^2(5, 60) = 2.49, p < .04$ . There was a significant difference between males and females in the total time taken to solve the problems with males taking more time than females, (186.1' vs. 149.1'),  $F(1, 64) = 7.50, p < .008$ , (as indeed they

did over the entire set of problems).

Univariate anovas revealed that on these problems, the effect of unsolvability on clue use was  $F(1, 64) = 2.98, p < .09$ . Unsolvable condition subjects took fewer clues than solvable condition subjects, (13.1 vs. 14.2).

The interaction between gender and solvability on clues was  $F(1, 64) = 3.63 p < .061$ . An examination of means indicated that males took fewer clues in the unsolvable condition than in the solvable condition (12.67 vs. 14.78 for internals and 13.33 vs. 15.78 for externals). It appears that, to the extent that subjects in the unsolvable condition did use fewer clues there was some indication that this effect was primarily a male one and occurred in the first five problems.

There were no significant differences for number of right answers nor confidence in answer. These results suggest that the failure to find the hypothesized effects using the entire problem set was not due to a mitigation of the effects over the series of problems.

### Self-esteem

It was hypothesized that subjects with low self-esteem would use more clues than subjects with high self-esteem, resulting in a negative correlation of self-esteem with clue use, and, moreover, that this correlation would be higher in the unsolvable condition than the solvable condition. Neither G, the measure of self-esteem most closely related to achievement

self-esteem nor SEI, the total self-esteem measure, was significantly correlated with clue use. (Correlations in the solvable condition were  $-.02$  and  $-.03$  respectively and in the unsolvable condition were  $.22$  and  $.18$  respectively.) G and SEI were significantly correlated with number of correct solutions and with efficiency. The correlations were in a different direction in the solvable versus the unsolvable condition and these differences were significant, for both G and SEI. No other correlations between measures of self-esteem and the dependent variables were found to be significant. (See Table 5.)

#### Self-esteem, post-hoc analyses

In order to further examine the differences between low and high self-esteem subjects on the test task, subjects were divided into low and high self-esteem groups, with those below the median on the CSEI assigned to low self-esteem groups and those above the median assigned to high self-esteem groups. A multivariate analysis of variance was performed, using gender, self-esteem, and experimental condition as independent variables. (The analysis was collapsed over locus as the original set of planned analyses had revealed no significant effects for this variable.) The results of this Manova revealed significant effects for self-esteem. An overall Hotelling's multivariate  $T^2$  showed a two-way interaction between self-esteem and solvability,  $T^2(5, 60)=2.33$ ,  $p<.053$ . Univariate analyses were significant only for RIGHT,  $F(1, 64)=8.38$ ,  $p<.005$  and EFF,

$F(1, 64) = 8.27, p < .005$ . An overall Hotelling's  $T^2$  for the three-way interaction of gender, self-esteem, and solvability was non-significant,  $F(5,60)=1.78, p < .130$  and therefore univariate tests are interpretable only with caution. The univariate test of significance was, however, significant for the three-way interaction of gender, self-esteem, and solvability on RIGHT,  $F(1, 64)=8.50, p < .005$  and EFF,  $F(1,64) = 5.90, p < .018$ . (See Tables 6 and 7.)

An inspection of means (see Figure 1) revealed that the interaction of solvability and self-esteem was primarily due to the males in the sample. Moreover, high self-esteem males solved more problems than low self-esteem males in the solvable condition but solved fewer problems in the unsolvable condition. The same pattern of effects was found for efficiency.

In order to explicate these findings, the correlation between self-esteem and attributions was examined. Rothbaum et al. suggest that low self-esteem subjects are particularly likely to attribute failure to limited ability. There were no significant correlations between the two self-esteem measures and attributions in the solvable condition. In the unsolvable condition subjects who had lower self-esteem tended to make more internal but unstable attributions. The correlations of G and SEI with internality were  $-.326$  and  $-.360$  respectively,  $p$ 's  $< .001$ . The correlations of G and SEI with stability were  $.315$  and  $.425$  respectively,  $p$ 's  $< .001$ . Moreover, the correlation between internality of attributions in the training task and mean number

of correct solutions in the test task was .41 ( $p < .001$ ) for the unsolvable condition and  $-.06$  (NS) for the solvable condition. These two correlations are significantly different ( $p < .05$ ). After failure, the attributions low self-esteem subjects made were more internal than the attributions high self-esteem subjects made and internality for failure was associated with solving more problems on the test task. There were no significant correlations between self-esteem and expectancies ( $r$ 's  $< .21$ ).

There were no significant correlations between clue use and any measure of self-esteem ( $r$ 's  $< .22$ ). There were no effects for locus or gender.

#### Predictability of test task

In order to evaluate whether subjects did indeed feel that the outcome of the test task was predictable, overall, subjects were asked several questions at the end of the test task. There was a significant difference between the solvable condition and unsolvable condition groups in their estimates of how well they had done on the test task with unsolvable condition subjects estimating their performance as better than solvable condition subjects did (4.86 vs. 4.78)  $F(1,64) = 4.98$   $p < .025$ . On the other hand, when asked to evaluate how sure they were of their estimate of their performance, both solvable condition and unsolvable condition groups were equally sure (4.28 vs. 4.86)  $F(1, 64) = 0.01$ ,  $p < .920$ . This suggests that subjects in the



unsolvable condition did not feel that outcomes were independent of actions and, moreover, that these subjects felt that the test task was predictable.

#### Attributions, test task

Finally, the set of attribution questions for the test task were analysed. The overall Hotellings  $T^2$  for each of gender, locus, and solvability revealed no effects ( $p$ 's  $> .15$ ). Since this suggested that subjects who rated their control after the training task as low had raised their assessments after the test task, a new variable, control, was calculated. This consisted of a subject's estimate of his/her control after the test task minus his/her estimate of control after the training task. A univariate  $F$  test revealed significant differences between subjects in the solvable and subjects in the unsolvable conditions ( $-.114$  vs.  $.972$ ,  $sd$ 's  $1.21$  vs.  $1.44$ ),  $F(1, 63)=11.30$ ,  $p<.006$ . While subjects in the solvable condition did not change their estimates of their control, subjects in the unsolvable condition did.

Table 1 -Attributions after training task

	*SOLVABLE	*UNSOLVABLE
LOCUS	4.91(1.81)	4.44(1.70)
STABILITY	3.83(1.84)	4.08(1.86)
GLOBALITY	4.09(1.60)	3.72(1.63)
CONTROL	5.69(1.32)	4.44(1.89)

\*Mean(Standard Deviation)

Table 2 - Attributions after training task

	*FEMALE	*MALE	*INTERNAL	* EXTERNAL
LOCUS	4.750(1.84)	4.600(1.68)	4.278(1.75)	5.086(1.69)
STABILITY	3.833(1.95)	4.086(1.74)	3.861(1.87)	4.057(1.83)
GLOBALITY	3.722(1.61)	4.086(1.62)	4.083(1.65)	3.714(1.58)
CONTROL	5.194(1.75)	4.914(1.74)	5.083(1.75)	5.029(1.76)

\*Mean(Standard Deviation)

Table 3 - Means and standard deviations for gender, locus, and solvability

	MALES			
	SOLVABLE		UNSOLVABLE	
	*INTERNAL	*EXTERNAL	*INTERNAL	*EXTERNAL
CLUES	44.67(4.85)	48.67(8.86)	42.11(6.57)	43.44(8.02)
TIME	611.7(181.6)	565.2(74.2)	583.0(172.0)	579.3(163.3)
RIGHT	6.67(2.35)	7.00(3.16)	6.33(2.35)	8.56(1.67)
EFF	0.149(0.05)	0.150(0.08)	0.150(0.05)	0.204(0.06)
CON	45.00(3.74)	42.78(4.21)	41.89(4.78)	46.00(3.46)

\*Mean(Standard deviation)

Table 4 - Means and standard deviations for gender, locus, and solvability

	FEMALES			
	SOLVABLE		UNSOLVABLE	
	*INTERNAL	*EXTERNAL	*INTERNAL	*EXTERNAL
CLUES	39.44(5.08)	41.44(9.37)	42.32(9.21)	40.00(9.86)
TIME	477.2(142.8)	466.6(181.2)	495.6(212.9)	496.0(203.1)
RIGHT	6.32(1.87)	5.56(1.01)	6.22(2.82)	7.32(2.87)
EFF	0.160(0.04)	0.140(0.04)	0.150(0.07)	0.185(0.06)
CON	43.11(6.03)	41.78(4.09)	41.32(4.82)	42.32(6.65)

\*Mean(Standard deviation)

Table 5 - Correlations of self-esteem measures with dependent variables

		RIGHT	EFF	CLUES	TIME	CON
G	SOLV	.410*a	.358*d	-.024	.214	.171
	UNSOLV	-.289*a	-.397*d	.223	.212	-.085
SEI	SOLV	.383*b	-.439*c	.184	.192	.139
	UNSOLV	-.325*b	-.398*c	.148	.220	-.096

\*  $p < .001$

a, b, c, d: differences between pairs,  $p < .001$

Table 6 - Means and standard deviations for gender, self-esteem, and solvability

	MALES			
	SOLVABLE		UNSOLVABLE	
	*HI SE	*LO SE	*HI SE	*LO SE
CLUES	47.10(2.30)	46.12(2.70)	42.82(2.32)	42.71(2.57)
TIME	639.6(51.0)	524.4(21.0)	569.8(37.8)	599.0(83.0)
RIGHT	8.30(0.76)	5.00(0.63)	6.36(0.58)	9.14(0.67)
EFF	0.179(0.02)	0.112(0.02)	0.149(0.01)	0.219(0.02)
CON	45.60(1.42)	41.75(0.70)	43.45(1.52)	44.71(1.49)

\*Mean(Standard deviation)

Table 7 - Means and standard deviations for gender, self-esteem, and solvability

	FEMALES			
	SOLVABLE		UNSOLVABLE	
	*HI SE	*LO SE	*HI SE	*LO SE
CLUES	39.75(6.39)	41.00(8.39)	42.86(7.63)	40.09(10.48)
TIME	535.9(175.0)	420.7(130.3)	549.1(239.7)	461.8(177.6)
RIGHT	5.88(2.18)	6.00(0.81)	6.71(2.81)	6.82(2.96)
EFF	0.150(0.05)	0.150(0.03)	0.160(0.07)	0.172(0.07)
CON	42.25(6.25)	42.60(4.20)	40.57(4.39)	42.64(6.41)

\*Mean(Standard deviation)



RIGHT

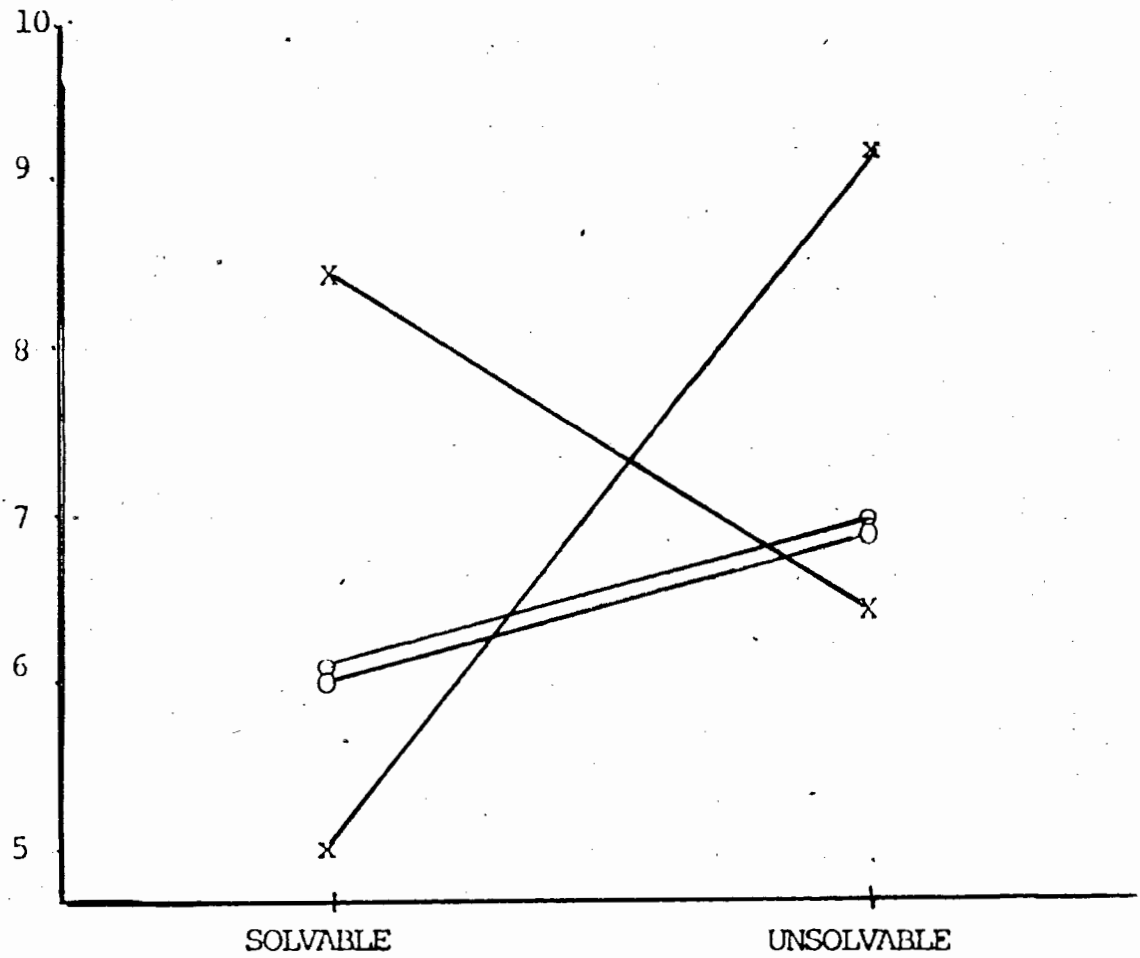


Figure 1. Interaction of solvability and self-esteem.

X = High self-esteem, males.

x = Low self-esteem, males.

O = High self-esteem, females.

o = Low self-esteem, females.

## D. DISCUSSION

The purpose of this study was to contrast Rothbaum et al.'s model of 'secondary control' with Abramson et al.'s model of learned helplessness. The former argue that subjects in learned helplessness (type) studies, rather than "giving up" attempts to exert control, in fact attempt to exert 'secondary control', thereby avoiding disappointment and increasing the predictability of the ensuing task by attributions to severely limited ability. Moreover, Rothbaum et al. suggest that externals and subjects with low self-esteem will be most prone to attempt to reexert secondary control.

Overall, then, do the results of this study support the Rothbaum et al. model or the reformulated learned helplessness model? Rothbaum et al. predict that subjects will make limited ability attributions after unsolvable problems. The attributions subjects made were at the midpoints of the scales for all groups and did not differ between solvable and unsolvable conditions save for the dimension of control. While this result does not support the prediction of an increased use of the attribution to limited ability, it does not contradict it either. Subjects appear to retain their usual attributions, altering only the dimension of controllability i.e. while subjects do not make more internal attributions after unsolvable problems, they do not deny internality and do acknowledge failure to control the

contingencies of the task. Furthermore, subjects' estimates of their abilities to do the test task were lower after unsolvable problems, than after solvable problems Rothbaum et al. model. This suggests that, as Rothbaum et al. postulate, subjects do rate their ability lower after failure and change expectancies accordingly. This result is not inconsistent with the learned helplessness model. It is inconsistent with the egotism hypothesis since subjects attempting to maintain self-esteem should not estimate their ability to do the next task lower after unsolvable than solvable problems.

Rothbaum et al. also argue that externals and those with low self-esteem will tend to use attributions to limited ability as a control strategy. This did not prove to be the case for externals.

There was, however, a negative correlation between self-esteem and internality of attributions after failure, which supports Rothbaum et al.'s hypothesis and is congruent with Layden's (1976) study. There was also a positive correlation between self-esteem and stability, suggesting that subjects with low self-esteem also made more unstable attributions. In sum then, there is some evidence that subjects modified their attributions and expectancies as postulated by Rothbaum et al, but it seems unlikely that they in fact modified their estimates of their own ability in the extreme way suggested by Rothbaum et al.

The finding that low self-esteem subjects (who performed better after unsolvable problems) also made unstable attributions while high self-esteem subjects (who performed worse after unsolvable problems) made more stable attributions accords with the Abramson, Seligman, and Teasdale (1978) reformulation of learned helplessness. Subjects who made unstable attributions would not be expected to evince helplessness after unsolvable problems while subjects who made stable attributions would be.

Rothbaum et al. define predictive control as the attempt to regain a sense of control by making the outcome of events more predictable. Clue use in the test task was considered to measure the attempt to regain secondary control through increased prediction of the outcome, since each succeeding clue gives the subject more information about the correctness or incorrectness of his/her answer (albeit at the cost of a lower score on the test). It was hypothesized that subjects in the unsolvable condition, especially externals and subjects low in self-esteem would take more clues in order to better predict their performance and to avoid disappointment.

None of the predictions about clue use derived from either the Rothbaum et al. model or the Abramson et al. model were supported. While subjects in the unsolvable condition did not take more clues, thus failing to support the Rothbaum et al. model, they did not take fewer clues either, thereby failing to support the learned helplessness model. The predicted interactions of locus of control with clue use and self-esteem

with clue use did not occur, further lack of support for the Rothbaum et al. model.

However, there were no main effects for solvability on latency of response, number of correct solutions, efficiency in problem solving, or confidence in solution. This is inconsistent with predictions from the learned helplessness model, the more so since subjects in the unsolvable condition clearly generalized their experience in the training task to the test task. This result is not inconsistent with the Rothbaum et al. model since that model postulates that subjects gain a sense of control through prediction of future performance. The difference between groups in their answers to the question concerning their confidence in their estimates of their performance on the test task was in the direction predicted from the Rothbaum et al. model and counter to the prediction from the learned helplessness model.

The final differentiation between the learned helplessness model and the the Rothbaum et al. model occurs when the performance of internal and of high self-esteem subjects is compared to that of the external and low self-esteem subjects. Subjects with low self-esteem performed better after unsolvable than solvable problems, while subjects with high self-esteem performed worse after unsolvable than after solvable problems. There was also a tendency for externals to perform better after unsolvable than after solvable problems. These results are incompatible with the learned helplessness model. While there was

a significant correlation between instability of attribution and low self-esteem, there was no significant correlation between self-esteem and expectancies for performance on the test task. Thus, while low self-esteem subjects may have made more unstable attributions for their performance on the training task, their expectancies for performance on the test task do not appear to be any different from the expectancies of high self-esteem subjects. The prediction derived from the learned helplessness model, that subjects with low self-esteem should be more susceptible to performance deficits and certainly not less, is not supported.

These results do support to some extent the Rothbaum et al. model. The model predicts that externals and subjects with low self-esteem will be more likely to utilize secondary methods of control. It is possible that these groups were able to reestablish a sense of control that allowed relative success at the task.

In brief, subjects in the unsolvable condition did not make attributions that differed from subjects in the solvable condition after the training task, or take more clues than subjects in the unsolvable condition. There were no interaction effects for either self-esteem or locus of control on these variables. These data contradict the predictions derived from the Rothbaum et al. model. On the other hand, subjects in the unsolvable condition did make lower estimates of their ability to do the test task than subjects in the solvable condition did, subjects with low self-esteem made attributions that were more

internal than subjects with high self-esteem after unsolvable problems, subjects in the unsolvable condition were surer of their estimates of their performance on the test task than subjects in the solvable condition and external subjects and subjects with low self-esteem performed better after unsolvable problems than after solvable problems. This evidence supports the Rothbaum et al. model. Overall, then, while the results of this study do not strongly support the Rothbaum et al. model, they do not refute it and do provide some support for it. The results are however, largely inconsistent with predictions derived from both the reformulated learned helplessness model and the egotism model.

Is there an explanation for these results, other than the most parsimonious conclusion that the Rothbaum et al. model does not predict behaviour, at least insofar as this type of study is concerned? The manipulation was clearly effective. Subjects in the unsolvable condition rated their performance and their control significantly lower than subjects in the solvable condition, as has been found in other studies.

There is a possibility that the study was too rigorous a test of the model. A number of studies have found that subjects fail to generalize the experience of failure to another testing situation and Miller and Norman (1979) point out that "the failure to demonstrate cross-situational generalization is a major flaw in the learned helplessness literature" (p. 104).

However, criticism has been levelled at studies which conduct the test phase within the same situation as the training phase. Wortman and Brehm (1975) for example, note that generalization under those circumstances may be the result of demand characteristics, hostility toward the experimenter, or may be, simply, trivial. With this in mind, the second task was administered in a different room, by a different experimenter and presented as a different cognitive skill. Nonetheless, subjects' expectancies for their performance on the test task were significantly lower for unsolvable condition subjects than for solvable condition subjects, suggesting that the experience of failure generalized to the second task. On the other hand, it is by no means uncommon to find in studies where the training and test task are separated that there are no differences between solvable and unsolvable groups (see Roth, 1980).

Moreover, in the absence of self-focussing, Carver, Blaney, and Scheier (1979) found no differences in performance on the test task between subjects expecting success and subjects expecting failure after exposure to unsolvable problems, nor did Kernis et al. (1982) find differences between subjects attributing failure externally and subjects attributing failure internally. Both studies employed separate testing situations. (There were no success conditions in these studies.) Danker-Brown and Baucom (1982) found no stable relationship between attributions for failure and performance on a test task



Boyd (1982) points out the importance in the literature of an alternate, S-R behavioural interference model of learned helplessness. He offers evidence of counter-conditioning in learned helplessness studies, and argues for the validity of Amsel's frustration motivation model in accounting for results in this area. He notes that "increased frustration, anxiety, and hostility are typical responses to frustrative non-reward" (p. 740). Frustration induced responses would generalize more readily to similar situations and less readily to different ones.

It is possible that, by verbalizing their expectancies, and thus predicting their performance, subjects in the unsolvable condition reduced arousal and anxiety and were able to perform the test task as well as, but for the most part no better than, subjects in the solvable condition. The act of giving expectancies itself may have resulted in the failure to find differences between solvable and unsolvable condition subjects. It has been suggested that the experience of lack of control results in anxiety (Bennett & Holmes, 1975; Coyne, Metalsky, & Lavelle, 1980). Frustration and arousal are often reported by subjects (Hiroto & Seligman, 1975, Miller & Seligman, 1975; Roth & Kubal, 1972). Boyd (1982) found evidence that subjects attempting to solve problems that were not solvable did display behavioural persistence (68% of the total responses made by subjects on an unsolvable task were to a single stimulus dimension) and found significant negative correlations, for subjects in the unsolvable condition, between response

persistence on the training task and performance on the test task. Fogle (1978) argues that individuals may try too hard to control a situation, resulting in "learned restlessness" and failure, as in the case of the test anxious student he gives as an example. He states that "emotional arousal in the form of anxiety and/or frustration is naturally prominent in learned restlessness". Fogle and Dyal (1983) found that giving up reduced subjective anxiety about sleep for insomnia patients (and improved sleep). Wortman and Brehm (1975) also suggest that over-arousal may account for poor performance after experiencing non-contingency. Steptoe (1983) cites several studies (Manuck, Harvey, Lechleiter, & Neal, 1978, and Solomon, Holmes, & McCaul, 1980) to support his contention that "effortful behavioural coping" elicits increased systolic pressure in subjects participating in a learned helplessness-like training task. Bennett and Holmes (1975) found that explanations for failure, prior to failure feedback, were effective in reducing subjective anxiety and pulse rate. Dweck and Gilliard (1975) have found evidence that verbalizing expectancies alters subjects' subsequent behaviour.

Moreover, Halisch and Heckhausen (1977) found that, while young children made uncertain about their performance on a task increased information search (measured in terms of glances at the experimenter's progress) and improved performance, subjects who had either high or low expectancies for success (i.e. who were certain of outcome) did not differ.

The effect that did occur was associated with a group that was hypothesized a priori to use secondary control, namely subjects with low self-esteem. Low self-esteem subjects solved more problems correctly in the unsolvable condition than in the solvable condition. Reactance after failure has been found when subjects expected a difficult task (Frankel & Snyder, 1978), when subjects were told failure was due to limited ability (Hanusa & Schulz, 1977; Wortman, Panciera, Shusterman, & Hibscher, 1976) and in subjects with low self-esteem (Brockner et al., 1983). It may be pertinent to note that the effect of failure on an individual expecting failure (i.e. someone with low self-esteem), of a forthcoming difficult task on an individual expecting failure (i.e. someone who has just experienced failure), of a suggestion of limited ability on an individual who has just failed, and of an expectancy to fail, is to reduce uncertainty. Conversely, the effect of failure, or of a difficult task on an individual who expects success is to increase uncertainty. (As an aside, it is interesting to note that Gong-Guy and Hammen, 1980, found that, although depressed and non-depressed subjects did not differ on the four attributional dimensions postulated by Abramson, Garber, and Seligman, 1980, depressed subjects did perceive more uncertainty in their lives than non-depressed subjects).

Folkman (1984) points out that emotion-focussed coping often accompanies problem-solving coping in stressful situations. It may be that any intervention which reduces uncertainty reduces

the emotion-focussed coping subjects do and allows for more problem-focussed coping.

This may explain the reversal of helplessness effects that Brockner et al. (1982) found for their subjects. There was a tendency for subjects with low self-esteem to perform better after solvable than unsolvable problems, while high self-esteem subjects performed worse after unsolvable problems, when relatively few problems were administered in the training task (48 trials, analogous to this study). When a large number of problems was utilized in the training task, the effect was reversed. (Similar reversals have been found for subjects differing on locus of control, e.g. Gregory et al., 1979) Brockner et al. note that low self-esteem subjects are more involved with the task after "small failure" (p. 204) and that involvement predicts performance on the test task. Similarly, high self-esteem subjects are more involved than low self-esteem subjects after "extended failure" (p. 204) and this is associated with improved performance versus low self-esteem subjects. Possibly, for subjects with low self-esteem, doing badly is expected and does not result in as much anxiety and doubt as for subjects with high self-esteem. If high self-esteem subjects do not expect failure, it may lead to the increased attributional activity and the failure to concentrate on the task that has often been found after failure. (Weiner, 1982, summarizes research in this area.) Eventually, with "extended failure" high self-esteem subjects may learn to expect to do badly. On the

other hand, for low self-esteem subjects, a small amount of failure may be expected but a large amount may be unexpected and debilitating.

### Conclusion

This study examined Rothbaum et al.'s two-process model and found some support for it. Subjects who worked on unsolvable problems, compared to subjects who worked on solvable problems did rate their abilities significantly lower and expected to do worse on a second task as predicted by the model. Moreover, subjects did not differ across groups in their assessments of the predictability of the test outcome. However, clue use, which would increase the predictability of the outcome, did not increase after unsolvable problems, nor did the postulated personality variables have any effect on clue use. This suggests a relatively weak effect, if any.

It may be that subjects were able to reduce uncertainty about the test task through the process of answering attribution and expectancy questions. Inconsistencies in the original learned helplessness formulation led to a reformulation (Abramson, Seligman, & Teasdale, 1978). Researchers now routinely include attributional questions in their studies. These studies also have produced a variety of results with, for example, external attributions leading to reactance while internal attributions result in helplessness (Frankel & Snyder, 1978); internal attributions leading to reactance while external attributions result in no differences (Hanusa & Schulz, 1977); and

attributions being associated only unstably with performance (Danker-Brown & Baucom, 1982).

It becomes clear that as Jones, cited in Harvey, Ickes, and Kidd (1978) said, "We're not adept enough yet to ask the right kinds of questions and to be sensitive to the sequence of questions. This is particularly a problem in the perceived freedom and attribution of responsibility areas. You can get almost anything you want, depending on how you phrase the questions" (p. 378). The confusing variety of effects underscores the necessity to vary experimental procedure. It is not enough to simply repeat studies. Nonetheless, it is also clear that we are beginning to delineate the circumstances under which failure and loss of control will lead to certain kinds of responses and the circumstances under which other responses will ensue.

Certain circumstances, and certain personality types clearly produce different outcomes but the area is not yet well-defined enough to elucidate the interactions. Chanowitz and Langer (1980) point out the importance of "the idea that the study of control is not the study of outcomes but rather the study of process" (p. 119, italics original) and maintain that "for ourselves as researchers, the task is not to gather 'more' data from our subjects. Instead we should gather 'other' data - data that will show more of what the subject knows" (p. 129). In this vein, this study suggests that subjects may be able to reassert control after exposure to unsolvable problems in a way that is not congruent with control theory.

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E. Appendix A

SAMPLE TEST TASK PROBLEM

Problem 1

---

(1) BC  
    (2)           (3)  
                  (4)           (5)  
                                  ANS. \_\_\_\_\_

---

(1) BC  
    (2) CD,  
      (3)           (4)           (5)  
                                  ANS. \_\_\_\_\_

---

(1) BC  
    (2) CD  
      (3) DE           (4)           (5)  
                                  ANS. \_\_\_\_\_

---

(1) BC  
    (2) CD  
      (3) DE           (4) EF           (5)  
                                  ANS. \_\_\_\_\_

---

(1) BC  
    (2) CD  
      (3) DE           (4) EF           (5) FG  
                                  ANS. \_\_\_\_\_

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## F. Appendix B

### SOC SCALE

Sex: M/F

#### Directions

The following are statements that may describe either yourself or the beliefs you have. Would you please respond to each statement by designating on the scale given with each item the degree to which you agree or disagree with the item. Please note that we are interested in your own opinion, not your judgement of what others think.

1. Children get into trouble because their parents punish them too much.

Disagree 7...6...5...4...3...2...1 Agree

2. When I get what I want it's usually because I worked hard for it.

Disagree 7...6...5...4...3...2...1 Agree

3. Even when I'm feeling self confident about most things, I still seem to lack the ability to control interpersonal situations.

Agree 1...2...3...4...5...6...7 Disagree

4. By taking an active part in political and social affairs we, the people, can control world events.

Agree 1...2...3...4...5...6...7 Disagree

5. When I make plans I am almost certain to make them work.

Disagree 7...6...5...4...3...2...1 Agree

6. I have no trouble making and keeping friends.

Agree 1...2...3...4...5...6...7 Disagree

7. The average citizen can have an influence on government decisions.

Agree 1...2...3...4...5...6...7 Disagree

8. Heredity plays the major role in determining one's personality.

Disagree 7...6...5...4...3...2...1 Agree

9. I prefer games involving some luck over games requiring pure skill.

Disagree 7...6...5...4...3...2...1 Agree

10. I'm not good at guiding the course of a conversation with several others.

Disagree 7...6...5...4...3...2...1 Agree

11. It is difficult for people to have much control over the things politicians do in office.

Agree 1...2...3...4...5...6...7 Disagree

12. I can learn almost anything if I set my mind to it.

Agree 1...2...3...4...5...6...7 Disagree

13. I can usually establish a close personal relationship with someone I find sexually attractive.

Disagree 7...6...5...4...3...2...1 Agree

14. The world is run by the few people in power and there is not much the little guy can do about it.

Agree 1...2...3...4...5...6...7 Disagree

15. There is some good in everyone.

Agree 1...2...3...4...5...6...7 Disagree

16. My major accomplishments are entirely due to hard work and intelligence.

Disagree 7...6...5...4...3...2...1 Agree

17. When being interviewed I can usually steer the interviewer toward the topics I want to talk about and away from those I wish to avoid.

Agree 1...2...3...4...5...6...7 Disagree

18. With enough effort we can wipe out political corruption.

Agree 1...2...3...4...5...6...7 Disagree

19. I usually don't make plans because I have a hard time following through on them.

Disagree 7...6...5...4...3...2...1 Agree

20. If I need help in carrying out a plan of mine, it's usually difficult to get others to help.

Agree 1...2...3...4...5...6...7 Disagree

21. One of the major reasons we have wars is because people don't take enough interest in politics.

Disagree 7...6...5...4...3...2...1 Agree

22. One should always be willing to admit mistakes.

Agree 1...2...3...4...5...6...7 Disagree

23. Competition encourages excellence.

Disagree 7...6...5...4...3...2...1 Agree

24. If there's someone I want to meet I can usually arrange it.

Agree 1...2...3...4...5...6...7 Disagree

25. There is very little we, as consumers, can do to keep the cost of living from going higher.

Disagree 7...6...5...4...3...2...1 Agree

26. The extent of personal achievement is often determined by chance.

Agree 1...2...3...4...5...6...7 Disagree

27. I often find it hard to get my point of view across to others.

Disagree 7...6...5...4...3...2...1 Agree

28. When I look at it carefully I realize it is impossible to have any really important influence over what politicians do.

Disagree 7...6...5...4...3...2...1 Agree

29. A good leader makes it clear to everybody what their jobs are.

Agree 1...2...3...4...5...6...7 Disagree

30. On any sort of exam or competition I like to know how well I do relative to everyone else.

Disagree 7...6...5...4...3...2...1 Agree

31. In attempting to smooth over a disagreement I usually make it worse.

Agree 1...2...3...4...5...6...7 Disagree

32. I prefer to concentrate my energy on other things rather than on solving the world's problems.

Disagree 7...6...5...4...3...2...1 Agree

33. Despite my best efforts I have few worthwhile accomplishments.

Disagree 7...6...5...4...3...2...1 Agree

34. I find it easy to play an important part in most group situations.

Agree 1...2...3...4...5...6...7 Disagree

35. In the long run we, the voters, are responsible for bad government on a national as well as a local level.

Disagree 7...6...5...4...3...2...1 Agree