Learned Helplessness in Elementary School-Aged Children: The Effects of Noncontingency, Failure, and Reinforcement Responsibility on Training and Generalization Task Performance

by

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LEARNED HELPLESSNESS IN ELEMENTARY SCHOOL-AGED CHILDREN: THE EFFECTS OF NONCONTINGENCY, FAILURE, AND REINFORCEMENT RESPONSIBILITY ON TRAINING AND GENERALIZATION TASK PERFORMANCE

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Pursuit of a doctoral degree was, for me, simultaneously a solitary and shared experience. On a most personal level, the times of solitude were times of challenge, discovery, and growth. However, it was the times of sharing, with colleagues, friends, and family, which provided the necessary counterpoint, and gave meaning to the personal growth. Hopefully, the following will express at least a small part of the gratitude I have felt toward the people who have shared my experiences.

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ABSTRACT

The main purposes of the present investigation were to determine, among a sample of fifth grade children (1) whether cognitive and behavioural effects of learned helplessness could be found on a treatment and generalization task; and (2) the relative contributions of noncontingency and constant failure to the learned helplessness effect.

Using a discrimination task, subjects received one of three treatment conditions: veridical feedback concerning the outcome of their response (contingent feedback condition); random failure and success feedback in which the number of positive and negative outcomes for each subject were the same as those received by a yoked contingent feedback subject (noncontingent feedback condition); and, negative outcomes regardless of response (constant failure feedback condition). Four treatment problems, each consisting of 16 trials, were administered to each subject. All of the treatment subjects, plus a control group of untreated subjects received the test task, which consisted of three WISC-R block design problems, repeated on four occasions. Between each administration of the treatment problems and each repetition of the test puzzles, subjects were asked questions designed to tap their perceptions of contingency,

future expectations of contingency, and attributions for failure.

Subjects in the noncontingent feedback condition demonstrated cognitive and behavioural evidence of learned helplessness during test, but not during treatment. In contrast, subjects in the constant failure feedback condition demonstrated cognitive and behavioural evidence of learned helplessness during treatment, but not during test. Thus, it appeared that the effects of noncontingency, but not constant failure, generalized to a test task. It was hypothesized that outcomes on the test task acted as discriminative stimuli of controllability. That is, for subjects in the noncontingent feedback condition, a mixture of success and failure outcomes during test would not signal a change in controllability of outcomes. However, for subjects in the constant failure feedback condition, any successful outcome during test would signal control over outcomes. Results were discussed in light of the original and more recent formulations of learned helplessness theory.

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CHAPTER ONE: THE NATURE OF THE PROBLEM

Development of motivational processes has not been a widely researched area in psychology (Seligman, 1975). Seligman (1975) has speculated on motivational development in the child based on a few case histories, studies of motivational development among infrahuman species, inferences from studies of maternal deprivation, and observation of behaviour of his own children. According to learned helplessness theory as presented by Seligman (1975), lack of response initiation, difficulty in learning that outcomes are dependent on responding, anxiety, and depression are often the result of an individual learning that outcomes within the environment are independent of responses. Helplessness in children was thought to develop in the following manner:

> Responsive mothering is fundamental to the learning of mastery. On the other hand, if the child experiences independence between voluntary responding and outcome, helplessness will take root. Absence of mother, stimulus deprivation, and nonresponsive mothering all contribute to the learning of uncontrollability. (Seligman, 1975, p. 150).

Seligman (1975) proceeds to speculate that helplessness in children will be "more catastrophic" (Seligman, 1975, p. 151) than helplessness in adults because helplessness will form the foundation for later motivational development. However, it would seem that children's susceptibility to

helplessness would be regulated by their abilities (1) to learn that responses and outcomes are independent; (2) to form expectations for future response independent outcomes; and (3) to generalize an expectancy of response independence to new situations. The present study was designed to investigate learned helplessness in children. Specifically, the study was designed to assess (1) whether young children perceive independence between responses and outcomes; (2) whether young children form expectations regarding independence of future responses and outcomes; and (3) whether perceived independence between responses and outcomes produces learned helplessness behaviour among young children.

Theories of learned helplessness, methodological problems related to learned helplessness and helpless behaviour in children are described in the remainder of the present chapter. The reader is directed to Appendix A for a detailed review of the animal and human research itself, and theory related to learned helplessness.

Theories of Learned Helplessness

Learned Helplessness: Original Formulation

Maier and Seligman (1976) have presented a theory of learned helplessness which was based primarily on evidence from infrahuman subjects. The theory involves three steps in order for a subject to behave in a helpless manner. First, the organism must have information concerning the

contingency between a response and an outcome. Second, the organism must develop the expectation that responding and outcomes are independent. According to Maier and Seligman, the cognitive representation of the contingency is the crucial component of their theory, although they do not specify the precise nature of the cognitive representation. Third, the organism must exhibit helplessness which is characterized by (1) a decrease in the likelihood of voluntary responding; (2) a greater difficulty in learning that later responses produce a contingent outcome; and (3) affective depression.

A critically important feature of learned helplessness theory is that the expectancy of noncontingency be generalized to new situations. Thus, unless the organism displays decreased likelihood of voluntary responding in a situation other than that in which outcomes were independent of responding, learned helplessness as defined by Maier and Seligman (1976) would not have been developed by the organism. A wealth of studies using infrahuman subjects support the theory of learned helplessness as presented by Maier and Seligman (1976). (See Appendix A).

However, much of the evidence from studies using human subjects suggested that the original formulation of the theory was not sufficient to account for the behaviour of children and adults. Research suggested that human subjects asked themselves why they were helpless, and that the degree

of generality and chronicity of effect, and changes in esteem depended on the causal attributions which were formulated by the subject (Abramson, Seligman, & Teasdale, 1978). For example, (Abramson et al., 1978) if a subject attributed response independence to a global cause (e.g., I am a failure at school), then helplessness effects would occur in many more situations than if a subject attributed response independence to a specific cause (e.g., I am a failure at math problems). If a subject attributed response independence to a stable cause (e.g., I am not very intelligent), then helplessness effects would occur over a longer period of time than if a subject attributed response independence to an unstable cause (e.g., I have a cold and cannot think well today). If a subject attributed response independence to an internal cause (e.g., I am not good at writing standardized achievement tests), then changes in self esteem would be more likely than if a subject attributed response independence to an external cause (e.g., standardized achievement tests are not fair) (Abramson et al., 1978). Therefore, learned helplessness theory was reformulated in the context of attribution theory (Abramson et al., 1978). (See Appendix A.)

Learned Helplessness: Reformulation

Abramson et al., (1978) have presented a reformulation of the original learned helplessness theory based on a revision of attribution theory. The first two steps in the development of learned helplessness are (1) objective noncontingency between responses and outcomes; and (2) perception of present and past noncontingency. Following the second step, a human subject attributes the perceived noncontingency to a cause. The cause may be (1) stable or unstable; (2) global or specific; and (3) internal or external. Stable factors are defined as those which are recurrent or long-lived, such as ability. Unstable factors are defined as those which are intermittent or short-lived, such as luck. Global factors are defined as those which occur over a broad range of situations, such as all achievement situations. Specific factors are defined as those which are found only in specific situations, such as mathematics class. Internal factors are defined as those which one attributes to one's self, such as effort. External factors are defined as those which are attributed to outside the self, such as an impossible task. Each of the factors of stable-unstable, global-specific, and internal -external is presumed to be orthogonal to the others. Therefore, an attribution could be stable, global, and internal all at the same time, such as the belief that an individual's lack of ability occurs in all aspects of life.

The type of attribution which is formed determines the generality, chronicity, and typology of helplessness symptoms, as outlined above. Helplessness effects will be more general if a subject makes a causal attribution for perceived response-outcome independence to a global factor than if a subject makes a causal attribution for perceived response-outcome independence to a specific factor. Helplessness effects will be more chronic if a subject makes a causal attribution for perceived response-outcome independence to a stable factor than if a subject makes a causal attribution for perceived response-outcome independence to an unstable factor. Self esteem deficits will be more likely to occur if a subject makes a causal attribution for perceived response-outcome independence to an internal factor than if a subject makes a causal attribution for perceived response-outcome independence to an external factor.

Another important step in the development of helpless behaviour follows the attribution for noncontingency. The person develops an expectation for future response-outcome noncontingency which will determine whether or not the individual will demonstrate helpless behaviour. Certainly, if there is no expectation of noncontingency in the future, helplessness will not occur. According to Abramson et al. (1978), only when there is an expectation of noncontingency between responses and outcomes in the future will helpless behaviour as described previously be exhibited.

Origin of the Problem

Two features of learned helplessness[1] are crucial in both the original formulation of learned helplessness theory (Maier & Seligman, 1976) and the reformulation of learned helplessness theory (Abramson et al., 1978) as described above. First, the organism must learn and must perceive that outcomes occur regardless of its behaviour. Second, generalization of noncontingency between response and outcome to a new situation must occur. The organism must expect noncontingency between response and outcome in future task situations for learned helplessness to occur. Typical behaviours associated with learned helplessness are a decrease in the likelihood of voluntary responding in the event of an aversive outcome, difficulty in learning a new association between responses and outcomes, and affective depression. In the remainder of the present section of the chapter, general characteristics of designs for evaluation of learned helplessness effects are discussed.

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[1] The tem learned hleplessness has been used previously to denote both an empirical effect and a theoretical construct. The empirical effect of learned helplessness has been typified by performance deficits as measured by correct responding and deficits in overall effort within animal experiments, and negative mood changes and lowered expectations of success within human experiments following exposure to uncontrollable outcomes. Theoretical constructs of learned helplessness have been developed to explain the effects of lack of motivation, inefficient learning, and anxiety and/or depression (e.g., Abramson et al., 1978; Miller & Norman, 1979,; Roth, 1980). Within the present study, the term learned helplessness has been used to refer to the empirical effect.

Learned Helplessness Methodology

Maier and Seligman (1976) have outlined a triadic design used to differentiate effects due simply to failure or aversive stimulation from effects due to the expectation of noncontingent reward or punishment (i.e., learned helplessness). Within the triadic design, one group of subjects receives contingent, controllable outcomes for their responses. A second group of subjects is yoked to the first group of subjects in that they experience the same amount of favourable and unfavourable outcomes except that outcome is not contingent on the subject's own response but on the response of the yoked subject. A third group of subjects receives no treatment and acts as a control group. All three groups of subjects are then tested on a new task to determine the effects of noncontingent outcomes on responding. Superior performance of subjects in the control treatment condition compared to subjects in the contingent treatment condition indicates effects of fatigue among contingent treatment subjects, possibly due to experiencing many treatment trials. Superior performance of subjects in the contingent treatment condition compared to subjects in the control treatment condition indicates a facilitation effect among contingent treatment subjects, possibly due to experiencing success on a treatment task. Superior performance of subjects in the contingent treatment condition compared to subjects in the noncontingent treatment condition indicates

that control over the aversive stimulus affected later behaviour. No differences in performance between subjects in the contingent treatment condition and subjects in the noncontingent treatment condition indicates that the aversive stimulus per se affected later behaviour rather than control over the aversive stimulus. Comparison of the control treatment and noncontingent treatment groups indicates whether the treatment induced a response decrement among the noncontingent subjects. In some cases, examination of the control treatment scores indicates an inability for any of the subjects to perform well on the test task. That is, if subjects who received no treatment could not solve the test problems, then it could not be argued that treatment produced a response decrement among noncontingent subjects. Examples will help to clarify the use of the triadic design in experiments with animals and humans.

Designs with infrahuman subjects. In a typical experiment with infrahuman subjects (e.g., Seligman & Maier, 1967), dogs in the contingent treatment condition had to learn to push a panel with their noses in order to turn off shock. Each subject in the noncontingent treatment condition was yoked exactly with one subject in the contingent treatment condition for number, duration, and pattern of shocks. An untreated control group of subjects did not receive shock treatment. All subjects were subsequently trained on an escape/avoidance task in a shuttle box. (The

reader is directed to Appendix A for a review and discussion of learned helplessness in animals.)

Designs with human subjects. One of three types of experimental designs is employed typically with human subjects. In the first design with human subjects, neither the amount of aversive stimulation nor the number or failure outcomes are yoked between the contingent and noncontingent treatment subjects (e.g., Roth & Kubal, 1975). For example, subjects in the contingent treatment group had to solve a concept formation task. Veridical feedback was provided to subjects in the contingent treatment condition. Subjects in the noncontingent treatment group were given random feedback with a .50 probability of a success or failure outcome on any single trial. The failure outcomes on a random schedule were defined operationally as aversive stimulation. Subjects in the control treatment condition did not receive the concept formation task. All subjects in each group were then tested on a concept formation task which was different from that used during treatment.

In the second design with human subjects, the amount of aversive stimulation was kept constant across treatment groups while the number of failure trials was greater in the noncontingent condition (e.g., Hiroto, 1974). For example, people in the contingent treatment group had to learn to push a button four times in order to turn off an aversive noise. Each trial lasted for a specified period of time and

at the end of each trial a signal indicated to the subject that either they or the experimenter had terminated the noise. Each subject in the noncontingent treatment group was yoked exactly with one subject in the contingent treatment group for the amount of aversive noise experienced on each trial. However, the noncontingent treatment subjects were always told that the experimenter terminated the noise. In other words, no matter what response the subject produced, the outcome was the same. Subjects in the control treatment group did not receive the noise task. All subjects in each group were then tested on a hand shuttle task to terminate an aversive noise.

In the third design with human subjects, the number of failure outcomes are yoked between the contingent and noncontingent treatment subjects (e.g., Watson, Note 1), with failure feedback serving as the aversive stimulus. For example, subjects in the contingent treatment group had to solve a concept formation task; veridical feedback was provided to the subject. Each subject in the noncontingent treatment group was yoked exactly with one subject in the contingent treatment group for the number of success and failure outcomes. Feedback of success and failure was presented in random order thus making it impossible for subjects in the noncontingent treatment condition to solve the concept formation task. Subjects in the control treatment group did not receive the concept formation task. All sub-

jects in each group were then tested on an anagram solution task.

Consideration of Methodology

As mentioned above, two methodological considerations are (1) differentiation of the effects of noncontingent aversive stimulation from the effects of aversive stimulation per se (i.e., controllability); and (2) generalization of an expectancy of noncontingency between responses and outcomes to a different task. In the case of studies in which animals are employed as subjects, generally both criteria of learned helplessness are satisfied by design specifications. In the case of studies in which humans are employed as subjects, both criteria of learned helplessness are not satisfied in all cases, as outlined below. Research paradigms commonly used in the evaluation of learned helplessness effects with adult and child subject samples will be evaluated separately.

Designs with adult subjects. The reader will recall the examples of typical learned helplessness experiments with human subjects. The noncontingent treatment in comparison to the contingent treatment varied as a function of number of failure outcomes (design 2), or amount of aversive stimulation and number of failure outcomes (design 1). In the first example above, subjects in the noncontingent

treatment condition received a different amount of aversive stimulation and a different number of failure trials than subjects in the contingent treatment condition. Although responses were explicitly independent of outcomes, effects of noncontingency could not be separated from effects of aversive stimulation or failure per se. That is, comparisons between noncontingent and contingent groups of subjects would involve effects of different experiences with contingency, aversive stimulation, and failure. Therefore, in designs in which aversive stimulation and/or failure are not yoked specifically to contingent responding (design 1) contingency effects are not tested adequately. Such designs will not be discussed further. In designs in which aversive stimulation and/or failure are yoked specifically to contingent responding (designs 2 and 3), contingency effects are tested adequately. Such designs will be discussed further.

A major methodological difference still remains between studies in which animals are employed as subjects and most studies in which humans are employed as subjects. In animal studies, typically the animal receives noncontingent feedback (i.e., outcomes are independent of current responses). In addition, animals in the noncontingent treatment condition receive the same amount of aversive stimulation as animals in the yoked contingent treatment condition. A depiction of the factors involved in treatment would be as follows:

Contingent Treatment: Aversive Stimulation +

	Controllability
Noncontingent Treatment:	Aversive Stimulation +
	Uncontrollability.

Thus, the only difference between experimental effects in the contingent and noncontingent treatment groups is controllability.

In contrast, typically a human subject receives explicit feedback that (s)he has failed, either in addition to aversive stimulation (see design 2 above) or as aversive stimulation (see design 3 above). Consider first the design in which a noncontingent treatment subject is yoked to a contingent treatment subject for the amount of aversive stimulation, and receives failure feedback on every trial (i.e., constant failure).

A comparison of behaviour between noncontingent and contingent treatment groups would involve more effects than simply controllability as follows:

Contingent Treatment:	Aversive Stimulation +
	Controllability +
	X Failure Trials +
	Y Success Trials
Noncontingent Treatment:	Aversive Stimulation +
	Uncontrollability +
	(X + Y) Failure Trials.

Thus, comparisons of effects in the contingent and noncontingent treatment groups involve both controllability and failure effects.

Now consider the design in which failure feedback is considered the aversive stimulation. A comparison between noncontingent and contingent subjects would involve the following effects.

Contingent Treatment:	X Failure Trials +
	Y Success Trials +
	Controllability
Noncontingent Treatment:	X Failure Trials +
	Y Success Trials +
	Uncontrollability.

Thus, the only difference between experimental effects in the contingent and noncontingent treatment groups is controllability. In other words a design which is comparable to that outlined in design 3 above should yield information concerning the effects of noncontingency (i.e., uncontrollability).

A comparison of effects from designs in which constant failure and yoked failure (truly noncontingent) are used would be as follows:

Contingent Treatment:	X Failure Trials +
	Y Success Trials +
	Controllability
Noncontingent Treatment:	X Failure Trials +

Y Success Trials +
Uncontrollability

Constant Failure Treatment: (X + Y) Failure Trials +
Uncontrollability.

Although both noncontingent treatment and constant failure treatment may reduce motivation for performing a task and thereby result in a decrease in overall responding, a subject would learn a different contingency in each case, as can be seen in the diagram above. As a result of learning that responses are independent of both failure and success outcomes, subjects should generalize an expectancy of noncontingency of both failure and success to a new situation. However, in a situation of constant failure, success outcomes are not explicitly independent of responses. Thus, a subject would not necessarily have an expectancy of noncontingency between responses and success outcomes, but may have an expectancy of failure. In other words, an individual's perception of success may be different following noncontingent treatment than following constant failure treatment. In the instance of noncontingent treatment, one may expect to find a decrease in the likelihood of voluntary responding, a greater difficulty in learning that later responses produce a contingent outcome, and affective depression even following a success experience. In contrast, in the instance of constant failure treatment, one may expect to find an increase in the likelihood of voluntary respond-

ing, no difficulty in learning that later responses produce a contingent outcome, and no affective depression following a success experience. A major methodological problem within studies of human learned helplessness has been the use of constant failure treatment as opposed to noncontingent treatment, even though it is noncontingency and not failure that is the central issue in learned helplessness theory.

Recently a study was reported in which the researchers attempted to determine the relative importance of failure and noncontingency in producing learned helplessness effects (Sergent & Lambert, 1979). In order to investigate the problem, success-failure and contingency-noncontingency were treated as orthogonal factors in the design. Using college students as subjects, Sergent and Lambert (1979) factorially combined a success-failure factor with a contingent-noncontingent factor. The treatment task was a very difficult spatial reasoning task. Generalization effects were tested using the Stroop Test. The Stroop Test consists of several colour names printed in a colour which contrasts with the name of the colour. For example, the colour name "red" would be printed in green ink, the colour name "blue" would be printed in orange ink, and the colour name "pink" would be printed in violet ink. The subject would have to read the names (i.e., red, blue, pink) as quickly as possible, or the ink colour (i.e., green, orange, violet) as quickly as possible.

Subjects who had previously experienced failure performed more poorly on a Stroop Test than subjects who had previously experienced success, regardless of contingency condition. Results of the study would seem to suggest that failure rather than noncontingency leads to helplessness (Sergent & Lambert, 1979). However, two methodological problems with the design of the Sergent and Lambert (1979) study suggest that the results are not conclusive. First, cell sizes ranged from three to eight observations per cell with half of the cells containing only three observations. Power to detect differences between effects would be low given the absolute and relative cell sizes involved in comparisons. Failure to detect group differences in an interaction between success-failure and contingent- noncontingent factors with very little power cannot be considered conclusive evidence that failure per se rather than noncontingent failure produced a performance decrement. Second, a very difficult task was employed during the treatment phase of the experiment. Because the treatment task was so difficult, subjects could not be certain of the correctness of their answer without feedback from the experimenter. That is, all subjects depended on feedback from the experimenter rather than their own evaluation to determine whether they had completed the task successfully. Because the subjects did not have an opportunity to determine independently of experimenter feedback the correctness of their response, it

is quite possible that all failure subjects perceived their performance as either contingent failure or noncontingent failure. Such an effect would have resulted in a lack of differences in performance on the test task in the contingent group of subjects as compared to the noncontingent group of subjects. That is, the authors may not have been comparing the performance of contingent and noncontingent failure subjects as all of the subjects may have perceived either contingency or noncontingency between their responses and the outcome.

The results of the Sergent and Lambert (1979) study cannot be considered conclusive and the problem of confounding failure and noncontingency within human learned helplessness studies remains a matter of concern. In an adequate study, therefore, the traditional learned helplessness triadic design (Maier & Seligman, 1976) in which noncontingent subjects receive the same number of failure trials as yoked contingent subjects should be employed. As well, in order to maintain comparability with previous studies of helplessness with human subjects, a group of subjects should receive failure feedback on every trial.

The second criterion in determining learned helplessness is evidence of generalization of an expectancy to a new situation. In general, studies in which adults are employed as subjects have been designed such that the test task is different from the treatment task. Thus, expectancy of non-

contingency between responses and outcomes can be evaluated on the basis of performance on the new task.

Designs with child subjects. As discussed above, a major methodological problem with learned helplessness experiments using adult human subjects has been that the effects of failure per se as opposed to noncontingent failure have been evaluated. The same problem arises among experiments with children. Constant failure feedback rather than noncontingent feedback has been used in all experiments in the available literature (Dweck & Bush, 1976; Dweck & Reppucci, 1973; Deiner & Dweck, 1978). Therefore, a design in which the effects of noncontingent feedback are compared to the effects of constant failure feedback is essential in order to assess learned helplessness effects in children adequately.

The methodological problem of using constant failure feedback as opposed to noncontingent feedback has been compounded among studies of children by the lack of use of both a contingent success treatment condition and an untreated control condition (Dweck & Bush, 1976; Dweck & Reppucci, 1973; Deiner & Dweck, 1978). Two difficulties in the interpretation of results arise from the lack of such control. First, because an untreated control group was not included in the design, no estimate can be made of the difficulty of the test task. Without an independent estimate of test task difficulty one cannot determine whether performance differ-

ences between contingent feedback subjects and noncontingent feedback subjects have resulted from facilitated performance by contingent feedback subjects, impaired performance by noncontingent feedback subjects, or a combination of the two effects. Second, because a contingent treatment control group has not been included in the design, one cannot determine whether noncontingency of response and outcome or the experience of aversive feedback per se has affected responding on the test task.

Research concerning learned helplessness in children also has not addressed the matter of generalization of expectancy from treatment to test task. In all studies, helplessness has been evaluated based on behaviour during treatment (Dweck & Bush, 1976; Dweck & Reppucci, 1973; Deiner & Dweck, 1978). Thus, we do not know if children generalize an expectancy of contingency from treatment to test task. Moreover, as was alluded to above, different expectancies of contingency could be generalized as a function of whether failure feedback is noncontingent or constant. In the case of constant failure during treatment, subjects may generalize an expectancy of contingency of success and failure outcomes and therefore perform as well as an untreated control group of subjects on a soluble test task. In the case of noncontingent failure during treatment, subjects may generalize an expectancy of noncontingency of success and failure outcomes. Such an expectancy should produce a decrease in

voluntary responding and difficulty in recognizing contingency between responses and outcomes. Thus, subjects in a noncontingent feedback treatment condition should perform more poorly than subjects in either a contingent feedback treatment condition or an untreated control condition on a soluble test task, and could perform more poorly than subjects in a constant failure treatment condition.

Thus, to examine learned helplessness in children adequately, one would need to employ the traditional triadic design (Maier & Seligman, 1976) with an additional constant failure group for comparison with previous research. In addition, one would require a test task which was different than the treatment task.

Helpless Behaviour in Children

Although in studies of learned helplessness in children effects of noncontingency of responses and outcomes or the expectancy of future noncontingency of responses and outcomes have not been evaluated, some information can be gained by evaluating results of such studies. Children's reactions to constant failure in what may be termed a "helpless" manner were evaluated by Dweck and Bush (1976), Dweck and Reppucci (1973), and Deiner and Dweck (1978). Studies of helpless behaviour in children are outlined below.

Dweck and Reppucci (1973) examined stimulus control of behaviour in a "helplessness" experiment. Behaviour was re-

lated to scores on the Intellectual Achievement Responsibility (IAR) scale (Crandall, Katkovsky, and Crandall, 1965). (See Appendix B.) Scores on the IAR scale were hypothesized to predict children's expectancy of reinforcement control (i.e., contingency or noncontingency expectancy between responses and outcomes), since scores on the IAR scale reflect general reinforcement responsibility tendencies among children. High scores on the IAR scale reflect high levels of personal responsibility (i.e., internal locus of control) for failure and success outcomes. Low scores on the IAR scale reflect low levels of personal responsibility (i.e., external locus of control) for failure and success outcomes.

Subjects were 20 female and 20 male fifth grade students. Two experimenters were employed with one experimenter designated as the failure experimenter and one experimenter designated as the success experimenter. The experimental task was a series of block design problems similar to those used on the Wechsler Intelligence Scale for Children (WISC). Success or failure on problems was manipulated by providing subjects with appropriately or inappropriately patterned blocks for task completion. Success problems were administered by the success experimenter and failure problems were administered by the failure experimenter. Success and failure trials were presented in a random sequence. Subjects were allowed 30 sec to complete each of the first 10 problems and 20 sec to complete each subsequent

problem. Time to complete each problem was recorded and employed as the dependent measure. Each experimenter administered 10 trials each followed by four test trials presented by the success experimenter. Subjects who were unable to complete any of the four test problems were terminated. Each experimenter administered 20 more trials, followed by 2 probe trials presented by the success experimenter to evaluate effects of fatigue and 2 test trials of soluble problems presented by the failure experimenter. The IAR scale had been administered to the subjects in their classrooms approximately one month before experimental treatment began.

Subjects were divided into helpless and persistent groups on the basis of a decline in performance between test items presented by the success experimenter and test items presented by the failure experimenter, with performance scores corrected for the effects of fatigue. Subjects were divided into groups on the basis of a median split of performance decrement scores. Those subjects who had scores above the median were placed in the persistent group and those subjects who had scores below the median were placed in the helpless group. Although subjects in the two groups differed in their performance on test problems administered by the failure experimenter, subjects in the two groups did not differ in their performance on test problems administered by the success experimenter. Thus, the authors concluded that decrements in performance within the helpless

group of subjects following failure were specific to the failure experimenter. In other words, stimulus control of behaviour was demonstrated within the helpless group of subjects but not within the persistent group of subjects.

Scores on the IAR scale were related to differences between the group of helpless subjects and the group of persistent subjects. Analysis of group differences in total score for overall responsibility (I), scores for responsibility for success (I+), and scores for responsibility for failure (I-) all yielded significant results. Subjects in the persistent group claimed more overall responsibility for academic performance, more responsibility for academic success, and more responsibility for academic failure than subjects in the helpless group. No differences were found between the helpless and persistent groups on the basis of responsibility for success or failure due to ability. Subjects in the persistent group indicated greater responsibility for success and failure due to effort than subjects in the helpless group. That is, items with a motivational answer differentiated between groups of persistent and helpless subjects. Although male subjects had higher scores than female subjects on the responsibility for failure due to effort items of the IAR scale, no other comparisons testing for sex differences were statistically significant.

The authors drew two main conclusions from their results. First, they suggested that children hold different

beliefs concerning reinforcement responsibility. That is, some children believe that reinforcement is independent of their own behaviour. Second, Dweck and Reppucci concluded that reinforcement expectancies, as evidenced by helpless behaviour following failure, can be brought under stimulus control, at least among those subjects who do not believe that they have personal control of reinforcement. The authors suggested that stimulus control can be used to generalize effects of failure from a training situation to a test situation, even though generalization effects were not tested in the study.

The results do suggest that children hold different beliefs concerning reinforcement responsibility. However, it appears premature to label groups of children "persistent" and "helpless", especially when one considers evaluative connotations that are associated with each label. Actually, when the data are examined more closely, it was the "helpless" subjects who were changing their behaviour to meet the externally controlled demands of the environment, not the "persistent" subjects. Children in the persistent group failed to discriminate between the success and failure experimenters even though each experimenter had administered 30 trials. Also, girls in the helpless condition had much faster solution times on test problems administered by a success experimenter than girls in the persistent group (Dweck and Reppucci, 1973, Figure 2, p. 114). Thus it ap-

pears that children in the helpless condition were displaying more adaptive behaviour than children in the persistent condition when the demands of the situation are considered. It appears that only the children in the helpless condition would generalize effects of success to a new situation. Also, it appears that children with high IAR scores (i.e., highly internal) had difficulty learning contingencies which were externally controlled.

The results of the Dweck and Reppucci (1973) study suggest that in an adequate study of learned helplessness in children, individual differences in reinforcement responsibility must be considered. It appears as though some children (i.e., those with high IAR scores) either do not perceive or do not respond to external relationships between stimuli and outcomes.

Deiner and Dweck (1978) further investigated the relationship between scores on the IAR scale and behaviour following failure feedback. In order to investigate differences in attributions and hypothesis-testing strategies during failure between persistent (i.e., mastery-oriented) and helpless children, Deiner and Dweck (1978) monitored verbalizations during testing. Children were divided into mastery-oriented and helpless groups on the basis of their scores on the IAR scale. Children were trained on a discrimination task for eight trials before failure was introduced. In the first of two experiments, children were asked for an attrib-

ution for their performance following four failure trials. In the second study, subjects were asked to verbalize their thoughts during the four test problems. Seventy fifth grade children, half of whom were male and half of whom were female, served as subjects during the first experiment. In the second experiment, 30 boys and 30 girls from the fifth grade served as subjects. For each experiment, subjects were divided into mastery-oriented and helpless groups on the basis of a median split of scores on the subset of 10 items of the IAR scale which evaluate attributions of failure to lack of effort.

Verbalization categories were (1) statements of useful-task strategy; (2) statements of ineffectual approach to task; (3) attributions; (4) self-instructions; (5) self-monitoring; (6) statements of positive affect; (7) statements of negative affect; (8) positive prognostic statements; and (9) solution-irrelevant statements. Based on a content analysis of subjects' responses in each category of verbalization, hypotheses were divided into two categories: useful strategies or stereotypes (i.e., ineffectual strategies).

Analysis of results of attributional statements from the first experiment indicated that over half of the helpless children stated that they failed because of lack of ability while none of the mastery-oriented children attributed their failure to ability. Both groups of children had performed equally well on the training problems.

Analysis of changes in strategies for solving discrimination problems following the introduction of failure revealed that helpless subjects in both experiments used ineffectual hypotheses more than mastery-oriented subjects. In both studies, helpless subjects also displayed a decrease in the use of effective hypotheses across trials. In the first experiment most mastery-oriented subjects maintained effective hypothesis strategies across trials, while some of the subjects displayed increasingly sophisticated hypothesis strategies. During the second experiment all master-oriented subjects exhibited continuous use of effective hypothesis testing strategies.

Analysis of verbalizations during the second study indicated that there were differences between groups of mastery-oriented and helpless children. Mastery-oriented children made few statements of attributions. Instead, mastery-oriented children engaged in self-monitoring and self-instruction statements. In contrast, helpless children made attributions for their failure and solution-irrelevant statements. Positive affect statements were expressed by 10 of the 30 mastery-oriented subjects and 2 of the 30 helpless subjects. Negative affect statements were expressed by 20 of the 30 helpless children and 1 of the 30 mastery-oriented subjects.

Deiner and Dweck (1978) concluded that there is a difference between mastery-oriented and helpless children in

that the former look for a remedy for failure while the latter look for a cause for failure. The authors also suggested that perhaps simply looking at differences in types of attributions made by different groups of individuals is not sufficient. Whether or not individuals make attributions may be the critical factor which distinguishes mastery-oriented from helpless children.

On the basis of the evidence presented by Dweck and Reppucci (1973) and Deiner and Dweck (1978), it appears that it would be important not only to measure levels of reinforcement responsibility using the IAR scale but also to measure attributions of causality during treatment and testing. It appears the reinforcement responsibility level is indicative of whether a child will form attributions, but is not indicative of the type of attribution which will be formulated. That is, a child with a high IAR score would be less likely to formulate attributions for failure than a child with a low IAR score. However, it is not clear on the basis of IAR score whether failure will be attributed to ability, effort, luck, another person, or some other cause. Thus, in an adequate study of learned helplessness in children, it is important to measure both levels of reinforcement responsibility and types of attributions of causality.

In a series of two experiments, Dweck and Bush (1976) evaluated sex differences in learned helplessness. Sex differences in performance were evaluated using both peer and

adult evaluators. In Experiment 1, subjects were 52 female and 56 male fifth grade students. The experimental task consisted of 9 digit-letter substitutions. Failure was manipulated by informing subjects that time for each problem was up after the subject completed only 15 of the 20 substitutions. On success trials subjects were allowed to complete all 20 substitutions before they were told that their time was finished. Instructions and feedback were tape-recorded using a male adult, a female adult, a male child, and a female child as experimenters. Subjects were told that the experimenter was in a control room which was adjacent to the experimental room. Each subject failed to complete the task on the first three trials. Following trial three, the subjects answered an attribution question regarding their performance. Each child was successful on all remaining trials. Time to complete 15 substitutions on each of the first four trials was employed as the dependent measure. Completion time data from the first four trials were employed because it was not until the end of the fourth trial that subjects successfully completed the task. Therefore, it was assumed by the experimenter that subjects' performance on trial four would be affected only by their previous failure trials. Experiment 2 was conducted in the same manner as Experiment 1 except that the attribution question was changed slightly in order to identify the evaluation agent as a male adult, female adult, boy your age, or girl your age depending on the experimenter condition.

Based on the results of the two experiments, Dweck and Bush concluded that boys and girls responded differently to evaluative feedback as a function of the sex and age of the evaluator. Differences appeared not only in performance but also in interpretation of feedback, as follows.

In Experiment 1, it was found that female subjects failed to improve their performance when the evaluator was an adult or a female. Performance of female subjects improved significantly over trials when the experimenter was a male or a peer. In contrast, it was found that male subjects failed to improve their performance when the evaluator was a peer or a male. Performance of male subjects improved significantly over trials when the experimenter was an adult or a female. The reader should note that helplessness in the Dweck and Bush (1976) study is defined as a failure to improve performance rather than a deterioration in performance. If compared with a control group of children who did not experience treatment, children in the group which simply failed to improve over trials may have no longer been considered helpless. That is, performance may have been facilitated differentially between the groups of children which may have led to the erroneous conclusion that one group of children exhibited helpless behaviour. Without appropriate control conditions it is difficult to determine whether a facilitation or a helpless effect was produced. In Experiment 2, it was found that female subjects were more likely

to attribute their failure to lack of ability if the experimenter was an adult or a female than if the experimenter was a peer or a male. Boys were more likely to attribute their failure to lack of ability if the experimenter was a peer than if the experimenter was an adult. That is, boys and girls reacted differently to failure in terms of attributions of failure to ability as a function of sex of experimenter. Therefore, Dweck and Bush (1976) speculated that generalization of learned helplessness effects to new settings could be different for boys and girls. Attributing failure to lack of academic ability would be expected to produce generalization of failure effects readily to other academic situations, according to Dweck and Bush (1976). However, if failure effects were attributed to another cause, for example, the agent of evaluation, generalization of failure effects to other academic situations would be expected to occur only to the extent that evaluator characteristics provided stimulus generalization cues.

Since in typical studies of learned helplessness behaviour the experimenter is an adult, the reaction of boys and girls to adult experimenters is of interest. Although Dweck and Bush (1976) do not discuss their results in terms of comparisons of female adult and male adult cell results, information contained in figures (Dweck & Bush, 1976, Figures 1 and 2, p. 151) provide some basis for comparison. Inspection suggests that girls failed to show improvement over

trials when the experimenter was a female adult. However, when the experimenter was a male adult, performance improved markedly over trials. From inspection it appears that boys displayed an improvement over trials when the experimenter was either a male or a female adult, although performance improved at a faster rate over trials when the experimenter was a female than when the experimenter was a male.

As well as a comparison of performance with a male or a female adult experimenter, a comparison of attributions to male or female adult experimenters is of interest. Girls tended to attribute their failure to ability and boys tended to attribute their failure to effort when the experimenter was a female adult (Dweck & Bush, 1976, Table 1, p. 154). When the experimenter was a male adult, both boys and girls tended to attribute their failure to effort (Dweck & Bush, 1976, Table 1, p. 154). The reader will note that attributions were consistent with behaviour. In the three conditions in which failure was attributed to lack of effort, performance improved on subsequent trials. Presumably, subjects were trying harder. In the only condition in which subjects attributed their failure to lack of ability, performance did not improve on subsequent trials. Presumably, subjects did not try harder as they believed their performance to be limited by their ability (a stable factor).

Based on the above results, it seems reasonable to expect that girls and boys would react differently to a female

experimenter. Analysis of attributions as a function of sex of subject may be necessary in order to explain differences in helpless behaviour, especially in instances in which only a female adult experimenter or only a male adult experimenter is employed.

Consideration of Results

Results of the studies by Deiner and Dweck (1978), Dweck and Reppucci (1973), and Dweck and Bush (1976) question some criticisms of Abramson et al.'s (1978) reformulated learned helplessness theory as outlined by Wortman and Dintzer (1978). Wortman and Dintzer (1978) suggested that subjects do not make attributions of causality for failure during an experiment. However, Deiner and Dweck (1978) found that subjects who did show deterioration in performance following failure had made attributions of causality spontaneously. Subjects who did not demonstrate a deterioration in performance did not make attributions spontaneously. It might be that the formulation of attributions may be an integral step in establishing perception of noncontingency. In contrast, it may be possible that attributions are formed only after the subject forms a belief of noncontingency.

Subjects who scored high on a scale of internal reinforcement responsibility may not have formed a belief of noncontingency (Dweck & Reppucci, 1973), consistent with re-

formulated learned helplessness theory (Abramson et al., 1978). Abramson et al., (1978) have presented a table of beliefs which predict whether an individual will become helpless following an experience of noncontingency, as shown in Table 1.

Those subjects who score high on the IAR scale would fall into either Cell 1 or Cell 2 (i.e., no helplessness). That is, because they have a high degree of reinforcement responsibility as measured by the IAR, they expect that the outcome is contingent on some response within their repertoire. Those subjects who score low on the IAR scale would fall into either Cell 3 or Cell 4. That is, because they have a low degree of reinforcement responsibility as measured by the IAR, they expect that the outcome is not contingent on any response within their repertoire. Although a distinction is made between personal and universal helplessness, in both cases helplessness occurs. That is, changes in self esteem are determined by the type of helplessness (i.e., personal or universal) but not whether or not helplessness occurs. In the case of universal helplessness (e.g., no one is able to provide a cure for a terminal illness), cognitive and motivational deficits would be evident. However, self esteem would not be affected. In the case of personal helplessness (e.g., I am the only person in the class who cannot pass the math exam), cognitive, motivational, and self esteeem deficits would be evident.

TABLE 1

PERSONAL AND UNIVERSAL HELPLESSNESS

		Self	
		The person expects the outcome is contingent on a response in his repertoire.	The person expects the outcome is not contingent on any response in his repertoire.
Other			
The person expects the outcome is contingent on a response in the repertoire of a relevant other.	Cell 1	NO HELPLESSNESS	Cell 3 PERSONSAL HELPLESSNESS (internal attribution)
The person expects the outcome is not contingent on a response in the repertoire of any relevant other.	Cell 2	NO HELPLESSNESS	Cell 4 UNIVERSAL HELPLESSNESS (external attribution)

(Abramson et al., 1978, p. 53)

A second criticism by Wortman and Dintzer (1978) of the reformulated model is that verbal reports of attributions are not correlated with measures of behaviour. As outlined above, a high degree of correspondence was found between attributions and behaviour in a study conducted by Dweck and Bush (1976). Deiner and Dweck (1978) reported that making attributions appeared to interfere with hypothesis strategy development and thus resulted in a deterioration in performance. It appears, then, that behaviour is related not only to the formulation of attributions but also to the content of the attributions which are formulated.

A third criticism by Wortman and Dintzer (1978) concerns the scope of Abramson et al.'s (1978) reformulated model. The model does not separate attributions of causality for failure from attributions regarding an ability to cope with failure. Although Wortman and Dintzer (1978) claim that no research addresses the issue, evidence from the study by Dweck and Bush (1978) provides some insight to the problem. Attributions concerning the outcome per se and ability to cope with the outcome appear to lead to different behaviours. When subjects attributed failure to a lack of effort (i.e., an outcome with which they could cope by changing their behaviour), subjects tried harder on each trial even though they continued to fail at the task. When subjects attributed failure to lack of ability (i.e., an outcome with which they could not cope by changing their be-

haviour), subjects did not improve their performance on subsequent trials. Therefore, it appears that some research has addressed the question of whether attributions of causality or attributions of coping are more important. Moreover, the answer appears to be that attributions of coping are an important determinant of behaviour, but are based on attributions of causality for outcome. It would be useful to evaluate further the role of attributions in determining behaviour and emotional responses because on the basis of results presented above it appears that attributions may play a central role in an individual's ability to cope with failure.

Summary

Maier and Seligman (1976) presented a model of learned helplessness which involved three steps. The sequence involved (1) obtaining information regarding the lack of contingency between response and outcome; (2) cognitive representation of the lack of contingency in the form of an expectation, perception, or belief; and (3) exhibiting motivational, cognitive, and emotional deficits behaviourally. Although the original formulation of the model accounted for most of the behaviour of infrahuman subjects, more complex behaviour of human subjects necessitated the reformulation of the model.

Abramson et al. (1978) provided a reformulation of the learned helplessness model based on a revision of attribution theory to account for the behaviour of human subjects. Five steps were involved in the sequence. The sequence involved (1) obtaining information regarding the lack of contingency between response and outcome; (2) perceiving the present or past lack of contingency between response and outcome; (3) attributing the present or past lack of contingency between response and outcome to a cause; (4) expecting no future contingency between response and outcome; and (5) exhibiting symptoms of helplessness, often termed depression.

Three studies of helplessness have been conducted using children as subjects (Deiner & Dweck, 1978; Dweck & Bush, 1976; Dweck & Reppucci, 1973). The previous investigations of learned helplessness behaviour in children have failed to employ appropriate methodological designs in order to evaluate the effects of contingent versus noncontingent failure or the effects of generalizing the relationship between responses and outcomes from one task to another. However, even though the traditional learned helplessness triadic designs were not employed in any of the three studies, several aspects of children's behaviour which are related to learned helplessness were investigated. Dweck and Reppucci (1973) found that scores on the IAR scale (Crandall et al., 1965) predicted behaviour in a situation in which children be-

lieved that either they had control over reinforcement by their own behaviour or that the experimenter had control over reinforcement independent of their own behaviour. Among those children who believed that reinforcement was controlled by external agents, stimulus control of responding behaviour was demonstrated clearly. No evidence of stimulus control of behaviour was found among children who believed that they controlled reinforcement themselves. The results of the Dweck and Reppucci (1973) study strongly suggest that levels of reinforcement responsibility in children should be considered when measuring their behaviour in a learned helplessness situation.

Deiner and Dweck (1978) found that children differed in terms of whether they looked for a cause for failure or a solution for failure. Moreover, such differences were a function of score on the IAR scale. Children who scored highly on the IAR scale (i.e., those who believed that they had control over their own reinforcement) engaged in solution-seeking behaviour and did not appear to formulate attributions of causality. Children who scored below the median on the IAR scale (i.e., those who believed that others had control over their reinforcement) formed attributions regarding the causes of their failure. The results of the Deiner and Dweck (1978) study imply that there is a relationship among IAR score, formulation of attributions, and behaviour in failure situations. Thus, it would seem neces-

sary to measure reinforcement responsibility levels using the IAR scale and to monitor the extent to which children make attributions during both the treatment and test phases of a learned helplessness experiment.

Dweck and Bush (1976) found that boys and girls responded differently to failure feedback according to the sex and age of the experimenter. Both performance and attributions of causality differed. Girls' performance on a digit-letter substitution task failed to improve if the experimenter was an adult or a female. Boys' performance on a digit-letter substitution task failed to improve when the experimenter was a peer. Girls were more likely to attribute their failure to a lack of ability when the experimenter was a female adult than when the experimenter was a peer or a male. Boys were more likely to attribute their failure to a lack of ability when the experimenter was a peer than when the experimenter was an adult. Because boys and girls seem to make different attributions of causality when an adult female provides failure feedback, it would seem necessary to monitor attributions of causality. Differences in behaviour on test items between boys and girls then could be related to differences in statements of causal attribution.

CHAPTER TWO: INVESTIGATION OF THE PROBLEM

Statement of the Problem

According to the reformulated learned helplessness theory (Abramson et al., 1978), the individual perceives a lack of contingency relationship between response and outcome, attributes the lack of contingency between response and outcome to a cause, and forms an expectancy for no future contingencies between responses and outcomes. Dweck and Reppucci (1973) have related scores on the IAR scale (Crandall et al., 1965) for responsibility for failure to behaviour following failure experience on a treatment task. They found that children who scored low on the IAR scale tended to give up following failure experiences whereas children who scored high on the IAR scale tended to persist following failure experiences. In an attempt to relate differences in helplessness behaviour between children who scored low on the IAR scale and children who scored high on the IAR scale, Deiner and Dweck (1978) monitored children's verbalizations during problem solving tasks in which failure was experienced. Children who scored low on the IAR scale made attributions for their failure. Their future performance on the same task was impaired markedly by the failure feedback. Children who scored high on the IAR scale did not

make attributions for their failure but instead engaged in self-instruction and self-monitoring behaviour. Their performance was not impaired by the failure feedback. It appears, then, that scores on the IAR scale which relate to responsibility for failure predict performance following experiences of failure under the conditions that (1) failure is constant; and (2) treatment and test tasks are the same.

Learned helplessness as defined by Seligman (1975) involves transfer of the effects of noncontingent (i.e., not necessarily constant) failure to a test task which is different than the treatment task. Previous evaluations of learned helplessness effects among children have been deficient in that (1) effects of noncontingency of responses and outcomes have not been contrasted with effects of aversive stimulation per se (i.e., a contingent failure treatment has not been employed); (2) effects of noncontingent failure have not been contrasted with effects of failure per se (i.e., only a constant failure treatment has been employed); (3) effects of generalization of expectancy of contingencies between responses and outcomes have not been evaluated (i.e., performance on the treatment task only has been monitored); and (4) an independent evaluation of test task difficulty has not been made (i.e., an untreated control condition has not been employed).

The purposes of the present investigation are to assess among a sample of children (1) behaviour following failure

per se and noncontingent failure using an extension of the triadic design suggested by Maier and Seligman (1976); and (2) generalization of the effects of noncontingent failure to a test task which is different from that employed during treatment. The triadic design as suggested by Maier and Seligman (1976) consists of a group of subjects who receive controllable, contingent outcomes to their responses, a group of subjects who receive the same outcomes as the contingent group of subjects except that outcomes are response independent, and a group of subjects who do not receive any treatment. Performance of all subjects is evaluated on a separate task. Effects of controllability of outcomes are measured by comparing the performance of response-contingent and response-independent subjects. To ensure that any differences between groups are not a result of facilitation effects among response-contingent subjects, an independent estimate of test task difficulty is made by evaluating the performance of untreated subjects on the test task. Because investigations of learned helplessness generally involve failure situations, it is necessary in an adequate study of learned helplessness to evaluate the effects of failure separately from the effects of uncontrollability (i.e., noncontingency between responses and outcomes). The triadic design thus should be modified to include a group of subjects who receive constant failure feedback. As well, comparability with many other studies of learned helplessness, partic-

ularly those with children, should be maintained by the inclusion of a constant failure condition in a learned helplessness design.

Generalization of expectancy of response independence to a task other than the treatment task is an important component of a learned helplessness design. Comparison of effects of (1) controllable versus uncontrollable stimulation; and (2) noncontingent versus constant failure feedback should be evaluated based on performance on a different task than the training task. Performance of subjects in the controllable (i.e., contingent) and constant failure feedback groups should be significantly better than performance of subjects in the uncontrollable, noncontingent feedback group because those subjects in the contingent and constant failure feedback groups should expect that outcomes are dependent on their responses during the test task whereas subjects in the noncontingent group should expect that outcomes are not dependent on their responses during the test task.

The design of the present study will involve the triadic design as suggested by Maier and Seligman (1976) as well as a group of subjects who receive constant failure feedback. Thus, the design will include the following treatment conditions: contingent feedback, noncontingent feedback, constant failure feedback and no treatment. Subjects will be treated on a discrimination task. The test task will consist of block design problems as used in the WISC-R.

Reasons for employing the four group treatment structure and a test task which are different than the treatment task have been outlined above. Several reasons contributed to the choice of a failure (i.e., aversive) treatment. First, failure has been used in previous studies of helplessness in children. Some degree of comparability with previous studies was deemed desirable. Second, the relationship between the effects of noncontingent feedback and constant failure feedback on performance was of theoretical interest. That is, it was of theoretical interest to determine whether noncontingency between responses and outcomes or failure was a more influential factor in determining performance on the test task. Third, Alloy and Abramson (c.f., Abramson et al., 1978) have reported that subjects perceive noncontingency more readily under conditions of constant failure than under conditions of constant success.

In addition to the four treatment conditions outlined above, the design will include a two level reinforcement responsibility factor, as measured by scores on the IAR scale. Reasons for employing the IAR scale are twofold. First, on the basis of theoretical considerations, reinforcement responsibility should predict whether a person will become helpless (Abramson et al., 1978). Only those subjects who have a low degree of belief in personal reinforcement responsibility (i.e., highly external) should show a performance decrement when confronted with either noncontingent

feedback or constant failure feedback. Second, on the basis of experimental evidence, Dweck and Reppucci (1973) have presented evidence that children with high internal responsibility scores do not respond to externally controlled contingencies. Thus, behaviour would not change as a function of treatment condition among highly internal subjects. Therefore, use of IAR scores will provide some experimental control for within-treatment error estimates which may be a function of a reinforcement responsibility variable.

In summary, the purposes of the present investigation are to investigate (1) effects of response independent failure as compared to effects of constant failure and to effects of contingent failure on attributions for failure and later responding; and (2) generalization of effects of noncontingent failure to a task which is different than the treatment task.

Statement of Experimental Interests

In order to explain clearly expectations of subjects' behaviour, comparisons between experimental groups and a rationale for each comparison are outlined below. For clarification, comparisons are divided between effects expected during the treatment phase and effects expected during the test phase of the experiment. Expected effects on behavioural measures of helplessness will be outlined followed by expected effects on attributional measures of helplessness.

A hypothesis cannot be formulated in all instances because of a lack of experimental evidence or theoretical rationale. In cases in which a hypothesis can be formulated it is listed as such at the beginning of the rationale. See Table 2 at the end of the present chapter for a summary of expected group behaviour and expectations of success.

Treatment (Training) Phase

1. Hypothesis

Subjects who score above the median on IAR scale items of failure pertaining to effort will not show differential effects of treatment condition on either behavioural or attributional measures of helplessness. Subjects who score below the median on IAR scale items of failure pertaining to effort will show differential effects of treatment condition on both behavioural and attributional measures of helplessness.

Both Dweck and Reppucci (1973) and Deiner and Dweck (1978) have provided evidence in support of the hypothesis. Dweck and Reppucci (1973) found that children who persisted on a block design task despite many failure trials had higher IAR scores than children who did not persist on a block design task following failure. Deiner and Dweck (1978) found that children who scored high on the IAR items related to

failure due to effort continued to seek solutions to problems following failure and did not verbalize attributions of causality. In contrast, children who scored low on the IAR items related to failure due to effort displayed impaired solution seeking behaviour following failure and spent much of their time verbalizing attributions of causality. Based on the evidence from Dweck and Reppucci (1973) and Deiner and Dweck (1978) it appears as though children who score high on IAR items pertaining to failure due to effort continue to seek solutions to problems effectively even following many continuous failure trials. Therefore, children whose IAR scores reflect high reinforcement responsibility are not expected to display differential effects of treatment. It does appear, however, that children who score low on IAR items pertaining to failure due to effort do not continue to seek solutions to problems effectively following continuous failure trials. Therefore, children whose IAR scores reflect low reinforcement responsibility are expected to display differential effects of treatment. Differences are expected in terms of both performance measures and attributions. Children who score high on the IAR scale are not expected to have significantly different performance scores during treatment as a function of treatment

condition. Children who score low on the IAR scale are expected to have significantly different performance scores during treatment as a function of treatment condition, as outlined below in Paragraphs 2, 3, and 4. Children who score high on the IAR scale are expected to report that they are able to solve the puzzle, regardless of treatment condition. Children who score low on the IAR scale are expected to report attributions which vary as a function of treatment condition, as outlined below in Paragraphs 2, 3, and 4.

Paragraphs 2, 3, and 4 refer only to subjects who score below the median on IAR scale items of failure pertaining to effort.

2. Hypothesis

Subjects in the noncontingent feedback condition should have poorer performance and lower expectations of success on the present and a future task than subjects in the contingent feedback condition.

According to learned helplessness theory (Abramson et al., 1978, Maier & Seligman, 1976, Seligman, 1975), a subject either should cease to respond or should show a performance decrement following the perception of noncontingency between responses and outcomes. Subjects in the contingent feedback condition should improve performance following the percep-

tion of a correct response. Therefore subjects in the noncontingent feedback condition should perform more poorly as measured by performance than subjects in the contingent feedback condition. According to learned helplessness theory (Abramson et al., 1978), subjects in the noncontingent feedback condition should report that they do not expect to succeed on the present task or on a future task. Subjects in the contingent feedback condition should report that they expect to succeed on the present task and on a future task.

3. Hypothesis

Subjects in the constant failure feedback condition should have poorer performance than subjects in the contingent feedback condition. Subjects in the constant failure feedback condition should report that they do not expect to succeed on the present task whereas subjects in the contingent feedback condition should report that they do expect to succeed on the present task.

Subjects in the constant failure feedback condition should perform more poorly than subjects in the contingent feedback condition on the treatment task. Dweck and Reppucci (1973) using a within subjects design, found that subjects ceased responding following several signalled failure trials but either main-

tained or decreased response latencies following several signalled success trials. Therefore, subjects in the constant failure feedback condition should perform more poorly following several consecutive failure trials. Subjects in the contingent feedback condition should perform better following perception of the correct response. Therefore, subjects in the constant failure condition should perform more poorly than subjects in the contingent failure condition.

In addition, subjects in the constant failure condition should report that they do not expect to succeed on the present task. According to evidence suggested by Dweck and Reppucci (1973) and Deiner and Dweck (1978), it appears that subjects in the constant failure condition should report that they do not expect to succeed on the present task. Dweck and Reppucci (1973) reported that subjects who scored below the median on IAR scale items pertaining to failure appeared to expect to fail when presented with a problem by the "failure" experimenter. Deiner and Dweck (1978) reported that subjects who scored below the median on IAR scale items of failure due to effort reported causal attributions for their failure at the task. That is, subjects not only expected not to succeed at the task, but believed that they had failed already, even before the task was completed.

No prediction can be formulated on the basis either of theory or of experimental evidence concerning what expectations subjects in the constant failure condition will have for their performance on a subsequent task. In contrast, subjects in the contingent failure condition should report that they expect to succeed both on the present task and on a future task.

4. Differences in performance between subjects in the noncontingent feedback condition and subjects in the constant failure feedback condition are difficult to predict. On the basis of learned helplessness theory (Abramson et al., 1978; Maier & Seligman, 1976; Seligman, 1975) one would predict that response latencies of subjects in the noncontingent feedback condition would increase following perception of noncontingency between responses and outcomes. On the basis of experimental evidence (Deiner & Dweck, 1978; Dweck & Bush, 1976; Dweck & Reppucci, 1973), one would predict that response latencies of subjects in the constant failure feedback condition would increase following several failure trials. It is impossible to predict, however, on the basis of either learned helplessness theory or experimental evidence whether response latencies will be (1) longer among noncontingent feedback subjects than among constant

failure feedback subjects; (2) shorter among noncontingent feedback subjects than among constant failure feedback subjects; or (3) equal among noncontingent feedback subjects and among constant failure feedback subjects. Therefore, differences in performance between subjects in the noncontingent feedback condition and subjects in the constant failure feedback condition as measured by performance will be explored.

According to learned helplessness theory (Abramson et al., 1978), subjects in the noncontingent feedback condition should report that they do not expect to succeed on either the present task or a future task. According to experimental evidence as outlined above in Paragraph 3 (Deiner & Dweck, 1978; Dweck & Bush, 1976; Dweck & Reppucci, 1973), it appears that subjects in the constant failure feedback condition should report that they do not expect to succeed on the present task. However, it is not clear whether subjects in the constant failure feedback condition will expect to fail on a future task. Therefore, differences in performance between subjects in the noncontingent feedback condition and subjects in the constant failure feedback condition as measured by attributions will be explored.

Test (Generalization) Phase

1. Hypothesis

Subjects who score above the median on IAR scale items of failure pertaining to effort will not show differential effects of treatment condition on either behavioural or attributional measures of helplessness. Subjects who score below the median on IAR scale items of failure pertaining to effort will show differential effects of treatment condition on both behavioural and attributional measures of helplessness.

Subjects who score above the median on IAR scale items of failure pertaining to effort will not show effects of different treatment conditions. Only subjects who score below the median of IAR scale items of failure pertaining to effort will show differential effects of treatment condition. Paragraph 1 (Test Phase) is based on evidence for Paragraph 1 (Treatment Phase) above. Given that it is unlikely on the basis of experimental evidence (Deiner & Dweck, 1978; Dweck & Reppucci, 1973) that children who score high on IAR scale items of failure due to effort will show differential effects of treatment condition, it is also unlikely that children would show differential effects of treatment condition on a generalization task. That is, if subjects in differ-

ent training conditions do not learn differentially, then there should not be evidence of differential training effects on a generalization task. Those children who score below the median of IAR scale items of failure due to effort are expected to show differential learning during the training phase, and such differences are expected to be reflected during the generalization phase as outlined in Paragraphs 2 through 11 below.

Paragraphs 2 through 11 refer only to subjects who score below the median on IAR scale items of failure pertaining to effort.

2. Hypothesis

Subjects in the noncontingent feedback condition should have poorer performance than subjects in the contingent feedback condition. Subjects in the noncontingent feedback condition should not expect to succeed on the generalization task whereas subjects in the contingent feedback condition should expect to succeed on the generalization task.

Subjects in the noncontingent feedback condition should perform more poorly than subjects in the contingent failure feedback condition. According to learned helplessness theory (Abramson et al., 1978; Maier & Seligman, 1976; Seligman, 1975), subjects in the noncontingent feedback condition should show two

distinct deficits on a new task following the perception of noncontingency compared to subjects in the contingent feedback condition. First, subjects in the noncontingent feedback condition should display a deficit in voluntary responding which would hinder learning a new task. Second, subjects in the noncontingent feedback condition should have difficulty recognizing a correct response because they expect noncontingency between responses and outcomes. Thus, subjects in the noncontingent feedback condition should perform more poorly than subjects in the contingent feedback condition as measured by performance because noncontingent feedback subjects should be less likely to produce a response and less likely to recognize a response as correct once it is reinforced.

Subjects in the noncontingent feedback condition should not expect to succeed on the generalization task as they should expect noncontingency between responses and outcomes (Abramson et al., 1978; Maier & Seligman, 1976; Seligman, 1975). In contrast, subjects in the contingent feedback condition should expect to succeed on the generalization task as they should expect contingency between responses and outcomes.

3. Hypothesis

Subjects in the noncontingent feedback condition should have poorer performance than subjects in the control treatment condition. Subjects in the noncontingent feedback condition should not expect to succeed on the generalization task whereas subjects in the control condition should expect to succeed on the generalization task.

Subjects in the noncontingent feedback condition should perform more poorly than subjects in the untreated control condition. According to learned helplessness theory (Abramson et al., 1978; Maier & Seligman, 1976; Seligman, 1975), subjects must show a learning deficit following perception of noncontingency, not simply a learning difference in comparison to subjects who experienced controllability. Given a difference in learning between noncontingent and contingent treatment subjects, the difference could be due either to a deficit in learning among noncontingent feedback subjects, or to facilitation of learning among contingent feedback subjects, or to both a deficit and a facilitation effect. In order to demonstrate conclusively that noncontingent feedback has produced a learning deficit, one must show that subjects in the noncontingent feedback condition performed more poorly on a generalization task than subjects who have not received any treatment. Thus,

according to learned helplessness theory (Abramson et al., 1978; Maier & Seligman, 1976; Seligman, 1975), subjects in the noncontingent feedback condition should perform more poorly than subjects in the untreated control condition as measured by performance on the test task.

Subjects in the noncontingent feedback condition should not expect to succeed on the generalization task as they should expect noncontingency between responses and outcomes (Abramson et al., 1978; Maier & Seligman, 1976; Seligman, 1975). In contrast, subjects in the untreated control condition should expect to succeed on the generalization task as they should expect contingency between responses and outcomes.

4. Differences in performance between subjects in the noncontingent feedback condition and subjects in the constant failure feedback condition are difficult to predict on the basis of either learned helplessness theory (Abramson et al., 1978; Maier & Seligman, 1976; Seligman, 1975), or experimental evidence. On the one hand, subjects in the noncontingent feedback condition may perform more poorly than subjects in the constant failure feedback condition as measured by performance, because subjects in the noncontingent feedback condition should expect response-indepen-

dent outcomes whereas subjects in the constant failure feedback condition may expect response-dependent outcomes. On the other hand, as Sergent and Lambert (1979) suggested, failure per se rather than noncontingency may lead to performance decrements. Amount of failure received then would be expected to determine the degree of performance decrement. That is, the more failure trials a subject experienced during treatment, the greater would be the expected performance decrement. If such is the case, then subjects in the constant failure feedback condition may perform more poorly than subjects in the noncontingent feedback condition as measured by performance, proportionate to the relative number of failure trials received. Differences in performance between subjects in the noncontingent feedback condition and subjects in the constant failure feedback condition will be explored.

According to learned helplessness theory (Abramson et al., 1978; Maier & Seligman, 1976; Seligman, 1975), subjects in the noncontingent feedback condition should not expect to succeed on the generalization task as they should expect noncontingency between responses and outcomes. However, it is not clear whether subjects in the constant failure feedback condition will expect noncontingency or contin-

gency between responses and outcomes and thus will expect to fail or succeed on the generalization task. Differences in attributions between subjects in the noncontingent feedback condition and subjects in the constant failure feedback condition will be explored.

5. Differences between subjects in the contingent feedback and constant failure feedback conditions cannot be predicted on the basis of learned helplessness theory (Abramson et al., 1978; Maier & Seligman, 1976; Seligman, 1975) or experimental evidence. Subjects in the contingent feedback group may perform equally to subjects in the constant failure feedback group as measured by performance if both groups are expecting outcomes to be dependent on responses. In contrast, if failure produces a response decrement among constant failure feedback subjects as outlined in Paragraph 4 (test phase) above, subjects in the contingent feedback group may perform better than subjects in the constant failure feedback group as measured by performance.

Thus, differences in performance between contingent feedback and constant failure feedback subjects will be explored.

Subjects in the contingent feedback group should expect to succeed on the generalization task because they should expect contingency between responses and

outcomes. The expectation of success among subjects in the constant failure feedback group is not clear, however, because it cannot be predicted on the basis of theory or experimental evidence whether they expect a noncontingency or a contingency relationship between responses and outcomes. Differences in attributions between subjects in the contingent feedback condition and subjects in the constant failure feedback condition will be explored.

6. Differences between subjects in the contingent feedback and untreated control condition are difficult to predict. According to learned helplessness theory (Abramson et al., 1978; Maier & Seligman, 1976; Seligman, 1975) subjects in the contingent feedback and untreated control conditions should not behave differently from one another. However, some authors (e.g., Wortman & Brehm, 1975) have reported that subjects in the contingent feedback condition performed better than subjects in the untreated control condition. Thus, differences in performance between contingent feedback subjects and untreated control subjects will be explored.

According to learned helplessness theory (Abramson et al., 1978; Maier & Seligman, 1976; Seligman, 1975) subjects in both the contingent feedback condition and the untreated control condition should ex-

pect to succeed as they should expect outcomes to be contingent on responses.

7. Differences between subjects in the constant failure feedback and untreated control conditions cannot be predicted. If subjects in the constant failure condition perceive independence between responses and outcomes, then subjects in the constant failure condition should perform more poorly than subjects in the untreated control condition. If subjects in the constant failure condition perceive dependence between responses and outcomes, then subjects in the constant failure condition should perform as well or better than subjects in the untreated control condition. Thus, differences in performance between constant failure subjects and untreated control subjects will be explored.

It is not clear whether subjects in the constant failure condition will expect to fail or succeed on the generalization task as it is not clear whether subjects in the constant failure condition will expect a noncontingent or a contingent relationship between responses and outcomes. Subjects in the untreated control condition should expect to succeed on the generalization task as they should expect a contingent relationship between responses and outcomes. Differences in attributions between subjects in the

constant failure and untreated control conditons will be explored.

8. Hypothesis

Over trials, performance and expectations for success for subjects in the noncontingent feedback condition should become increasingly similar to performance and expectations for success for subjects in the contingent feedback condition and the untreated control condition.

As test trials proceed, subjects in the noncontingent feedback condition should have total response times which are increasingly similar to the total response times of subjects in the contingent feedback and control treatment conditions. That is, subjects in the noncontingent feedback condition should become less helpless as trials proceed as measured by ability to solve problems. According to learned helplessness theory (Abramson et al., 1978; Maier & Seligman, 1976; Seligman, 1975), helplessness should dissipate gradually over time as the subject realizes that outcomes are no longer response-independent. Therefore, over trials, performance of subjects in the noncontingent feedback condition should become increasingly similar to performance of subjects in the contingent feedback condition and the untreated control condition.

In addition, as test trials proceed, and helplessness dissipates, subjects in the noncontingent feedback condition should more frequently express an expectation that they will succeed on the generalization task. Subjects in the contingent feedback and untreated control conditions should expect to succeed on the generalization task across all trials.

9. As test trials proceed, the amount of time spent engaged in problem solving for subjects in the noncontingent feedback condition should become increasingly similar to that of subjects in the contingent feedback and control treatment conditions. That is, subjects in the noncontingent feedback condition should become less helpless over trials as measured by motivation to solve problems. According to learned helplessness theory (Abramson et al., 1978; Maier & Seligman, 1976; Seligman, 1975), motivation to respond will increase as helplessness dissipates. Thus, motivation among noncontingent feedback subjects as measured by the amount of time spent engaged in problem solution should become increasingly similar to that among subjects in the contingent feedback and control treatment conditions.

10. Differences between subjects in the noncontingent feedback condition and subjects in the constant failure feedback condition are difficult to predict over

trials for performance and expectation for success. If subjects in the constant failure condition perceive independence between their responses and outcomes, then the performance of subjects in the constant failure condition over trials should be similar to the performance of subjects in the noncontingent feedback condition over trials as measured by performance, amount of time engaged in problem solving, and expectation for success. If subjects in the constant failure condition perceive dependence between their responses and outcomes, then the performance of subjects in the constant failure condition over trials should be similar to the performance of subjects in the contingent feedback condition over trials, as measured by performance, amount of time engaged in problem solving, and expectation for success.

11. Performance, amount of time engaged in problem solving, and expectation of success on the generalization task should not be different over trials for subjects in the contingent feedback and control treatment conditions, as subjects in both the contingent feedback and control treatment conditions should expect a contingent relationship between responses and outcomes.

Summary of Hypotheses

Treatment Phase

1. Subjects who score above the median on IAR scale items of failure pertaining to effort will not show differential effects of treatment condition on either behavioural or attributional measures of helplessness. Subjects who score below the median on IAR scale items of failure pertaining to effort will show differential effects of treatment condition on both behavioural and attributional measures of helplessness.

   The following hypotheses refer only to subjects who score below the median on IAR scale items of failure pertaining to effort.

2. Subjects in the noncontingent feedback condition should have poorer performance and lower expectations of success on the present and a future task than subjects in the contingent feedback condition.

3. Subjects in the constant failure feedback condition should have poorer performance than subjects in the contingent feedback condition. Subjects in the constant failure feedback condition should report that they do not expect to succeed on the present task whereas subjects in the contingent feedback condition should report that they do expect to succeed on the present task.

Test Phase

1. Subjects who score above the median on IAR scale items of failure pertaining to effort will not show differential effects of treatment condition on either behavioural or attributional measures of helplessness. Subjects who score below the median on IAR scale items of failure pertaining to effort will show differential effects of treatment condition on both behavioural and attributional measures of helplessness.

   The following hypotheses refer only to subjects who score below the median on IAR scale items of failure pertaining to effort.

2. Subjects in the noncontingent feedback condition should have poorer performance than subjects in the contingent feedback condition. Subjects in the noncontingent feedback condition should not expect to succeed on the generalization task whereas subjects in the contingent feedback condition should expect to succeed on the generalization task.

3. Subjects in the noncontingent feedback condition should have poorer performance than subjects in the control treatment condition. Subjects in the noncontingent feedback condition should not expect to succeed on the generalization task whereas subjects in the control condition should expect to succeed on the generalization task.

4. Over trials, performance and expectations for success for subjects in the noncontingent feedback condition should become increasingly similar to performance and expectations for success for subjects in the contingent feedback condition and the untreated control condition.

In addition to the above stated hypotheses, several group comparisons will be conducted for which no specific hypotheses can be formulated because of a lack of theoretical rationale or experimental evidence. However, a summary of expected effects for each experimental group on performance and expectation of success measures is presented below in Table 2.

TABLE 2

SUMMARY OF EXPECTED GROUP BEHAVIOUR

	Behaviour	Expectations of Success
PRETREATMENT		
High IAR		
1. Contingent Feedback	perform well on task	expect to do well on present and future task
2. Noncontingent Feedback	perform well on task	expect to do well on present and future task
3. Constant Failure Feedback	perform well on task	expect to do well on present and future task
Low IAR		
1. Contingent Feedback	perform well on task	expect to do well on present and future task
2. Noncontingent Feedback	progressively poorer performance on task	expect not to do well on present and future tasks
3. Constant Failure Feedback	progressively poorer performance on task	expect not to do well on present task may or may not expect to do well on future task
TEST PHASE		
High IAR		
1. Contingent Feedback	perform well on task	expect to do well on task
2. Noncontingent Feedback	perform well on task	expect to do well on task
3. Constant Failure Feedback	perform well on task	expect to do well on task
4. Untreated Control	perform well on task	expect to do well on task
Low IAR		
1. Contingent Feedback	perform well on task	expect to do well on task
2. Noncontingent Feedback	perform poorly on task	expect to do poorly on task
3. Constant Failure Feedback	may perform well on task	may expect to do well or poorly on task
4. Untreated Control	perform well on task	expect to do well on task

CHAPTER THREE: PRELIMINARY STUDY

Rationale

According to reformulated learned helplessness theory (Abramson et al., 1978), helplessness develops in a series of five stages. The stages are (1) objective noncontingency in the environment; (2) perception of noncontingency between responses and outcomes; (3) attributions of noncontingency between responses and outcomes; (4) expectation of future noncontingency; and (5) exhibition of helpless behaviour on a generalization task. In order to demonstrate helplessness one must show that the subject perceives response independence, attributes response independence to a cause, expects response independence in the future and generalizes helpless behaviour to a different situation or task.

One purpose of the preliminary study was to develop a methodology for testing helplessness effects, in a generalization testing situation, by demonstrating that subjects do perceive response-independent outcomes, do attribute response-independent outcomes to a cause, and do expect response independence in the future.

Objective noncontingency was ensured by the presentation of success and failure trials in random order to subjects in a noncontingent feedback condition. The number of

success and failure trails was determined by the performance of individually yoked contingent feedback subjects. Perception of noncontingency, attribution of noncontingency, and expectation of future noncontingency were monitored by questions presented to the subject during training.

According to Abramson et al. (1978) subjects become helpless when they believe that the outcome is not contingent on any response within their repertoire (i.e., they are unable to solve the problem). Therefore, subjects were asked whether they thought that they could solve the problem. Abramson et al. (1978) further divide their subjects according to personal or universal helplessness. Those who believe that relevant others could solve the problem fall into the personally helpless category. Those who believe that no relevant others could solve the problem fall into the universally helpless category. Because generality of helplessness is determined by personal or universal helplessness (Abramson et al., 1978), subjects were asked whether they thought that others could solve the problem. Attributions of contingency or noncontingency were tapped using questions adapted from Dweck and Bush (1976) with the additional option "you don't know why" for those children who had not yet formed an attribution of causality. (See question 4 and 5 of the questionnaire, p. 84). Expectation of future noncontingency was measured by asking the children how well they expected to do, if asked by the experimenter to solve a different puzzle.

A second purpose of the preliminary study was to test a task in which subjects in the contingent feedback condition could solve the problem, but solve it gradually enough that learned helplessness had time to develop within the noncontingent feedback condition. Deiner and Dweck (1978) used a three- dimension, two-choice discrimination problem in their investigation of verbalizations associated with failure. The three dimensions and two choices for each dimension were: colour (red or blue), form (square or triangle), and symbol in the centre of the form (dot or star). The correct solution to the problem was one of red, blue, square, triangle, dot, or star. Although Deiner and Dweck (1978) conducted testing only under conditions of failure, they trained each of their subjects to solve discrimination problems reliably before testing began. The results of their preliminary training provided some indication of the number of trials needed by children to solve the task. Only the first training trial in the Deiner and Dweck (1978) study would be equivalent to the training procedure in the contingent feedback condition in the present study, as slightly different procedures were used in the Deiner and Dweck (1978) and present studies, as follows. In the Deiner and Dweck (1978) study, subjects were given verdical feedback for 16 trials and then were asked for the solution to the problem. If the child gave the correct response, then the next problem was begun. If the child gave an incorrect re-

sponse, then the experimenter told the child which dimension was correct and repeated the deck of 16 trial cards until the subject reached criterion. The trials continued until the child had six successive correct choices. By the end of the third repetition all children had solved the problem. In other words, all of the children achieved six successive correct reponses within 64 trials. There is no indication of how many children solved the problem following the first, second, and third presentation of the cards. In contrast, in the present study, subjects were given 64 trials to learn the discrimination with no prompting of the correct response provided to the subject. Despite differences in the two procedures it was expected that all subjects in the contingent feedback condition would learn the discrimination within 64 trials while subjects in the noncontingent feedback condition could realize that they could not solve the problem.

A third purpose of the preliminary study was to test the suitability of the test (i.e., generalization) task for measuring helplessness effects. If a test task is very easy, then subjects generally do not display helplessness (Maier and Seligman, 1976). However, if the test task is too difficult, then subjects in all treatment conditions will display a response deficit on the test task, thereby masking the effects, if any, of helplessness. In order to measure the suitability of the block design task, all sub-

jects in the preliminary study were tested on a block design generalization task which, hopefully, would be neither too easy nor too difficult to solve.

A block design task was selected for two reasons. First, norms for the performance of subjects within a given age group have been developed and therefore it was possible to select block design problems at an appropriate level of difficulty. Second, block design problems were used by Dweck and Reppucci (1973) in their evaluation of effects of discriminable failure feedback. Measures of response latency on block design problems were found to be sensitive to differences between trials in which success was signalled and trials in which failure was signalled, indicating that block design problems may be a sensitive measure of effects which operate during helplessness training.

In summary, the preliminary study was designed to develop a methodology appropriate for studying generalization of training effects in a learned helplessness paradigm with children. The purposes, specifically, were (1) to demonstrate that subjects in the noncontingent feedback condition perceived response independence, attributed response-independent outcomes to a cause, and expected response independence in the future; (2) to test a training task in which subjects in the contingent feedback condition could solve the problem, but solve it gradually enough that learned helplessness had time to develop within the noncontingent

feedback condition; and (3) to test the suitability of the test task. Only two treatment conditions were considered to be necessary in order to satisfy the purposes of the preliminary study: a contingent feedback condition and a noncontingent feedback condition.

Method

Subjects

Subjects were 40 children in the fifth grade from John Dafoe, Montrose, and William Osler elementary schools in Winnipeg. An equal number of male (N = 5) and female (N =5) subjects were used in each cell of the design. Mean age of all subjects was 11.1 years.

Apparatus

The IAR scale (Crandall et al., 1965), which was designed to measure the extent to which children take personal responsibility for academic success and failure, was employed to determine levels of academic responsibility. The IAR scale was designed such that higher scores indicate a greater willingness to accept responsibility for failure due to lack of effort. The reader is directed to Appendix B for information concerning the development, reliability, validity, and subsequent verification by various investigators of the IAR scale. A copy of the IAR scale is included in Appendix B.

For treatment, a series of stimulus slides, on which each of three dimensions and two choices for each dimension were displayed, were presented on a projection screen. The three dimensions used and the choices were the same as those employed by Deiner and Dweck (1978): colour (red or blue), form (square or triangle), and symbol in the centre of the form (dot or star). The panels on which the stimuli were displayed were connected to a relay. When a panel was pushed by a subject, the panel connected with the relay, and the subject's response was recorded automatically. The score was represented to the subject by a pile of tokens worth 10 points each. Response latency was timed with an electric timer. Subjects responded to attribution questions on sheets of paper on which the questions were typewritten.

In the test situation, 1-in blocks with white, red, or white and red sides as used in the WISC-R block design task were employed. Designs were displayed on 3 in by 5 in pieces of white cardboard. Using the standardized WISC-R method of response latency measurement, a stop watch was used to record the amount of time engaged in the task, from the time the subject was presented with the problem until the subject reported that (s)he was finished.

Design

Treatment (training) phase. The design was a 2 (IAR score) by 2 (procedure) by 4 (blocks of 16 training trials) mixed model with between subject measures on the IAR score and procedure factors and repeated measures on the training trial factor. The two levels of IAR score were high and low as determined by a median split of scores for the failure items pertaining to effort within sex of subject groupings. Dweck and Reppucci (1973) have reported that scale items dealing with failure due to lack of effort best discriminate between helpless and nonhelpless children in failure situations. Deiner and Dweck (1978) divided their subjects into groups based on the subset of items dealing with failure due to lack of effort. Therefore, only the items which measured responsibility for failure due to lack of effort were employed to determine IAR grouping.

The two levels of the training factor were contingent feedback and noncontingent feedback. See below for descriptions of procedures related to each condition.

Test (generalization) phase. The design was the same as that employed during the treatment (training) phase, except that the test trial factor consisted of blocks of 3 rather than 16 trials. A block design problem was presented on each test trial.

Procedure

Measurement of IAR score. Approximately one to two weeks before individual learned helplessness treatment and testing occurred, a female experimenter (other than the experimenter for the treatment phase of the experiment) administered the IAR scale to fifth grade children in a classroom situation. The entire IAR scale was administered to the children. The experimenter read the following instructions to each group of children:

> These are questions which ask you about how you would behave in certain common situations. There are no right or wrong answers or any tricks to the questions. Simply put an "X" beside the answer that better describes the way you would act. The answers you give will be seen only by the experimenter and will not be shown to your teacher, principal, parents, friends, or anyone else. Before you begin, be sure to put your name, school, age, and sex on the first page of the questionnaire. Work carefully but don't dawdle - you should take only about 10 minutes to finish.

When completed IAR questionnaires had been obtained from all of the children in the sample for the preliminary study, a score was tallied for each child on the basis of the subset of items which concerned failure due to lack of effort (Deiner & Dweck, 1978). Children were divided into groups based on a median split of IAR scores (Deiner & Dweck, 1978; Dweck & Reppucci, 1973) such that subjects with scores above the median were placed in the high responsibility group and subjects with scores below the median were placed in the low responsibility group. Median scores were calculated separately for boys and girls.

Treatment (training) phase. The general procedure for the learned helplessness phase of the experiment was administered to each subject individually one to two weeks following IAR score measurement as follows. The subject was escorted from the classroom to the experimental room by the experimenter. In both procedural conditions, the experimenter read the following instructions to the subject:

> I want you to work on solving a puzzle. See this display? (Experimenter shows sample display to subject.) On each display that I am going to show you, there will be two colours, both red and blue, two forms, a square and a triangle, and two shapes in the centre of the form, a circle and a star. (Experimenter points to each choice of dimension while describing them to the child.) Each time I show you a display, I want you to push one panel or the other, depending on which stimulus you choose, like this. (Experimenter demonstrates.) You choose which panel you push on the basis of one of the characteristics of red, blue, square, triangle, circle, or star. I will tell you if your choice is right or wrong. But remember, when you push a panel for one side of the display or the other, any one of three characteristics could be right or wrong. For example, if I told you that you were right when you pushed the panel for this side of the display, either red, square, or star could be correct. What you have to do is get as many correct as possible and you can do that by keeping track of when I say "right" or "wrong". If you can figure out what to do so that I say "right" most of the time, then you will do well on the puzzle. Just so that you can keep track of how many right and wrong answers you have, I have a stack of counters here that will help you to keep track. (Experimenter points to pile of counters.) There are 800 points here right now. Each time you give a wrong answer I will take a counter worth 10 points out of the stack. As well, I will give you some marbles at the end of the session and the number of marbles will depend on the number of points you have left in the stack.
>
> So what you have to do is for each display, push the panel for one figure or the other and I

> will tell you if your choice is right or wrong. If you choose correctly then you won't lose points. But if you choose incorrectly, then you will lose 10 points. Remember that you should try to get as many answers correct as possible so that you don't lose many points and get lots of marbles at the end of the session.
>
> Every once in a while I will ask you to answer some questions about how you think that you are doing on the puzzle. The questions will be written on sheets of paper, and you can just put the papers in a pile over here as you finish them. (Experimenter points to a place near subject.) For now though, I just want you to work at solving the puzzle and trying to not lose points.

Each subject received 64 trials during treatment. Success or failure on each trial was determined according to condition of experimental procedure as described below. Subjects had 10 sec to respond each time a new stimulus display was shown. One response by the subject constituted a trial. An approximately 5 sec interval between the subject's response and presentation of the next slide was used to allow the experimenter to record data and set the timer. Response latency and success or failure on each treatment trial were recorded.

In addition to behavioural measures of performance as outlined above, attributions of causality were measured following trials 16, 32, 48, and 64. The questionnaire contained the following questions:

1. Do you think that you can solve the puzzle?
   a) yes
   b) no
   c) maybe

2. Do you think that other kids your age can solve the puzzle?

   a) yes

   b) no

   c) maybe

3. How well do you think that you are doing on this task?

   a) very well

   b) quite well

   c) well

   d) not very well

   e) not at all well

4. If you think that you're doing well on this task, why do you think that is ?

   a) the lady is being fair

   b) you are trying very hard

   c) you are good at this kind of puzzle

   d) you don't know why

5. If you think that you're not doing well on this task, why do you think that is ?

   a) the lady isn't being fair

   b) you aren't trying very hard

   c) you aren't very good at this kind of puzzle

   d) you don't know why

6. If I asked you to try a different kind of puzzle, how well do you think you would do ?

   a) very well

   b) quite well

c) well

d) not very well

e) not at all well

The first three questions concerned the perception of noncontingency. The next two questions concerned the attributions of causality for outcome. The last question concerned expectation for future noncontingency. Following each presentation of the questionnaire, the subjects were reminded that they still were working on the same puzzle as before and that they were to try to get as many answers correct as possible.

Test (generalization) phase. Immediately following treatment, all subjects were asked to solve 12 block design problems as outlined in the following instructions which were read to the subject by the experimenter:

> Now I would like you to try these block design problems. I will show you a design on a card like this, and give you some blocks like this. Notice that each block has some sides that are solid white, some sides that are solid red, and some sides that are half white and half red. What I would like you to do is to arrange the blocks so that they look exactly like the picture, like this. (Experimenter points to sample design card and blocks at appropriate time while reading directions.) When you are finished, let me know that you are done. If you do well on these problems I will let you keep the pen you have been using to answer the question sheets. Once again, I will be giving you questions to answer between problems, and you can just put them in the pile with the others once you have answered them.

All test trials were soluble but a time limit of 60 sec was set for the solution of each test problem. Three dependent measures were recorded as follows. First, the amount of time to solve each problem was recorded from the time the design was presented to the subject until the subject reported that the problem was complete. Subjects who failed to complete or to solve a problem were assigned the maximum amount of time (i.e., 60 sec) for the problem in question. The first dependent measure constituted a global measure of performance and was referred to as solution time.

Because subjects who gave up easily were assigned the maximum amount of time for solution, a second dependent measure of interest was a more direct measure of motivational effects rather than the more global measure of problem solving. Amount of time spent engaged in actual problem solving behaviour from the time the design was presented to the subject until the subject reported that the problem was completed was recorded. It was possible that high responsibility children might have engaged in more problem solving behaviour than low responsibility children but might not have performed any more effectively, thus achieving solution time scores similar to those of low responsibility children.

Third, the number of errors on the test trials constituted another dependent measure of interest. Again, no significant differences among groups might have been found on measures of solution time or actual time spent seeking a so-

lution, but some groups of subjects could have been more successful than other groups of subjects.

After trials 3, 6, 9, and 12, subjects were asked to complete a questionnaire. The questions were the same as those presented during treatment except that question 6 read:

> 6. If I asked you to go back and try the first puzzle, how well do you think that you would do?
>
> a) very well
>
> b) quite well
>
> c) well
>
> d) not very well
>
> e) not at all well

It was of interest to note if performance on the test task influenced subjects' perceptions of how well they would perform on the treatment task if asked to try the first puzzle again.

Specific procedures for each level of the procedure factor were as follows.

Contingent feedback. The purpose of the contingent feedback treatment condition was to provide an estimate of the effect of failure per se on later responding. Subjects had to learn to choose the red figure, which was randomly chosen as correct, in order not to lose points on a given trial.

Noncontingent feedback. The noncontingent feedback procedure was used to fulfill Maier and Seligman's (1976) specifications: both contingent and noncontingent groups experienced the same degree of failure, and failure and success within the noncontingent condition was not contingent on performance. Regardless of the response of subjects in the noncontingent treatment condition, each subject received the same number of failure and nonfailure trials as a yoked subject in the contingent treatment condition. Failure and nonfailure trials were presented in random order.

Debriefing

Immediately following the block design task, in order to ensure that children understood the nature of the experiment, it was explained carefully to subjects who failed to solve the discrimination task, regardless of experimental condition, that the problem had no solution. All subjects then were told that they could try the first puzzle again in order to find the correct answer. The response made by the subject on the first trial was designated as correct, and, for the sake of simplicity, the colour of the figure chosen by the subject was designated as the correct response. After each subject had been debriefed, (s)he was awarded a package of 25 marbles and a ballpoint pen and escorted back to his or her classroom.

Results and Discussion

Analysis of the results was designed to answer the specific questions which constituted the purposes of the preliminary study. Following the purposes of the preliminary study results were organized in the following manner: (1) treatment questionnaire responses; (2) suitability of treatment task; and (3) test (generalization) phase.

Treatment Questionnaire Responses

Perceptions of noncontingency, attributions or response independence of outcomes to a cause, and expectations of response-outcome independence in the future were evaluated in terms of responses to questionnaire items following each block of trials during treatment. In addition, differences in responses to questionnaire items as a function of IAR level and sex of subject were evaluated. Due to the large amount of data, contingency tables were prepared only for statistically significant relationships.

Perceptions of noncontingency. In order to determine whether subjects in the noncontingent feedback condition perceived response-outcome independence, t-statistics were calculated comparing answers on questions 1, 2, and 3 between subjects in the contingent and noncontingent feedback conditions.

Contingency tables indicating responses to Question 1 (i.e., Do you think that you can solve the puzzle?) are pre-

sented in Table 3 for each block of treatment trials. Inspection of Table 3 suggests that more subjects in the contingent treatment condition reported that they could solve the puzzle than subjects in the noncontingent treatment condition for Blocks 2, 3, and 4. Statistical analyses partially supported observation. On Blocks 2 and 4, significantly more subjects in the contingent treatment condition reported that they could solve the puzzle than subjects in the noncontingent treatment condition (t's (38) = 1.99 and 1.80, respectively, p's < .05, one-tailed). On Block 3, although the effect was in the same direction as in Blocks 2 and 4 (see Table 3), analysis revealed only marginal statistical significance (t (38) = 1.64, p < .10, one-tailed). It was interesting to note that very few subjects ever stated that they could not solve the problem. The most frequent response other than "yes" was "maybe". It appeared that children in both treatment conditions were reluctant to state that they could not solve the problem.

No significant differences in responses to Question 1 were found as a function of either IAR level or sex of subject.

No significant differences between treatment conditions, IAR levels or sex of subjects, were found in responses to Question 2 (i.e., Do you think that other kids your age can solve the puzzle ?) or Question 3 (i.e., How well do you think that you are doing on this task ?). In gener-

TABLE 3

NUMBER OF CHILDREN WHO CAN AND CANNOT SOLVE PUZZLE: P1

	Response Category		
	Yes	No	Maybe
Block 1			
Contingent Feedback	5	0	14
Noncontingent Feedback	7	0	13
Block 2			
Contingent Feedback	15	1	4
Noncontingent Feedback	9	1	10
Block 3			
Contingent Feedback	15	0	5
Noncontingent Feedback	10	0	10
Block 4			
Contingent Feedback	17	0	3
Noncontingent Feedback	12	0	8

al, most subjects reported that they thought that other children their age could solve the puzzle. Over Blocks 1 and 2 subjects in both treatment conditions tended to report that they were doing "well" or "quite well" on the puzzle. Over Blocks 3 and 4 subjects in both treatment conditions tended to report that they were doing "quite well" or "very well". Note that subjects in the noncontingent treatment condition reported that they were doing "quite well" or "very well" on the puzzle even though they were not certain that they could solve the puzzle. Again, it appeared that children were reluctant to state that they were not doing well on the task.

In summary, more subjects in the contingent treatment condition reported that they could solve the puzzle than subjects in the noncontingent treatment condition, suggesting that perhaps subjects in the noncontingent treatment condition perceived response-outcome independence. However, subjects in the noncontingent treatment condition did not report that they could not solve the puzzle, therefore it could not be concluded that subjects in the noncontingent treatment condition perceived response-outcome independence. Subjects in the contingent treatment condition were not more likely to report that others could solve the problem than subjects in the noncontingent treatment condition. According to revised learned helplessness theory, subjects who believed that they could not, but others could, solve the

problem would become personally, as opposed to universally, helpless. Subjects in both the contingent and noncontingent treatment conditions reported that they were doing "well", "quite well", or "very well" most frequently irrespective of whether or not they believed that they could solve the problem. It appeared on the basis of responses to Question 3 and Question 1 that subjects were reluctant to state specifically that they were not doing well or that they could not solve the problem.

Attributions of response independence. In order to determine if the types of attributions for success or failure were different in the two treatment conditions, subjects' responses to Questions 4 and 5 of the treatment questionnaire were compared. Because of the decidedly nominal nature of the data chi-square statistics were calculated to determine differences in types of attributions as a function of treatment condition. Results of the analyses are presented in Table 4, and a breakdown of the type of attributions made as a function of treatment condition are presented in Table 5. No significant differences in types of attributions for success or failure were found between subjects in the contingent treatment condition and subjects in the noncontingent treatment condition. Most subjects attributed success to "effort" on each block of trials (see Table 5). In response to the attribution of failure question, subjects in each treatment condition almost equally

attributed failure to "effort" and to "don't know" on each block of trials (see Table 5).

In addition to analyzing the types of attributions made, the number of subjects in each treatment condition to respond to Questions 4 and 5 were compared. All subjects responded to Question 4 (i.e., If you think that you're doing well on this task, why do you think that is ?) on each block of treatment trials. The number of subjects in each treatment condition who responded to Question 5 (i.e., If you think that you're not doing well on this task, why do you think that is ?) are presented in Table 6. Inspection of Table 6 suggests that fewer subjects in the contingent treatment condition answered Question 5 than subjects in the noncontingent treatment condition. Analyses of the number of people responding in each condition only partially supported the results of data inspection. On Block 1 significantly fewer (t (38) = -2.50, $p < .01$, one-tailed), and on Blocks 2, 3, and 4 marginally significantly fewer (t 's (38) = 1.07, 1.43, and 1.43, respectively, p 's $< .15$, .10, and .10, respectively, one-tailed) subjects in the contingent treatment condition answered Question 5 than in the noncontingent treatment condition. Thus, there was a tendency for more children in the noncontingent treatment condition than children in the contingent treatment condition to make attributions for failure, although all children made attributions for success.

TABLE 4

ANALYSES OF ATTRIBUTIONS

	Chi-Square Statistics	
	Success	Failure
Block 1	3.82[1]	4.48[2]
Block 2	4.98[3]	.65
Block 3	3.82	.07
Block 4	2.57	2.51

---

1. For $p \leq .05$, $\chi^2_4 \geq 9.49$
2. For $p \leq .05$, $\chi^2_2 \geq 5.99$
3. For $p \leq .05$, $\chi^2_3 \geq 7.82$

TABLE 5

ATTRIBUTIONS OF SUCCESS AND FAILURE: P1

	Success Attributions				Failure Attributions			
	Fair Experimenter	Effort	Ability	Don't Know	Unfair Experimenter	Effort	Ability	Don't Know
Block 1								
Contingent	1	12	2	5	0	5	0	4
Noncontingent	1	12	0	7	0	6	6	4
Block 2								
Contingent	0	15	2	2	0	4	3	4
Noncontingent	2	10	2	6	0	6	2	6
Block 3								
Contingent	0	15	3	2	0	4	1	5
Noncontingent	1	11	2	6	0	6	1	7
Block 4								
Contingent	1	12	5	2	0	6	2	2
Noncontingent	1	12	2	5	0	6	2	7

TABLE 6

NUMBER OF SUBJECTS MAKING ATTRIBUTIONS

	Contingent Feedback	Noncontingent Feedback
Block 1	9	16
Block 2	11	14
Block 3	10	14
Block 4	10	14

Because some differences in failure attributions may have been obscured by collapsing over levels of the IAR factor, the types of attributions made were examined as a function of both treatment condition and IAR level. A breakdown of types of attributions to failure as a function of treatment condition and IAR level are presented in Table 7. Inspection of Table 7 suggests that at the high level of IAR, subjects in both treatment conditions tended to attribute failure to either "effort" or "don't know" (see Table 7). In contrast, at the low level of IAR, more subjects in the noncontingent treatment condition than in the contingent treatment condition tended to attribute failure to "don't know" although fairly equal numbers of subjects in each treatment condition tended to attribute failure to "effort" (see Table 5). The perceived interaction between treatment condition and IAR level for types of attributions for failure was not substantiated by the statistical analysis.

No significant differences in responses to Questions 4 and 5 were found as a function of sex of subject.

Expectations of future independence. In order to determine how well noncontingent feedback subjects expected to do on a future task in comparison with contingent feedback subjects, chi-square statistics were computed comparing the answers on Question 6 between subjects in the noncontingent and contingent feedback conditions for each block of treatment trials. No significant differences between treatment

TABLE 7

ATTRIBUTIONS FOR FAILURE BY IAR LEVEL

	High IAR				Low IAR			
	Unfair Experimenter	Effort	Ability	Don't Know	Unfair Experimenter	Effort	Ability	Don't Know
Block 1								
Contingent	0	3	0	1	0	2	0	3
Noncontingent	0	3	3	2	0	3	3	2
Block 2								
Contingent	0	1	2	3	0	3	1	1
Noncontingent	0	4	0	2	0	2	2	4
Block 3								
Contingent	0	2	0	3	0	2	1	2
Noncontingent	0	4	0	2	0	2	1	5
Block 4								
Contingent	0	3	1	1	0	3	1	1
Noncontingent	0	4	0	2	0	2	1	5

conditions were found in estimates of future performance. Most subjects in each treatment condition reported that they expected to do "well" or "quite well" on a future task.

Summary and discussion. Responses to questions were analyzed in order to determine whether perceptions and attributions as outlined in the reformulated learned helplessness theory (Abramson et al., 1978) had developed in the noncontingent feedback group of subjects. Subjects in the contingent feedback condition were more likely to report that they could solve the treatment puzzle than subjects in the noncontingent feedback condition on Blocks 2 and 4 of treatment, suggesting that noncontingent feedback subjects did not perceive that they could solve the puzzle. However, it could not be concluded that noncontingent feedback subjects perceived response-outcome independence as they did not report that they could not solve the puzzle. Most subjects in both treatment conditions reported that they thought that other children could solve the puzzle. In addition, most subjects in both treatment conditions reported that they were doing "well" or better on the puzzle, even though some children were not certain that they could solve the puzzle. All subjects made attributions for success, with the majority of subjects attributing success to trying hard (i.e., effort). More subjects in the noncontingent feedback condition than in the contingent feedback condition made attributions for failure, indicating that more subjects

in the noncontingent than in the contingent feedback condition perceived that they were not doing well on the problem. Most attributions for failure in both treatment conditions were to "effort" or "don't know" although it appeared as though subjects in the noncontingent feedback condition at the low level of IAR were most likely to attribute failure to the "don't know" category. Most subjects in both treatment conditions reported that they thought that they would do "well" or "quite well" on a subsequent task. No differences in responses to any of the questions were found as a function of IAR level or sex of subject.

On the basis of responses to questionnaire items, four observations seem to be warranted. First, it appeared that subjects in the noncontingent feedback condition were less likely to report that they could solve the treatment puzzle, were more likely than other subjects to attribute failure to a cause, but did not expect response-outcome independence in the future. Therefore, only tenuous support for the first purpose of the preliminary study was found. Such tenuous support suggests that although the method employed in the preliminary study may be suitable for studying the effects of learned helplessness, questionnaire results must be considered in conjunction with behavioural results before the suitability of the method can be confirmed.

Second, it appeared that the children either believed that they could solve the puzzle or were reluctant to admit

failure. Subjects in both treatment conditions were more likely to report that they could "maybe" solve the problem than to report that they could not solve the problem. In addition, even those subjects who were not certain that they could solve the problem reported that they were doing "well", "quite well", or "very well" on the problem. As well, subjects who made failure attributions also made success attributions. Thus, it appeared to the present author that children were reluctant to admit that they could not solve the puzzle. On the basis of subjects' apparent reluctance to report that they were not doing well on the treatment problem, it would seem to be important to provide subjects with ambiguous response categories, as in the preliminary study (e.g., "maybe", "don't know") rather than to force choices, as in the Dweck and Bush (1976) study.

Third, the large number of marginally significant differences suggested that the power to detect significant effects should be increased by increasing the number of subjects in a future study.

Fourth, the lack of any significant sex differences on questionnaire responses implied that sex of subject need not be considered as a factor in future studies, although results on performance factors also need to be considered before such a decision is finalized.

Suitability of Treatment Task

The second purpose of the preliminary study was to determine whether the training task was appropriate for inducing learned helplessness. The first appropriateness criterion was that subjects in the contingent feedback condition had enough trials in which to learn the discrimination. The second appropriateness criterion was that subjects in the noncontingent feedback condition had enough trials in which to develop a performance decrement in comparison to subjects in the contingent feedback condition.

Number of trials. In order to determine whether subjects in the contingent feedback condition had a sufficient number of trials in which to solve the discrimination problem, two measures of performance were evaluated. First, using a criterion of six successive correct responses (Deiner & Dweck, 1978), the number of subjects who learned the discrimination was calculated. Second, in order to determine the number of trials necessary for subjects to learn the discrimination, the number of subjects who met the learning criterion within each block of trials was calculated. The number of subjects who solved the discrimination problem, broken down by blocks of treatment trials, is presented in Table 8. Inspection of Table 8 reveals that the majority of subjects (N = 15) in the contingent feedback condition were able to solve the training problem. Inspection of block by block results reveals wide variations in the number of tri-

als necessary in order to solve the discrimination problem even though a majority of subjects who solved the puzzle did so within the first block of trials. Wide variations in the number of blocks of trials needed to solve the puzzle correspond with wide variations in the number of errors each subject made within the contingent feedback condition. In fact, the number of errors over the 64 treatment trials ranged from 1 (N = 1) to 33 (N = 2). Although the number of subjects to solve the puzzle was satisfactory, the variability in number of trials required to solve the puzzle and number of errors may have resulted in wide variations in the amount of performance decrement induced among yoked noncontingent feedback subjects during the test phase.

In order to investigate the relationship between number of failure trials and the amount of performance decrement displayed during treatment, correlation coefficients were calculated between number of failure trials and response latency during treatment for subjects in each experimental condition on each block of trials. Correlations are presented in Table 9. Inspection of Table 9 suggests that within the contingent feedback-high IAR condition and the noncontingent feedback-low IAR condition number of failure trials was correlated positively with response latency. That is, subjects who received fewer failure trials had longer response latencies than subjects who received fewer failure trials. Within the contingent feedback-high IAR

TABLE 8

NUMBER OF SUBJECTS SOLVING PROBLEM ON EACH TRIAL

	Number of Subjects
Block 1	8
Block 2	3
Block 3	3
Block 4	1
TOTAL	15

condition, correlations were significant on trial blocks 3 and 4 (r 's = .73 and .89, respectively, p 's < .01 in both cases). Within the noncontingent feedback-low IAR condition correlations were significant on trial blocks 2, 3, amd 4 (r = .55, p < .05 on Block 2 and r 's = .81 and .70, p 's < .01 on Blocks 3 and 4). Thus it appears that within the contingent feedback-high IAR and noncontingent feedback-low IAR conditions the number of failure trials was related to response latencies during treatment. If the degree of performance decrement during treatment is related to the degree of helplessness, then the number of failure trials received during treatment would be related to the degree of helplessness, at least among low IAR subjects.

Development of performance decrement. The second criterion in determining the appropriateness of the treatment task was that subjects in the noncontingent feedback condition had enough trials in which to develop a performance decrement. Although a performance decrement appeared to be evident from the answers to questionnaire items, an analysis of variance of response latencies between contingent feedback and noncontingent feedback subjects was of interest for corroboration of attribution results. Therefore, a 2 (IAR score) by 2 (treatment condition) by 2 (sex of subject) by 4 (blocks of trials) mixed model analysis of variance was conducted to investigate differences between groups during treatment. Between subject factors were IAR score, treat-

TABLE 9

CORRELATIONS BETWEEN FAILURES AND RESPONSE LATENCY

	Block 1	Block 2	Block 3	Block 4
Contingent Feedback				
High IAR	.44*	.34	.73***	.89***
Low IAR	.01	.05	.28	.37
Noncontingent Feedback				
High IAR	-.26	.13**	-.02***	.01***
Low IAR	.29	.55**	.81***	.70***

* p .10
** p .05
*** p .01

ment condition, and sex of subject, and the within-subject factor was blocks of trials. Response latency in sec was the dependent measure of interest.

A summary of the results of the analysis of variance is presented in Table 10. Conservative F-statistics were calculated for significant within-subject main and interaction effects in order to correct for liberal estimates of effects due to violation of assumptions of homogeneity of within-group variance-covariance matrices (Kirk, 1968). As can be seen from Table 10, no significant main effect of sex of subject or significant interaction effects of any variable with sex of subject were found. Therefore, data were combined across the sex of subject variable and reanalyzed, as sex of subject was not a factor of interest. A 2 (IAR score) by 2 (treatment condition) by 4 (blocks of trials) mixed model analysis of variance was conducted.

A summary table of results is presented in Table 11, and mean response latencies of subjects in each treatment condition at each block of treatment trials are presented in Figure 1. Inspection of Figure 1 suggests that (1) response latencies in the two treatment conditions differed, with faster response latencies in the contingent feedback condition; (2) response latencies decreased over time; and (3) response latencies in the contingent feedback treatment condition decreased more quickly over blocks of trials than response latencies in the noncontingent feedback condition.

TABLE 10

ANALYSIS OF TREATMENT LATENCIES WITH SEX

Source	df	Mean Square	F
Treatment	1	420.88	3.08*
Sex	1	27.47	.20
IAR	1	98.44	.72
Treatment x Sex	1	266.00	1.95
Treatment x IAR	1	15.56	.11
Sex x IAR	1	164.63	1.21
Treatment x Sex x IAR	1	11.29	.08
ERROR	32	136.45	
Blocks	3	671.25	38.43*** (19.21*;1,32)[1]
Blocks x Treatment	3	18.39	1.05
Blocks x Sex	3	2.82	.16
Blocks x IAR	3	12.03	.69
Blocks x Treatment x Sex	3	2.46	.14
Blocks x Treatment x IAR	3	12.25	.70
Blocks x Sex x IAR	3	42.81	2.45*
Blocks x Treatment x Sex x IAR	3	69.13	3.96*** (3.98;1,32)
ERROR	96	17.47	

1. Conservative F-ratio, followed by degrees of freedom.
* $p \leq .10$
** $p \leq .05$
*** $p \leq .01$

The results of the analysis only partially supported the observations. A marginally significant main effect of treatment was found (F (1, 36) = 3.13, $p < .06$) (see Table 11). A significant main effect for blocks of treatment trials was found (F (3, 108) = 35.74, $p < .001$ and Conservative F (1, 12) = 11.91, $p < .01$) indicating that response latencies decreased over blocks of treatment trials. No significant interaction was found between blocks of trials and treatment condition indicating that response latencies decreased at an equivalent rate across trials. No other significant main effects or interaction effects were found (see Table 11).

Despite the lack of a significant interaction between blocks of trials and treatment condition, it remained of interest to determine whether subjects in the contingent feedback condition had shorter response latencies than subjects in the noncontingent feedback condition. Means for the two treatment conditions were compared for each block of treatment trials. In order to control for liberal estimates of effects due to assumptions of homogeneity of within-group variance-covariance matrices, individual estimates of error variance were employed as suggested by Rouanet and Lepine (1970). Referring again to Figure 1, it appears that response latencies did not differ between the two treatment conditions on Block 1, but that response latencies were shorter in the contingent feedback condition than in the noncontingent feedback condition on Blocks 2, 3, and 4. Us-

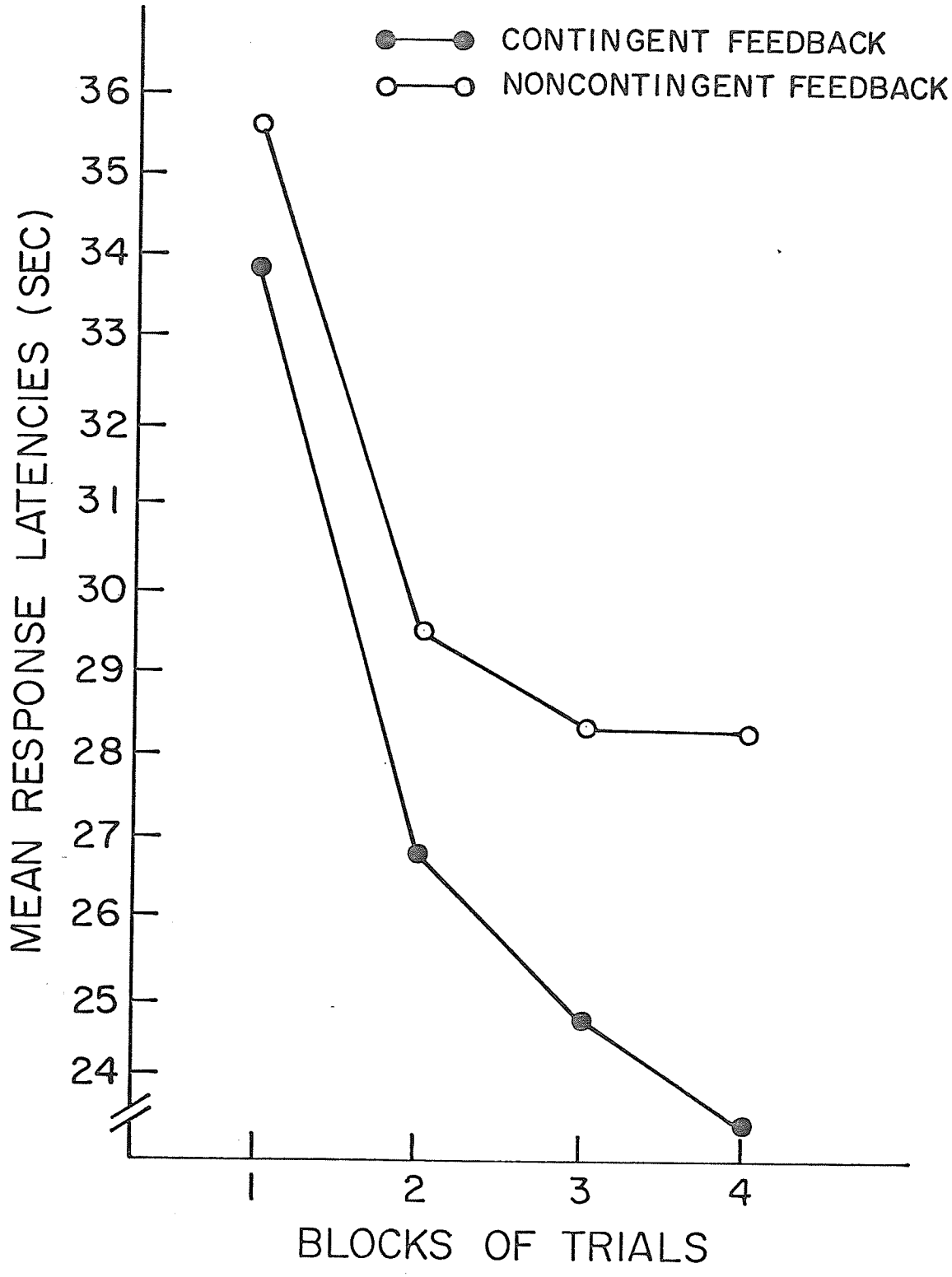
TABLE 11

ANALYSIS OF TREATMENT LATENCIES

Source	df	Mean Square	F
Treatment	1	420.88	3.13*
IAR	1	98.44	.73
Treatment x IAR	1	15.56	.12
ERROR	36	134.33	
Blocks	3	671.25	35.74***(11.91;1,12)
Blocks x Treatment	3	18.39	.98
Blocks x IAR	3	12.03	.64
Blocks x Treatment x IAR	3	12.25	.65
ERRORS	108	18.78	

* $p \leq .10$
** $p \leq .05$
*** $p \leq .01$

Figure 1: Treatment response latencies.


CONTINGENT FEEDBACK
NONCONTINGENT FEEDBACK
MEAN RESPONSE LATENCIES (SEC)
36
35
34
33
32
31
30
29
28
27
26
25
24
1
2
3
4
BLOCKS OF TRIALS

ing alpha = .02 in order to control for Type I error rate increments, observed differences were significantly different statistically only on Block 4 (F 's = .40, 1.46, 4.62, and 6.64, respectively, p 's = .53, .24, .04, and .01, respectively). Thus it was apparent that subjects in the noncontingent feedback condition were responding more slowly than subjects in the contingent feedback condition by the end of the treatment phase of the experiment.

It could not be concluded, however, that a performance decrement had occurred among noncontingent feedback subjects. Although subjects in the noncontingent feedback condition were responding more slowly than subjects in the contingent feedback condition, subjects in both feedback conditions were responding more quickly over blocks of trials. An alternate explanation of response latency differences between treatment conditions is that an adventitious response strategy may have been adopted by noncontingent feedback subjects. It was possible that slower responding was the result of children considering their answers more carefully among subjects who had not solved the puzzle by the fourth block of trials (i.e., all subjects in the noncontingent feedback condition) than among subjects who had solved the puzzle (i.e., a majority of subjects in the contingent feedback condition).

Summary. Suitability of the treatment task for investigating learned helplessness was measured in a number of ways. It was found that a majority (75%) of the subjects in the contingent feedback condition solved the discrimination problem. However, wide variations in the number of trials required to learn the discrimination and also in the total number of errors were found in the contingent feedback condition. Furthermore, number of errors was found to relate significantly in a positive manner to response latencies during treatment among subjects in the contingent feedback-high IAR and noncontingent feedback-low IAR conditions. Such a finding indicated that the number of failure trials probably influenced response latencies. To determine whether a performance decrement had developed among noncontingent feedback subjects, response latencies across blocks of trials were compared between treatment conditions. Although only a marginally significant main effect for treatment condition was found, subjects in the contingent feedback condition had significantly faster response latencies than subjects in the noncontingent feedback condition on the last block of treatment trials. However, because subjects in both treatment conditions demonstrated an increasingly faster rate of responding over blocks of trials, it could not be concluded that a performance decrement had been induced. Instead, it appeared that subjects in the noncontingent feedback condition had adopted an adventitious response strategy.

Three observations seemed to be warranted from the evaluation of the suitability of the treatment task. First, most subjects in the contingent feedback condition learned the discrimination and subjects in the noncontingent feedback condition demonstrated slower responding than subjects in the contingent feedback condition by the end of treatment. Thus, criteria for determining suitability of the treatment task were satisfied, suggesting that the discrimination puzzle should be employed during treatment in future studies.

Second, it was found that subjects within the contingent feedback -high IAR and noncontingent feedback-low IAR groups who experienced more failure trials had longer response latencies than subjects who experienced fewer failure trials. Thus, it appeared that a greater performance decrement was induced among those subjects who experienced a greater number of failure trials. Wide variations in the number of errors made may have obscured learned helplessness effects among noncontingent feedback subjects during the test phase of the experiment. Therefore, it would seem to be important to attempt to reduce variability in number of errors in future studies of learned helplessness effects.

Third, no significant sex differences in behaviour on treatment trials were found, again implying that sex of subject does not need to be considered as a factor in studying learned helplessness effects. However, test differences as

a function of sex of subject will require inspection before a final decision is made.

Test (Generalization) Phase

The third purpose of the preliminary study was to test the suitability of the block design task for use as the test task. If the task were either too difficult or too easy, then no differences in performance would be found between the contingent feedback and noncontingent feedback conditions. A 2 (IAR score) by 2 (sex of subject) by 2 (treatment condition) multivariate analysis of variance collapsing over the 4 blocks of test trials was conducted to test the hypothesis of overall group differences. The dependent measures used were (1) actual amount of time for problem solving or time spent; (2) solution time; and (3) number of unsuccessfully completed trials. A summary table of results is presented in Table 12. As can be seen from Table 12, a significant main effect of sex of subject was not found, and a significant interaction of sex of subject with any other variable or combination of variables was not found. Therefore, data were combined across levels of the sex of subject factor and re-analyzed.

Subsequently, a 2 (IAR score) by 2 (treatment condition) multivariate analysis of variance collapsing over the 4 blocks of test trials was conducted. Follow-up analyses included discriminant function analysis, examination of mul-

TABLE 12

ANALYSES OF TEST SCORES WITH SEX FACTOR

Source	df	Multivariate F
Treatment	3,30	1.54
Sex	3,30	.42
IAR	3,30	2.79**
Treatment x Sex	3,30	1.47*
Treatment x IAR	3,30	2.42*
Sex x IAR	3,30	.84
Treatment x Sex x IAR	3,30	.17

	Mean Square	Univariate F	Step-Down F
Treatment			
Time Spent	202.50	.12	.12
Solution Time	1470.16	.70	4.50**
Errors	5.62	1.00	.12
Sex			
Time Spent	112.22	.07	.07
Solution Time	31.15	.01	.03
Errors	1.22	.22	1.15
IAR			
Time Spent	96.72	.06	.06
Solution Time	5671.54	2.71	7.33**
Errors	30.62	5.44	.98
Treatment x Sex			
Time Spent	1.94	.00	.00
Solution Time	730.17	.35	1.11*
Errors	11.02	1.96	3.21*
Treatment x IAR			
Time Spent	756.90	.45	.45
Solution Time	851.01	.41	5.07**
Errors	13.22	2.35	1.59
Sex x IAR			
Time Spent	140.62	.08	.08
Solution Time	387.51	.18	.12
Errors	5.62	1.00	2.30
Treatment x Sex x IAR			
Time Spent	304.70	.18	.18
Solution Time	400.06	.19	.02
Errors	2.02	.36	.33

* $p \leq .10$
** $p \leq .05$
*** $p \leq .01$

tivariate, univariate, and step-down results for each block of trials individually. Summaries of results are presented in Tables 13, 14, 15, 16, 17, and 18. Centroids associated with each group of subjects are presented in Figure 2. Unless otherwise specified, alpha = .05 was employed to determine the significance of effects.

Overall multivariate analysis. Inspection of Figure 2 suggests that subjects in the low IAR noncontingent feedback condition performed more poorly than subjects in other experimental conditions.[2] No other groups of subjects appeared to perform differentially. Observed differences were substantiated generally by the results of the overall multivariate analysis. Using alpha = .10 for multivariate test statistics because of the conservative nature of the analysis (Hummel and Sligo, 1971) a significant interaction effect was found between IAR level and treatment condition (Multivariate F (3, 34) = 2.42, $p < .10$). The overall main effect for IAR level was found to be significant (Multivariate F (3, 34) = 2.84, $p < .05$) while the overall main effect for treatment condition was found to be nonsignificant (see Table 13).

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[2] The term experimental condition is used to identify unique cells within the factorial design (i.e., one level of the IAR factor crossed with one level of the treatment factor).

Discriminant function analysis. Raw and standardized discriminant function weights for the treatment condition by IAR level interaction are presented in Table 14. Discriminant function analysis provides a linear combination of weights which maximally differentiates among experimental conditions. By examining group rankings and dependent measure weightings, one is able to describe group differences within a multivariate sphere (Tatsuoka, 1970). Group centroids were constructed by weighting the mean for each experimental condition by the corresponding raw discriminant function weight to form a score which reflected overall performance. Comparisons of group centroids were conducted in order to explore the nature of the significant interaction effect. Contingent and noncontingent feedback conditions did not differ at the high level of IAR (see Table 15). At the low level of IAR, subjects in the contingent feedback condition had significantly better performance scores than subjects in the noncontingent feedback condition (Multivariate F (3, 34) = 3.65, $p < .05$). Within the noncontingent feedback condition, subjects at the low level of IAR had significantly lower performance scores than subjects at the high level of IAR (Multivariate F (3, 34) = 5.07, $p < .01$).

Consideration of comparisons of group centroids clarifies the nature of significant main and interaction effects. In general, subjects with a high IAR score for attributing failure to effort performed better than subjects with a low

Figure 2: Treatment condition centroids.

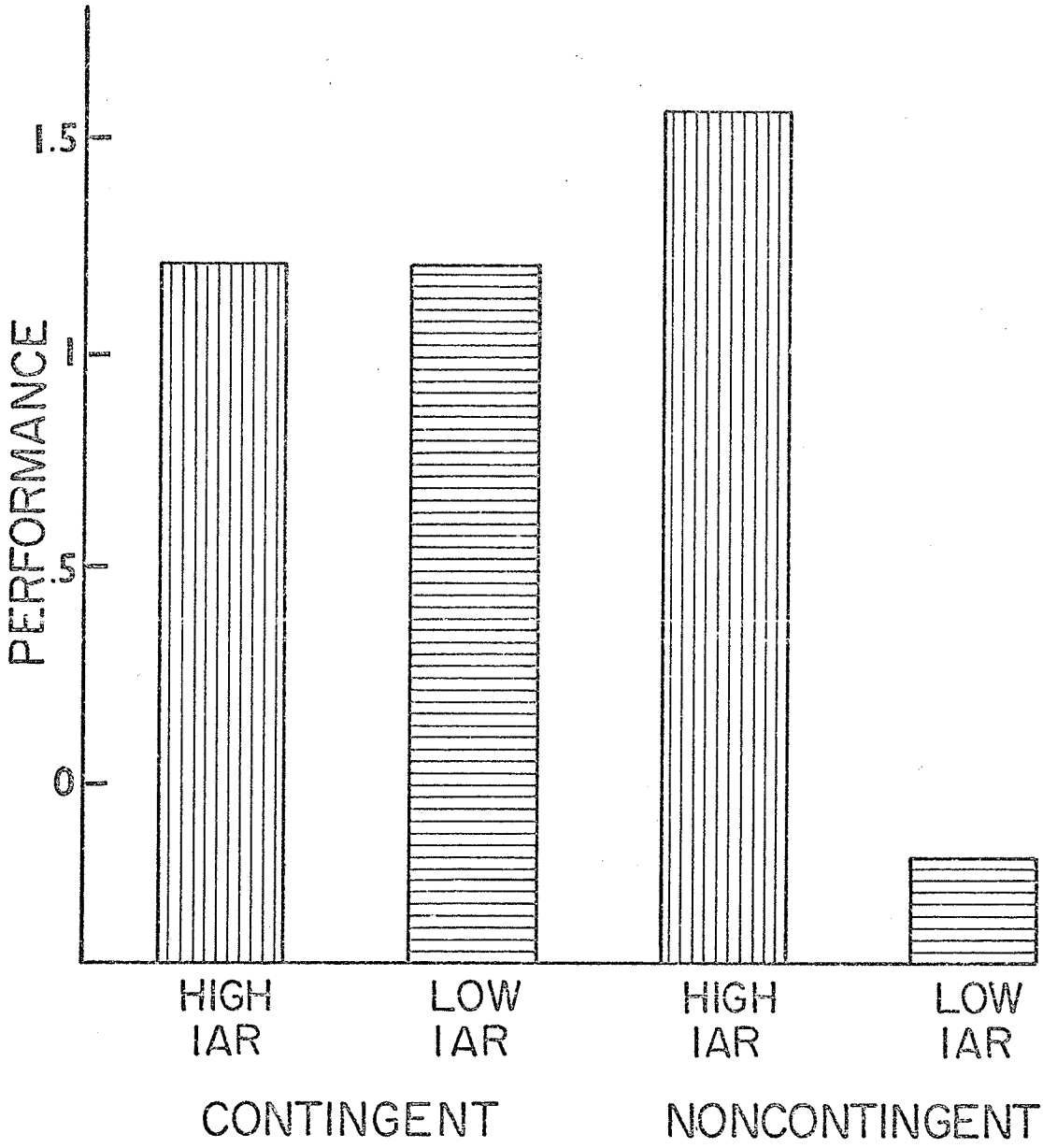
PERFORMANCE
1.5
1
.5
0
HIGH IAR
LOW IAR
HIGH IAR
LOW IAR
CONTINGENT
NONCONTINGENT

TABLE 13

ANALYSES OF TEST SCORES

Source	df	Multivariate F
Treatment	3	1.71**
IAR	3	2.84*
Treatment x IAR	3	2.42*
ERROR	34	

	Mean Square	Univariate F	Multivariate F
Treatment			
Time Spent	202.50	.13	.13**
Solution Time	1470.16	.77	4.89
Errors	5.62	1.01	.21
IAR			
Time Spent	96.72	.06*	.06***
Solution Time	5671.54	2.98**	7.94
Errors	30.62	5.52	.61
Treatment x IAR			
Time Spent	756.90	.50	.50**
Solution Time	851.00	.45	5.51
Errors	13.22	2.38	1.18

* $p \leq .10$
** $p \leq .05$
*** $p \leq .01$

TABLE 14

DISCRIMINANT FUNCTION WEIGHTS

Dependent Measure	Raw Coefficient	Standardized Coefficient
Time Spent	0.031	1.225
Solution Time	-0.006	-0.271
Errors	-0.476	-1.121

IAR score. However, differences between high and low IAR subjects were significant only following noncontingent feedback during treatment. The magnitude of the difference following noncontingent feedback contributed to the overall main effect of IAR level as no significant difference between high and low IAR subjects was found following contingent feedback during treatment. In addition, subjects at the high level of IAR performed significantly better than subjects at the low level of IAR following noncontingent feedback. In other words, only one group of subjects performed differently than any other group of subjects: children with low IAR scores receiving noncontingent feedback during treatment performed more poorly than all other children.

Univariate effects. Univariate effects of the omnibus analysis are presented in Table 13, followed by univariate effects of group contrasts in Table 15. Means and standard deviations are presented in Table 16. Inspection of Table 16 suggests that no group differences occurred in the amount of time subjects spent trying to solve the block design problems. Analysis of group means supported observation (see Tables 13 and 15). Inspection of Table 16 for solution time (unadjusted means) suggests that subjects with low IAR scores had longer problem solution times than subjects with high IAR scores. Observation was supported partially by the results of the analysis. Mean solution times were marginal-

TABLE 15

ANALYSES OF TEST PHASE GROUP COMPARISONS

Source	Multivariate F	Univariate F	Step-Down F
High IAR- Contingent vs. Noncontingent	.48		
Time Spent		.11	.11
Solution Time		1.25	2.37
Errors		1.09	.20
Low IAR - Contingent vs. Noncontingent	3.65**		
Time Spent		.47	.47
Solution Time		.08	2.60
Errors		.24	.07
Noncontingent - High vs. Low IAR	5.07***		
Time Spent		.10*	.10***
Solution Time		2.87***	13.39
Errors		7.57	1.50

* $p \leq .10$
** $p \leq .05$
*** $p \leq .01$

ly significantly longer among the low IAR subjects than among high IAR subjects (F (1, 36) = 2.98, $p < .10$). Main effect of treatment condition and interaction effect of treatment condition and IAR level were not significant (see Tables 13 and 15). Inspection of Table 16 for number of errors suggests that low IAR subjects made more errors than high IAR subjects and that noncontingent feedback subjects made more errors at the low level of IAR than at the high level of IAR. Analyses of group means supported observation. Subjects within the low level of IAR made significantly more errors than subjects within the high level of IAR (F (1, 36) = 5.52, $p < .05$). Within the noncontingent feedback condition, subjects within the low level of IAR made significantly more errors than subjects within the high level of IAR (F (1, 36) = 7.57, $p < .01$). Main effect of treatment condition and interaction effect of treatment condition and IAR level were not significant (see Tables 13 and 15). Inspection of Table 16 for number of errors suggests that low IAR subjects made more errors than high IAR subjects and that noncontingent feedback subjects made more errors at the low level of IAR than at the high level of IAR. Analyses of group means supported observation. Subjects within the low level of IAR made significantly more errors than subjects within the high level of IAR (F (1, 36) = 5.52, $p < .05$). Within the noncontingent feedback condition, subjects within the low level of IAR made significant-

ly more errors than subjects within the high level of IAR (F (1, 36) = 5.52, $p < .05$). Within the noncontingent feedback condition, subjects within the low level of IAR made significantly more errors than subjects within the high level of IAR (F (1, 36) = 7.57, $p < .01$). Main effect of treatment condition and interaction effect of treatment condition and IAR level were not significant (see Tables 13 and 15).

In general, results of univariate analyses support and further explicate results of multivariate analyses. No significant differences were found between treatment groups as a result of either univariate or multivariate analyses. Although the interaction effect between treatment condition and IAR level was not found to be significant as a result of univariate analyses, it was found to be significant as a result of multivariate analyses. Thus, it appeared that a linear combination of dependent measures, represented by discriminant function weights, provided a more powerful test of group differences than the use of any single univariate measure. Overall, then, comparison of results employing univariate and multivariate analyses suggested that all three dependent measures should be retained in future studies of a similar nature.

Step-down effects. An analysis of step-down effects was provided by the computer package for analysis of multivariate effects (Finn, 1979). Step-down analyses are simi-

TABLE 16

TEST SCORE MEANS

Time Spent

	IAR High	IAR Low
Contingent	21.54 (8.80)*	24.49 (11.47)
Noncontingent	22.58 (7.89)	21.19 (10.44)

Solution Time (unadjusted)

	IAR High	IAR Low
Contingent	23.63 (11.08)	27.28 (13.72)
Noncontingent	24.36 (10.55)	32.62 (15.35)

Solution Time (adjusted for Time Spent)

	IAR High	IAR Low
Contingent	24.42	25.54
Noncontingent	23.99	33.69

Errors

	IAR High	IAR Low
Contingent	.43 (.47)	.58 (.69)
Noncontingent	.33 (.34)	1.05 (.76)

* Standard deviations are presented in parentheses.

lar to analyses of covariance and are calculated as follows. Dependent variables are stepped into a multivariate equation one at a time; the amount of variance accounted for by a given dependent variable is tested after the variance of all previously stepped-in dependent variables has been removed. In the present analysis, dependent variables were stepped in according to the order that the variables were listed in the analysis. Therefore, the order of testing of step-down effects was actual amount of time spent engaged in problem solving behaviour, followed by solution time, followed by number of errors. Although an analysis of step-down effects was not planned, the results of the analysis provided useful information.

Step-down effects of the omnibus analysis are presented in Table 13, followed by step-down effects of group contrasts in Table 15. Means associated with the solution time dependent variable adjusted for actual amount of time engaged in problem solution are presented in Table 16. Inspection of adjusted means in Table 16 suggested that (1) subjects in the contingent feedback condition had faster solution times for block design problems than subjects in the noncontingent feedback condition; (2) subjects with high IAR scores had faster solution times for block design problems than subjects with low IAR scores; and (3) within the noncontingent feedback condition, subjects with high IAR scores had faster solution times for block design problems than

subjects with low IAR scores. Observed differences were corroborated by statistical analyses. A significant main effect of treatment was found (F (1, 35) = 4.89, $p < .05$), indicating that subjects in the contingent feedback condition had significantly faster solution times than subjects in the noncontingent feedback condition. A significant main effect of IAR level was found (F (1, 35) = 7.94, $p < .01$) indicating that subjects with high IAR scores had significantly faster solution times than subjects with low IAR scores. A significant interaction effect between treatment condition and IAR level was found (F (1, 35) = 5.51, $p < .05$). The nature of the interaction was clarified by comparisons of means. Comparisons of treatment condition means at the high and low levels of IAR revealed only marginally significant differences (F 's (1, 35) = 2.37 and 2.60, p 's = .13 and .10, respectively). Within the noncontingent feedback condition, subjects with high IAR scores had significantly faster solution times than subjects with low IAR scores (F (1, 35) = 13.39, $p < .01$). Within the contingent feedback condition, subjects with high IAR scores did not have significantly faster solution times than subjects with low IAR scores ($F < 1$).

The lack of significant effects associated with the dependent variable number of errors was due to the nature of the analysis. Variability of number of errors among experimental conditions was tested only after variability of actu-

al amount of time engaged in problem solving and solution time had been removed. Because number of errors and solution time were highly correlated (r = .90), unique variance associated with the number of errors dependent variable was minimal. Therefore, no significant effects among experimental conditions in the number of errors per trial could be detected.

In general, analyses of step-down effects did not reveal any more information regarding group differences than did multivariate analyses except for a significant overall treatment effect. However, analyses of step-down effects in comparison with univariate effects clearly indicated that variability among subjects in the actual amount of time spent working on block design problems obscured performance differences among experimental conditions. Particularly noticeable was reduction in between -group error variance from a univariate analysis (Mean Square = 475.73) to a step-down analysis (Mean Square = 136.87) of solution time. Such a result suggests that in future studies of a similar nature, an effort should be made to reduce within-cell variability. It seems clear that control over within-cell variability should be experimental rather than statistical in nature.

Because one possible contributing factor to the within-cell variability in scores during test was the wide variability in number of failure trials during treatment, correlation coefficients between number of failure trials during

treatment and scores during each block of testing were calculated for each experimental condition. Correlations are presented in Table 17. Inspection of Table 13 suggests that number of failure trials during treatment was related positively to performance in the contingent feedback conditons but not in the noncontingent feedback conditions. That is, it appears that within contingent feedback conditions subjects who experienced more failure trials during treatment worked on problems for a longer period of time, had longer solution times, and made more errors during testing than subjects who experienced fewer failure trials during treatment. Analysis partially supported inspection. Significant correlations were found between amount of time working on the puzzle in Block 3 within the high IAR group ($p < .01$) and between number of errors in Block 4 within the low IAR group ($p < .01$) and number of failure trials. Marginally significant correlations were found between amount of time working on the puzzle and number of failure trials in Blocks 2 and 4 within the high IAR group and between number of errors during test and number of failure trials in Block 2 for the low IAR group and in Block 3 for the high IAR group. No significant correlations were found within the noncontingent feedback conditions. It appears, therefore, that within the contingent feedback condition, but not within the noncontingent feedback condition, the number of failure trials during treatment was related to performance measures during the

test situation. Perhaps perceived control over failure rather than amount of failure per se during treatment was related significantly to performance during test within the noncontingent feedback treatment condition.

Effects for individual blocks of trials. Effects for individual blocks of trials as a function of treatment condition and IAR level were examined in order to determine on which block(s) of trials learned helplessness as measured by time spent, solution time, and number of errors was manifested. The development and dissipation of learned helplessness over time was of interest. Results of multivariate analysis on each block of test trials are present in Table 18.

As can be seen from Table 18, most of the significant treatment differences between groups of subjects occurred during the second or third blocks of test trials. Such a result suggests that subjects must encounter failure or difficulty on the test task before learned helplessness is manifested. It appears, therefore, that the test phase task which was employed was difficult enough to induce learned helplessness but not so difficult that learned helplessness effects were obscured. It also should be noted that by the last block of test trials, no significant differences among groups of subjects were found (see Table 18), indicating that learned helplessness effects likely had dissipated over blocks of trials.

TABLE 17

CORRELATIONS BETWEEN TREATMENT AND TEST SCORES

	Block 1	Block 2	Block 3	Block 4
Contingent Feedback				
High IAR				
Time Spent	.11	.46*	.69***	.49*
Solution Time	.25	.24	.40	.30
Errors	.41	-.27	.47	.17
Low IAR				
Time Spent	.15	-.11	.09	-.02
Solution Time	.41	.05*	.09	.31***
Errors	.29	.51	.27	.67
Noncontingent Feedback				
High IAR				
Time Spent	.06	-.01	-.06	-.29
Solution Time	.17	-.01	.01	-.02
Errors	.10	-.34	.04	.12
Low IAR				
Time Spent	-.02	.20	.10	-.23
Solution Time	-.18	.18	.03	-.23
Errors	-.34	.01	-.17	-.24

* $p \leq .10$
** $p \leq .05$
*** $p \leq .01$

TABLE 18

ANALYSES FOR EACH BLOCK OF TEST TRIALS

Source	F-Statistics			
	Block 1	Block 2	Block 3	Block 4
Treatment	.92	1.85	2.22*	.93
IAR	3.11**	4.39***	1.50	.54
Treatment x IAR	.86	3.16**	1.28	1.08

* $p \leq .10$
** $p \leq .05$
*** $p \leq .01$

Summary. Suitability of block design problems for testing learned helplessness effects was examined using a variety of data analytic techniques. No significant differences as a function of sex of subject were found. Overall, using a multivariate analysis, subjects with high IAR scores performed significantly better on block design problems than subjects with low IAR scores. Although no overall significant difference between treatment conditions was found, a significant interaction between treatment condition and IAR level was found. Discriminant analysis follow-up revealed that contingent feedback subjects performed better than noncontingent feedback subjects only at the low level of IAR, indicating that learned helplessness effects occurred in the noncontingent feedback condition at the low IAR level. Using univariate analyses, no significant main effect of treatment condition or interaction effect of treatment condition by IAR level was found. The only significant difference between IAR levels which was detected was that subjects with high IAR scores made fewer errors than subjects with low IAR scores. Analyses of step-down effects revealed that subjects in the contingent feedback condition had significantly shorter problem solution times than subjects in the noncontingent feedback condition. Subjects with high IAR scores had significantly shorter problem solution times than subjects with low IAR scores. In addition, it was found that within the noncontingent feedback condition subjects

with high IAR scores had significantly shorter problem solution times than subjects with low IAR scores. When group differences were examined separately for each block of test trials, it was found that the largest differences among groups occurred during the second block of trials. By the final block of test trials, no group differences were evident.

Five observations seem to be warranted from the evaluation of the suitability of the test task. First, learned helplessness was evident among subjects who had received noncontingent feedback during treatment and had low IAR scores, indicating that the series of block design problems was a sensitive measure of treatment effects.

Second, analyses of individual block results revealed that the largest learned helplessness effects occurred during the second and third blocks of test trials. While such a result supports the contention that a challenging test task is necessary in order to produce learned helplessness, it also suggests that the test task was not so difficult that learned helplessness effects were obscured. Thus, it appears that the block design problems used during test were neither too easy nor too difficult to be suitable.

Third, an evident lack of power to detect group differences employing univariate analyses suggests that in future studies a multivariate design which includes the three dependent variables employed in the present study should be retained.

Fourth, step-down analyses revealed that a great deal of within-cell variability was obscuring an overall treatment condition effect, indicating a need to reduce error variability in future studies of a similar nature. Although it was found that number of failure trials during treatment was not related to degree of learned helplessness during testing, number of failure trials during treatment was related to length of time spent working on problems and number of errors within contingent feedback groups. Thus it would appear that reducing variability in the number of treatment failure trials would reduce within-cell variance during testing at least among contingent feedback subjects.

Fifth, no sex of subject differences were found. Considered in conjunction with treatment results as a function of sex of subject, it appears as though sex of subject does not need to be included as a factor in future studies of learned helplessness.

Summary of Results

The present section was divided into a number of subsections in order to discuss each purpose of the preliminary study separately. In addition, several issues which arose from the results were discussed in the section titled "Further Thoughts". Because of the large number of recommendations formulated for the main study of learned helplessness, a summary of recommendations is presented at the end of the present section.

To recapitulate, the purposes of the preliminary study were threefold. Specifically, the purposes were (1) to demonstrate that subjects in the noncontingent feedback condition perceived response independence, attributed response-independent outcomes to a cause, and expected response-outcome independence in the future; (2) to test a training task in which subjects in the contingent feedback condition could solve the problem, but solve it gradually enough so that learned helplessness had time to develop within the noncontingent feedback condition; and (3) to test the suitability of the test task.

Purpose One: Questionnaire Data

In general, it appeared that subjects in the noncontingent feedback condition were less likely than other subjects to report that they could solve the treatment puzzle, were more likely than other subjects to attribute failure to a cause, but did not expect response-outcome independence in the future. Although subjects in the noncontingent feedback condition did not report that they expected to do poorly on a second task, their performance on the second task did not confirm their expectations. Overall, therefore, it was concluded that the desired cognitive effects were induced.

On the basis of answers to a question regarding the performance of other children their age, most subjects reported that they thought that other children could solve the

puzzle. According to reformulated learned helplessness theory (Abramson et al., 1978), people who believe that they cannot solve the problem but other people can solve the problem become personally helpless. Personally helpless individuals are hypothesized to demonstrate greater deficits in self-esteem than univerally helpless individuals. Although differences in self-esteeem as a function of personal or universal helplessness were not addressed in the present study, it appeared that the method employed in the present study would be useful in future studies of personal helplessness.

Two recommendations for the main study were formulated on the basis of questionnaire results. First, the continued use of the questionnaire in the main study was recommended. Asking children questions about their performance may have focussed their attention on cognitive activity. Focussing on cognitive activity may have interacted synergistically with treatment to produce helpless behaviour. Thus, it would be advisable to retain a procedure as close to that employed in the preliminary study as possible. In addition, retaining the questionnaire provides the child with short breaks from concentrating on solving the puzzle. Even such short breaks helped to pace each child and to prevent fatigue in what was typically a half hour session. The time spent by the subject answering the questionnaire was employed by the experimenter to reset the slide tray of stimu-

li. Also, if results of the main study are not consistent with those of the preliminary study, answers to questionnaire items may provide clues to the source of differential results. Therefore, it is recommended that the questionnaire be retained for the main study.

Second, it is recommended that the questionnaire be retained in the form employed in the preliminary study. Clearly, children in the preliminary study were not convinced of their success or failure at the task. Yet when they were not forced to choose between success and defeat, subjects in the noncontingent feedback condition expressed their lack of confidence in regard to succeeding at the task. It also was interesting to note subjects' patterns of responses regarding reasons behind their success or failure; while all subjects gave a reason for their success, substantially fewer subjects gave a reason for their failure. Thus, it is recommended that the questionnaire be retained in its present form for the main study.

Purpose Two: Suitability of Treatment Task

Three-quarters of the subjects in the contingent feedback condition solved the discrimination problem and subjects in the noncontingent feedback condition demonstrated slower response latencies in comparison with subjects in the contingent feedback condition by the last block of treatment trials. It was concluded that the treatment task was suitable for use in the main study.

In addition to the above results, it was found that the number of failure trials was related positively to the amount of performance decrement found among contingent feedback-high IAR subjects and noncontingent feedback-low IAR subjects. That is, subjects who received more failure trials showed greater performance decrements during treatment. When such results were considered in conjunction with wide variations in the number of failure trials experienced, it was concluded that within-group variance in performance decrement during test which may be associated with variability in the number of failure trials could be reduced by minimizing variability in the number of failure trials experienced by subjects. Therefore, it is recommended that the treatment procedure be modified in order to reduce variability in the number of failure trials. The procedure which was recommended was that a new problem be introduced to contingent feedback subjects on each block of treatment trials. Within the contingent feedback condition, the noncontingent feedback condition, and the constant failure feedback condition, it was recommended that each subject be informed at the beginning of each block of trials that the puzzle may be the same or different as on the previous set of trials. The recommended changes in procedure should help to minimize differences among subjects in the number of failure experiences by producing more failure trials among contingent feedback subjects who quickly solve the problems. Thus, within-group

error variance in performance decrement associated with within-group variability in number of failure trials should be reduced.

Purpose Three: Suitability of Test Task

Learned helplessness, as evidenced by a performance deficit during testing in comparison with other experimental conditions, was evident among subjects who had received non-contingent feedback during treatment and had low IAR scores for failure due to effort items. Thus, it was concluded that the block design task used during the test situation was suitable for use in the main study. Of further interest theoretically was the lack of a significant correlation between number of failure trials during treatment and learned helplessness behaviour among noncontingent failure subjects, suggesting that noncontingency of failure and success rather than failure per se contributed significantly to learned helplessness behaviour. It will be of interest to pursue the relationship between noncontingency and failure in the main study.

Two recommendations were developed on the basis of the test situation results. First, the procedure employed during the preliminary study should be retained in the main study. The procedure was found to be sensitive to group differences in performance as a function of treatment variables. Moreover, helplessness was found to dissipate over

trials, suggesting that the task itself promoted relief from learned helplessness effects. Second, the multivariate model should be retained in the main study. Not only was the multivariate model more powerful than the univariate models in detecting group differences but the multivariate method also provided more information concerning relationships among the dependent variables than the univariate models. Thus, on the basis of results from the test situation, it is recommended that the block design task be retained as the test task and that the multivariate model be retained for analysis purposes.

Further Thoughts

Although data pertaining to the main purposes of the preliminary study have been reviewed, several results which did not pertain directly to stated purposes but have important implications for the main study remain to be discussed. Degree of variability in the data, use of IAR as a factor in the design, sex of subject effects, experimenter bias, and suggestions for an untreated control condition will be discussed.

Variability of scores. Evidence of variability in the data was found at each stage of analysis. A large number of marginally significant effects among questionnaire answers, wide variability in the number of trials required to solve the discrimination problem by contingent feedback subjects

during treatment, and the large reduction in within-group variance when a step-down analysis procedure was used during test all suggested that variability in data must be reduced in the main study in order to increase the probability of detecting group differences (i.e., power). The procedure change during treatment which was recommended above should reduce error variability to some extent, especially among contingent feedback subjects. It also was recommended that the number of subjects per experimental condition be increased from 10 in the preliminary study to 16 in the main study. By reducing within-group variability and increasing number of subjects within experimental conditions, problems associated with variability in scores should be reduced in the main study.

IAR as a design factor. No differences in answers to questionnaire items or performance during treatment were found as a function of IAR score. During the test situation, however, helpless behaviour was found only among those subjects who had low IAR scores and had received noncontingent feedback during treatment. No differences in behaviour as a function of IAR score were found among subjects who had received contingent feedback during treatment. In addition, no differences in behaviour as a function of treatment procedure were found among subjects with high IAR scores. Although lack of significant group differences during treatment as a function of IAR level was surprising in light of

previous research (Deiner and Dweck, 1978; Dweck & Reppucci, 1973), procedures employed in the preliminary study were not precisely the same as those employed previously. More appropriate comparisons can be made with the constant failure feedback condition to be employed in the main study. IAR scores did appear to be a relevant factor in identifying those subjects who exhibited helpless behaviour following noncontingent feedback. Thus, it was recommended that IAR be maintained as a factor in the experimental design of the main study.

Sex of subject as a design factor. No differences between male and female subjects were found in questionnaire answers, in treatment performance scores, or in test performance scores. It was concluded that sex of subject was not a relevant factor in the present study of learned helplessness effects among children. The results were surprising in that Dweck and Bush (1976) had reported sex differences in reactions to failure. However, it was possible that sex differences were accounted for by differences in IAR score. Therefore, it is recommended that high and low IAR scores be determined on the basis of within-sex median splits for the main study. It also is recommended that an equal number of male and female subjects be included in each experimental condition of the main study, not only for control purposes, but also for purposes of increased generalizability of experimental results. Thus, although it was re-

commended that sex of subject should not be analyzed as a separate design factor in the main study, an equal number of male and female subjects and a median split of IAR scores with male and female subject groups were recommended for the main study.

Experimenter bias effect. In general, the hypothesized results of the preliminary study (as predicted by the experimenter) were confirmed. Subjects in the noncontingent feedback condition were less likely than subjects in the contingent feedback condition to report that they could solve the puzzle and were more likely than subjects in the contingent feedback condition to make attributions for failure. Slower response latencies during treatment were found among noncontingent feedback subjects in comparison with contingent feedback subjects. Learned helplessness effects were found only among noncontingent feedback-low IAR subjects. The positive nature of the results in light of experimental hypotheses would be satisfactory except for one factor: the experimenter was aware of both the experimental hypotheses associated with each experimental conditon and the experimental condition of each subject. The possibility that the experimenter may have influenced the results could not be dismissed lightly. Therefore, it was recommended that (a) female experimenter(s) who is/are unfamiliar with experimental hypotheses be employed to collect data in the main study.

Untreated control condition. During the collection of data for the preliminary study, it was the perception of the experimenter that filling out the questionnaires helped to relax the subject. It is possible that subjects in the untreated control condition will be nervous in the test situation and therefore will perform poorly. Thus, it is recommended that a short questionnaire be developed focussing on students' interests to be administered to each subject in the untreated control condition before (s)he attempts the block design problems.

Summary of Recommendations

A number of recommendations were formulated for the main study on the basis of results of the preliminary study, as follows.

1. Retain use of treatment questionnaires.
2. Retain the treatment questionnaire in the form used in the preliminary study.
3. Adopt a prodcedure in which a new problem is introduced to subjects on each block of treatment trials.
4. Maintain the block design task during the test situation.
5. Maintain the multivariate model.
6. Increase the number of subjects per experimental condition to 16.
7. Retain IAR scores as a factor in the design.

8. Determine high and low IAR groups on the basis of within-sex median splits of IAR scores.

9. Discontinue use of sex of subject as a factor in the design but retain equal number of male and female subjects in each experimental condition.

10. Employ female experimenters who are unaware of hypotheses associated with experimental conditions to collect data.

11. Use a student interest questionnaire to help to relax untreated control condition subjects before testing.

CHAPTER FOUR: MAIN STUDY

The main study was designed to investigate learned helplessness effects in children. Specific research questions of interest related (1) to differences in behaviour between groups receiving contingent and noncontingent failure outcomes; (2) to differences in behaviour between groups receiving noncontingent and constant failure outcomes; (3) to generalization of expectancy of response dependent or response independent outcomes from pretreatment to test; and (4) to differences in behaviour as a function of reinforcement responsibility. Detailed explanations of hypotheses related to the present research questions are explained in the section, Statement of Experimental Interests, which falls at the end of Chapter 2 (see page 72).

Recommended changes in procedure as outlined in the section, Summary of Recommendations, from the preliminary study were incorporated into the main study as outlined below in the procedure section.

Method

Subjects

Subjects were children in the fifth grade from nine Winnipeg schools.[3] Seven male and seven female subjects were included in each of eight cells of the design, for a total of 112 subjects. The average age of the children was 10.3 years (standard deviation = .48 yrs).

Apparatus

The apparatus was the same as that used in the preliminary study.

Design

Treatment (training) phase. The design was a 2 (IAR score) by 3 (procedure) by 4 (blocks of 16 training trials) mixed model with between subject measures on the IAR score and procedure factors, and repeated measures on the training trial factor. The two levels of the IAR score were high and low as determined by a median split of scores for the failure items pertaining to effort (Deiner & Dweck, 1978; Dweck & Reppucci, 1973).

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[3] The nine schools from which children were chosen as subjects for the main study included Brock Corydon, Carpathia, Glenelm, Grosvenor, Harrow, Kent Road, Laura Secord, Mulvey, and Wolseley.

The three levels of the treatment procedure factor correspond to the triadic design suggested by Maier and Seligman (1976) plus a constant failure condition. Thus, the three training procedures were contingent feedback, noncontingent feedback, and constant failure feedback. See below for a description of procedures related to each treatment condition. Cues on a concept formation task were presented on each training trial.

Test (generalization) phase. The design was a 2 (IAR score) by 4 (procedure) by 4 (blocks of 3 test trials) mixed model with between subject measures on the IAR score and procedure factors, and repeated measures on the test trials factor. The two levels of IAR score were high and low as determined by a median split of scores for the failure due to effort items. The four levels of the procedure factor correspond to the triadic design suggested by Maier and Seligman (1976) plus a constant failure condition. Thus, the four procedural groups were contingent feedback, noncontingent feedback, constant failure feedback, and untreated control. See below for a description of procedures related to each of the treatment conditions. A block design problem was presented on each test trial.

Procedure

Three female experimenters were employed to conduct the treatment and test phases of the study. Female experimenters were chosen for two reasons. First, women were used in order to maintain comparability with the preliminary study in which a female experimenter conducted treatment and testing. Second, Dweck and Bush (1976) have demonstrated significant interaction effects on performance between the sex of subject and sex of experimenter. Each experimenter was trained by the investigator until the experimenter felt comfortable with the procedure related to each experimental condition, and was not making errors during treatment or test phases. Volunteer graduate students acted as subjects during the training of experimenters. None of the experimenters were aware of the experimental hypotheses.

A fourth female experimenter, also naive to the experimental hypotheses, was employed to administer the IAR scale to the children. When all of the participants had completed the IAR scale, the investigator scored the questionnaires for effort items pertaining to failure. Subjects were divided into high and low IAR groups by selecting children within each sex with the highest and lowest scores on failure due to effort items, respectively. Subjects in the high IAR group had a mean score of 8.9, and subjects in the low IAR group had a mean score of 4.7. Within each level of IAR score, subjects were assigned to experimental treatment con-

ditions. Because of the time involved in individual testing of subjects, and restrictions of school schedules, administration of experimental treatments and testing occurred from two weeks to two months following measurement of IAR scores.

Contingent feedback. The procedure for contingent feedback subjects was essentially the same as that in the preliminary study, except that each block of 16 treatment trials constituted a new problem. The modification was consistent with the procedural change suggested at the end of the preliminary study in order to minimize variability in number of failure trials experienced by subjects. The change in procedure was incorporated into the instructions between each puzzle to subjects as follows:

> We are going to try this puzzle again. The same displays may or may not be correct this time - - that is for you to figure out. Remember to try to get as many correct as possible.

Questionnaires and instructions for the block design task employed during the test phase were the same as those in the preliminary study. Subjects were not provided with feedback concerning their performance on the block design task until the experiment was completed.

Noncontingemt feedback. The procedure during both the treatment and test phases of the main study was the same as in the preliminary study, except for the change in instructions between treatment problems which was described above for contingent feedback subjects.

Constant failure feedback. The purpose of the constant failure treatment condition was to provide an estimate of the effects of failure per se on later responding. Use of a constant failure condition also provided comparability with previous studies of learned helplessness in children (Deiner & Dweck, 1978; Dweck & Bush, 1976; Dweck & Reppucci, 1973). Regardless of the response of the subjects in the constant failure condition, each subject was told that his or her response was incorrect and lost points on every trial. All other aspects of the procedure were identical to those for the contingent and noncontingent feedback subjects during both treatment and test.

Control. The purpose of the control treatment condition was to provide an estimate of the difficulty of the test problem. Comparison of performance of subjects in the control and contingent feedback treatment conditions may identify a facilitation effect among contingent feedback subjects as a result of good performance on the treatment task.

Subjects in the control condition received the block design test problems only. In order to help subjects relax in the testing situation, the experimenter conducted a short interview with each subject before beginning the block design task. The interview was introduced to the subject with the following instructions:

> Before we begin working on puzzles, I would like to ask you a few questions about yourself. There

are no tricks to the questions, they're just to help us get to know each other a bit better.

The questions included in the interview were as follows:

1. What games do you enjoy playing in winter ?

2. What games do you enjoy playing in summer ?

3. What clubs or organizations do you attend (for example, Guides, Scouts, YMCA classes)?

4. What are your hobbies (for example, playing the piano, skating, hockey, collecting stamps)?

5. What are your favourite television programmes ?

6. What do you enjoy doing the most on weekends ?

Because subjects in the control condition did not receive any treatment instructions, instructions for the block design problem had to be altered slightly. The instructions were as follows:

> Now I would like you to try these block design puzzles. I will show you a design on a card like this. Notice that each block has two sides that are solid white, two sides that are solid red, and some sides that are half and half. What I would like you to do is to arrange the blocks so that they look exactly like the picture, like this. When you are finished, let me know that you are done. If you do well on these problems I will give you a pen.
>
> Every once in a while I will ask you to answer some questions. The questions will be written on sheets of paper, and you can just put the papers in a pile over here as you finish. For now though, I just want you to work at solving the puzzles.

Results and Discussion

Analysis of the results was designed to answer the specific hypotheses and questions of experimental interest which constituted the purposes of the main study. Hypotheses and questions of interest may be found in the section, Statement of Experimental Interests, at the end of Chapter 2. A detailed presentation of the results of the main study will be followed by a comparison of the present results with the results of the preliminary study, where applicable.

Treatment (Training) Phase

Presentation of the results of significance testing of omnibus effects will be followed by presentation of results pertaining to specific hypotheses.

Overall analysis. A 3 (treatment condition) by 2 (IAR score) by 4 (blocks of trials) analysis of variance was conducted in order to investigate differences among groups in treatment response latencies. Between-subjects factors were treatment condition and IAR score and the within-subjects factor was blocks of trials. Results of the analysis are shown in Table 19. Mean response times are presented in Table 20. A significant main effect for treatment groups was found ($F(2, 78) = 9.31$, $p < .001$). T-tests were employed to investigate hypothesized treatment group differences on each treatment trial.

Rouanet and Lepine (1970) have suggested that individual estimates of error variance are most appropriate for investing differences between individual effects within a repeated measures design. The approach has been adopted in the present investigation since analysis revealed that the assumption of homogeneity of within-group variance-covariance matrices across treatment trials was not satisfied. In order to control for repeated testing, alpha was set at .03 for each comparison, yielding a hypothesis-wise error rate of .06 across four treatment trials (Kirk, 1968). See below for a presentation of results of hypothesized group differences of interest as outlined below (Rouanet and Lepine, 1970).

No significant main or interaction effects with IAR score were found in the overall analysis (Table 19). Further investigation of effects related to IAR scores are discussed below (Hypothesis 1).

A significant main effect for blocks of trials was found ($F(3, 234) = 28.33$, $p < .001$), indicating that subject's responses became significantly faster over blocks of trials (Table 20). No other significant main or interaction effects of trials were found.

Because of the decidedly nominal nature of the questionnaire data, chi-square tests of significance among treatment and IAR conditions were conducted at each block of trials for each question. Examination of effects for the

TABLE 19

ANALYSIS OF TREATMENT RESPONSE LATENCIES

Source	df	Mean Square	F
Treatment	2	5277.32	9.31***
IAR	1	51.86	.09
Treatment x IAR	2	130.37	.23
ERROR	78	566.85	
Blocks	3	1711.25	28.33***
Blocks x Treatment	6	39.22	.65
Blocks x IAR	3	36.69	.61
Blocks x Treatment x IAR	6	66.09	1.09
ERROR	234	60.39	

* $p \leq .10$
** $p \leq .05$
*** $p \leq .01$

TABLE 20

MEAN TREATMENT RESPONSE LATENCIES

	Block 1	Block 2	Block 3	Block 4
Contingent				
High IAR	29.3	24.8	19.0	19.0
Low IAR	35.5	25.9	23.5	20.0
Noncontingent				
High IAR	32.6	26.5	22.4	22.5
Low IAR	30.4	25.1	23.0	22.0
Constant Failure				
High IAR	44.7	36.8	34.5	31.7
Low IAR	39.1	37.1	36.6	35.1

full model revealed no main effect of IAR score, not interaction between IAR score and treatment condition. Significant treatment group differences emerged on every block of trials for Questions 1, (i.e., Do you think that you can solve the puzzle?), 3 (i.e., How well do you think that you are doing on this task ?), and 6 (i.e., If I asked you to try a different kind of puzzle, how well do you think you would do ?), and on every block of trials except Block 3 for Questions 4 (i.e., If you think that you're doing well on this task, why do you think that is ?) and 5 (i.e., If you think that you're not doing well on this task, why do think that is ?). In general, subjects in all treatment conditions believed that other children their age could, or maybe could, solve the puzzle. Since no treatment differences were found on Question 2, results of responses to that item will not be discussed further. It should be noted however, that children's responses to Question 2 in the main study were consistent with those in the preliminary study. Numbers of subjects responding to each category for Questions 1, 3, 4, and 5 are presented in tables below, for discussion in conjunction with the appropriate hypothesis (Tables 21 through 29).

Hypothesis. The first hypothesis was that subjects who scored above the median on IAR scale items of failure pertaining to effort would not show differential effects of treatment condition on either behavioural or attributional

measures of helplessness. In contrast, it was hypothesized that subjects who scored below the median on IAR scale items of failure pertaining to effort would show differential effects of treatment condition on both behavioural and attributional measures of helplessness. That is, differences on both behavioural and attributional measures of helplessness were expected between subjects who scored above the median and those who scored below the median. Analyses of both behavioural and attributional measures failed to reveal any significant differences as a function of IAR score, as outlined below.

A table of mean response latencies is presented in Table 20. As can be seen from Table 20, it appears that no consistent differences between high and low IAR subjects occurred within any of the treatment conditions. Results of inspection of Table 20 were substantiated by the analysis (Table 19). No significant main effect of IAR score, nor interaction of IAR score with other factors was found. The lack of an effect of IAR score was evident on each block of treatment trails. Although the behavioural results are inconsistent with Hypothesis 1, they are consistent with the results found in the preliminary study.

Chi-square analyses between high and low IAR subjects on each block of trials for answers to questionnaire items were conducted. No attributional differences occurred as a function of IAR score, either across or within treatment

conditions. No significant differences between high IAR children and low IAR children were found on: (1) whether subjects thought that they could solve the problem (Question 1); (2) whether subjects thought that other children their age could solve the problem (Question 2); (3) how well they were doing on the puzzle (Question 3); (4) why they were doing well (Question 4); (5) why they were not doing well (Question 5); and, (6) how well they expected to do if the experimenter asked them to try a different kind of puzzle (Question 6). Once again, results were contrary to those which were hypothesized, but were consistent with results which were found in the preliminary study.

One possible explanation for a lack of behavioural or attributional differences between groups of children who scored either high or low on the IAR scale is that, despite a median split, children's IAR scores were not substantially different. Children in the high IAR condition had a mean IAR score of 8.9, and children in the low IAR condition had a mean IAR score of 4.7. A non-directional t-test revealed that the two groups of children had significantly different IAR scores (t (110) = 19.22, $p < .001$, two-tailed). Therefore, it is unlikely that behavioural and attributional differences were not found because of a similarity between the two groups on IAR score.

Because of the lack of significant behavioural or attributional differences either across or within treatment

conditions, the remainder of analyses of treatment results were conducted with scores summed across levels of IAR score.

Hypothesis 2. The second hypothesis was that subjects in the noncontingent feedback condition would have exhibited poorer performance and lower expectations of success on the present and a future task than subjects in the contingent feedback condition. As outlined below, neither behavioural nor attributional differences between contingent and noncontingent feedback subjects were substantiated by the analyses.

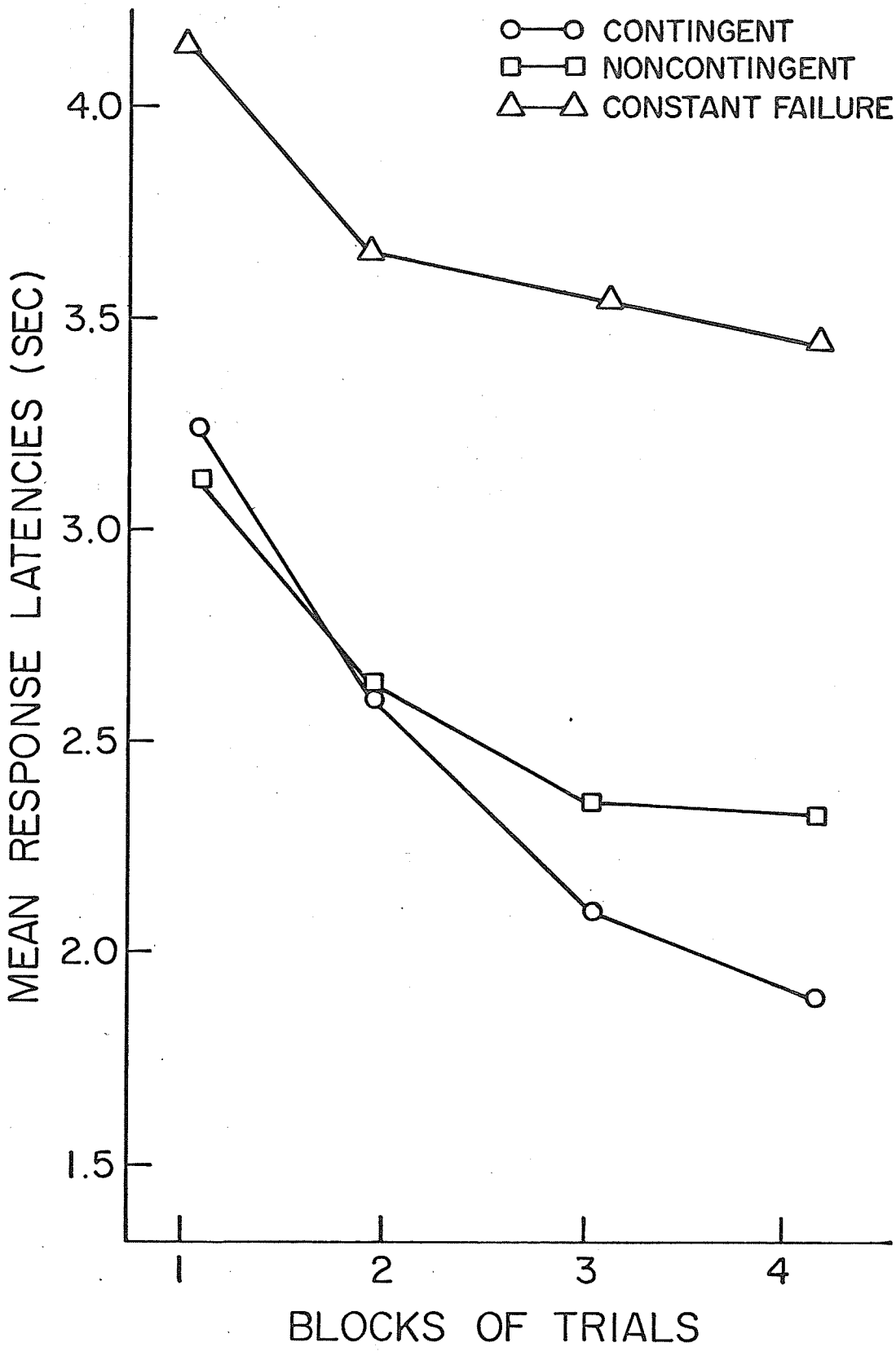
Mean response latencies for the contingent and noncontingent groups of subjects across trials are presented in Figure 3. It appears, from inspection of Figure 3, that contingent feedback subjects may have had faster response latencies than noncontingent feedback subjects on Blocks 3 and 4. The differences, however, were not substantiated by the analyses (t 's (54) = -.56 and -1.36, p 's = .29 and .09, one-tailed, respectively, for Blocks 3 and 4).

The trend toward faster latencies among contingent feedback subjects than among noncontingent feedback subjects is consistent with both the hypothesized results and preliminary study results. However, only a trend was noted in the main study, and the differences between treatment conditions were not significant. Comparisons of actual latencies between the preliminary and main studies suggest that Block 4

latencies of subjects in the contingent feedback conditions were similar across experiments (Means = 23.4 sec for preliminary study and 19.5 sec for main study), but that latencies of subjects in the noncontingent feedback conditions were slower in the preliminary study (Mean = 28.3 sec) than in the main study (Mean = 22.2 sec). Given that, on the average, subjects in the main study experienced more failure trials than subjects in the preliminary study due to changes in procedure, the observed differences are difficult to explain. However, it does appear that slower response latencies among noncontingent subjects than contingent subjects in the preliminary study do not reflect simply the effects of impaired performance.

Further study, including evaluations of children's verbalizations during training, would be necessary in order to determine whether at least some children in the noncontingent feedback group are responding more slowly in order to consider their answer more carefully. It is possible that the change in procedure from one training problem, as in the preliminary study, to four training problems as in the main study, influenced subjects' response latencies. In the preliminary study, subjects had 64 trials in which to solve the puzzle. Over trials, subjects were able to test and reject a number of possibly correct answers. Thus, by the last block of training trials, it is quite possible that subjects in the noncontingent feedback condition were responding more

Figure 3: Mean response latencies on treatment.


CONTINGENT
NONCONTINGENT
CONSTANT FAILURE
MEAN RESPONSE LATENCIES (SEC)
4.0
3.5
3.0
2.5
2.0
1.5
1
2
3
4
BLOCKS OF TRIALS

slowly than subjects in the contingent feedback condition because of the careful consideration noncontingent subjects were giving to their answers. In contrast, subjects in the main study were presented with the task of finding a different correct answer after each block of 16 trials. With only 16 trials for each problem, subjects would not have enough trials in which to test and reject all of the possible simple (i.e., one-dimensional) correct answers. Thus, response latencies among noncontingent feedback subjects would not be necessarily slower than response latencies among contingent feedback subjects.

Analyses were conducted in order to compare the attributions of children in the contingent feedback and noncontingent feedback conditions. The number of children in each treatment condition responding to each response category are noted in Tables 21, 22, and 23 for respectively: whether children think that they can solve the puzzle (Question 1); how well children think that they are doing on the puzzle (Question 3); and children's reasons for doing well or not doing well on the puzzle (Questions 4 and 5).

Inspection of Table 21 suggests that more subjects in the contingent feedback condition than in the noncontingent feedback condition believed that they could solve the puzzle. Comparison of numbers of children in each treatment group who thought that they could solve the puzzle revealed that significant differences occurred only on Block 1 (t-

(54) = 3.20, $p < .01$, one-tailed). Differences on Blocks 2, 3, and 4 were nonsignificant (t's (54) = 1.12, 1.08, and .30, all p's $< .05$, one-tailed). Thus, more children in the contingent feedback condition than in the noncontingent feedback condition thought that they could solve the puzzle only on Block 1. Inspection of Table 21 also indicated that most of the children who did not say that they could solve the puzzle, reported that "maybe" they could solve the puzzle.

Differences in the first question between contingent and noncontingent subjects are, for the most part, inconsistent with both the hypothesis of group differences and results of the preliminary study. As with behavioral dissimilarities between the preliminary and main studies, it appears as though the modification in procedure may have affected the results. A greater proportion of contingent feedback subjects in the preliminary study than in the main study reported that they could solve the puzzle. The focus of difference in the results of the two studies appeared to be that, in the preliminary study, differences in frequency of reports of being able to solve the puzzle increased over trials. However, during the preliminary study, more and more subjects within the contingent feedback condition were able to report that they thought that they could solve the puzzle. In contrast, during the main study, subjects' performance on individual blocks of trials probably influenced their responses to a wide degree.

TABLE 21

NUMBER OF CHILDREN WHO CAN AND CANNOT SOLVE PUZZLE: 1

	Response Category		
	Yes	No	Maybe
Block 1			
Contingent	13	0	15
Noncontingent	4	2	22
Block 2			
Contingent	15	0	13
Noncontingent	11	4	13
Block 3			
Contingent	19	0	9
Noncontingent	15	1	12
Block 4			
Contingent	15	1	11
Noncontingent	14	3	11

Inspection of Table 22 suggests that almost all children within the contingent and noncontingent feedback treatment conditions reported that they were doing "well", "quite well", or "very well" on the puzzles. The results are consistent with those of the preliminary study, but contrary to hypothesized results.

In Table 23 the attributions of contingent and noncontingent feedback subjects for success and failure are shown. As can be seen from Table 23, most subjects, regardless of treatment conditions said that they were succeeding because they were trying hard. Attributions for failure were fairly equally distributed among not trying hard enough, not being able, and not knowing why they could not solve the puzzle. No treatment group differences were evident. As in other comparisons of attributional results between contingent and noncontingent feedback subjects, the lack of differences on attributions for success and failure were inconsistent with the hypothesized results, but consistent with the results of the preliminary study.

The majority of both contingent feedback subjects (98% over blocks of trials) and noncontingent feedback subjects (98% over blocks of trials) believed that they would do "well", "quite well", or "very well" on another puzzle. Once again, results were not consistent with Hypothesis 2, but were consistent with the results of the preliminary study.

TABLE 22

CHILDREN'S ESTIMATES OF HOW WELL THEY ARE DOING: 1

	Response Category				
	Very Well	Quite Well	Well	Not Very Well	Not At Well
Block 1					
Contingent	5	11	11	0	1
Noncontingent	5	5	15	3	0
Block 2					
Contingent	3	11	9	5	0
Noncontingent	3	14	11	0	0
Block 3					
Contingent	6	10	11	1	0
Noncontingent	8	12	4	2	1
Block 4					
Contingent	6	8	12	1	0
Noncontingent	6	13	4	3	2

In summary, subjects in the noncontingent feedback condition did not exhibit poorer performance nor lower expectations of success on the present or a future task than subjects in the contingent feedback condition.

Hypothesis 3. The third hypothesis was that subjects in the constant failure feedback condition were expected to have poorer performance than subjects in the contingent feedback condition. In addition, it was hypothesized that subjects in the constant failure feedback condition would report that they do not expect to succeed on the present task whereas subjects in the contingent feedback condition would report that they do expect to succeed on the present task. Both behavioural and attributional results were consistent with the hypothesized results, as follows.

Mean response latencies, in sec, are shown in Figure 3 for subjects in the contingent feedback and constant failure feedback conditions for each block of pretreatment trials. Inspection of Figure 3 suggests that subjects in the contingent feedback condition had faster response latencies than subjects in the constant failure feedback condition on each block of trials. Analyses of group differences supported the results on Blocks 1, 2, 3, and 4 (t 's (54) = -2.50, -2.96, -3.54, and -3.23, all p 's $< .002$, one-tailed, respectively). Thus, subjects in the constant failure feedback condition exhibited poorer performance than subjects in the contingent feedback condition, consistent with the hypothesized results.

TABLE 23

ATTRIBUTIONS OF SUCCESS AND FAILURE: 1

	Success Attributions				Failure Attriubitons			
	Fair Experimenter	Effort	Ability	Don't Know	Unfair Experimenter	Effort	Ability	Don't Know
Block 1								
Contingent	2	21	3	2	1	12	5	6
Noncontingent	1	17	4	4	0	5	4	8
Block 2								
Contingent	2	20	1	5	0	10	8	6
Noncontingent	2	21	2	3	0	7	5	4
Block 3								
Contingent	1	20	2	5	0	9	8	7
Noncotingent	0	19	4	4	0	7	6	4
Block 4								
Contingent	0	21	1	5	0	11	4	8
Noncontingent	3	19	3	1	0	6	6	5

The number of children in the contingent and constant failure feedback groups who thought that they could, could not, or maybe could solve the puzzle on each block of trials is displayed in Table 24. Inspection of Table 24 suggests that more children in the contingent feedback condition believed that they could solve the puzzle than children in the constant failure feedback condition. Inspection was supported by analysis of the results of each block of trials (t 's (54) = 4.84, 4.95, 6.10, and 4.37, all p 's < .01, one-tailed, respectively). Thus, fewer subjects in the constant failure feedback condition reported that they could solve the puzzle than subjects in the contingent feedback condition. Moreover, as can be seen from Table 24, most subjects in the constant failure feedback condition reported that they could not solve the puzzle on Blocks 2, 3, and 4. Reports of expectations of success on the treatment task, therefore, were consistent with the hypothesized results.

Inspection of Table 25 suggests that most children in the constant failure and contingent treatment groups had a realistic estimation of their performance on the task. Most children in the constant failure condition reported that they were doing "not very well" or "not at all well", while children in the contingent condition reported that they were doing "well", "quite well", or "very well". Results of children's estimates of their performance level also are supportive of Hypothesis 3, in that subjects in the constant

TABLE 24

NUMBER OF CHILDREN WHO CAN AND CANNOT SOLVE PUZZLE: 2

	Response Category		
	Yes	No	Maybe
Block 1			
Contingent	13	0	15
Constant Failure	0	11	17
Block 2			
Contingent	15	0	13
Constant Failure	1	22	5
Block 3			
Contingent	19	0	9
Constant Failure	2	23	3
Block 4			
Contingent	15	1	11
Constant Failure	2	25	1

failure feedback condition reported that they were not doing well and subjects in the contingent feedback condition reported that they were doing well.

Inspection of attributions of success and failure reveal differences between treatment conditions (Table 26). Very few children in the constant failure condition made success attributions, and those who did, generally attributed success to effort or "don't know". In contrast, all children in the contingent feedback condition (except for one child on Block 4) made success attributions, and most attributed success to trying hard (i.e., effort). Attributions for failure revealed a more divergent pattern of responses between the two treatment groups. Although approximately equal numbers of subjects in the two treatment conditions made attributions for failure, subjects in the constant failure feedback condition were most likely to attribute their failure to lack of ability, whereas subjects in the contingent feedback condition were most likely to attribute their failure to lack of effort. Differences were evident on all blocks of trials except Block 3.

Differences in expectations of performance also were found for a future task. More subjects in the contingent feedback condition believed that they would do well on another task (95% across blocks of trials) than in the constant failure feedback condition (54% across blocks of trials). In fact, less than half of the subjects in the

TABLE 25

CHILDREN'S ESTIMATES OF HOW WELL THEY ARE DOING: 2

	Response Category				
	Very Well	Quite Well	Well	Not Very Well	Not At All Well
Block 1					
Contingent	5	11	11	0	1
Constant Failure	0	0	3	15	10
Block 2					
Contingent	3	11	9	5	0
Constant Failure	1	1	0	12	14
Block 3					
Contingent	6	10	11	1	0
Constant Failure	0	1	4	10	13
Block 4					
Contingent	6	8	12	1	0
Constant Failure	0	1	0	10	17

TABLE 26

ATTRIBUTIONS OF SUCCESS AND FAILURE: 2

	Success Attributions				Failure Attributions			
	Fair Experimenter	Effort	Ability	Don't Know	Unfair Experimenter	Effort	Ability	Don't Know
Block 1								
Contingent	2	21	3	2	1	12	5	6
Constant Failure	2	6	0	8	0	1	15	10
Block 2								
Contingent	2	20	1	5	0	10	8	6
Constant Failure	2	3	1	11	1	1	14	9
Block 3								
Contingent	1	20	2	5	0	9	8	7
Constant Failure	1	9	0	8	1	3	10	9
Block 4								
Contingent	0	21	1	5	0	11	4	8
Constant Failure	1	6	1	7	2	3	13	8

constant failure feedback condition believed that they would do well on a future task by the last two blocks of trials (43% on Block 3 and on Block 4).

In summary, it appears that subjects in the constant failure feedback condition exhibited poorer performance and lower expectations of success on the treatment task than subjects in the contingent feedback condition, consistent with hypothesized differences. In addition, constant failure feedback subjects exhibited lower expectations of success than contingent feedback subjects on a future task.

Experimental interest 4. Because differences both in behaviour and attributions between constant failure feedback subjects and noncontingent feedback subjects were difficult to predict, no hypotheses concerning differences were formulated. However, it was of interest to compare performance on the treatment task and attributions for performance between the two groups of subjects.

Mean response latencies, in sec, on each treatment block of trials for the noncontingent feedback and constant failure feedback conditions are presented in Figure 3. Inspection of Figure 3 suggests that subjects in the constant failure feedback condition had slower response latencies than subjects in the noncontingent feedback condition. Analysis of trial by trial differences confirmed the observed differences (t 's (54) = -2.60, -2.96, -3.47, and -2.52, all p 's < .01, two-tailed, for Blocks 1, 2, 3, and 4, re-

TABLE 27

NUMBER OF CHILDREN WHO CAN AND CANNOT SOLVE PUZZLE: 3

	Response Category		
	Yes	No	Maybe
Block 1			
Noncontingent	4	2	22
Constant Failure	0	11	17
Block 2			
Noncontingent	11	4	13
Constant Failure	1	22	5
Block 3			
Noncontingent	15	1	12
Constant Failure	2	23	3
Block 4			
Noncontingent	14	3	11
Constant Failure	2	25	1

spectively). Thus, subjects in the constant failure feedback condition exhibited poorer performance on the treatment task on each block of trials than subjects in the noncontingent feedback condition.

The number of children in each treatment condition who reported that they could, could not, or maybe could solve the treatment puzzle are presented in Table 27. As can be seen, more children in the noncontingent treatment condition believed that they could solve the puzzle than children in the constant failure treatment condition. Inspection was supported by the analysis of frequencies on the last three blocks of treatment trials (t's (54) = 2.00, 3.49, 4.70, and 3.97, $p < .05$ for Block 1 and $< .01$ for Blocks 2, 3, and 4, two-tailed). Thus, it appears that subjects in the noncontingent feedback condition tended to report that they could, or maybe could, solve the treatment puzzle whereas subjects in the constant failure feedback condition tended to report that they could not solve the treatment puzzle.

Subjects' estimates of how well they were doing on the treatment task are presented in Table 28. For the most part, subjects' estimates were consistent with their performance as reflected in response latencies. Inspection of Table 28 reveals that most children in the constant failure treatment condition reported that they were doing "not very well" or "not at all well". In contrast, most children in the noncontingent treatment condition reported that they

were doing "well," or "quite well". Differences were evident on all blocks of treatment trials.

Attributions for success and failure are presented in Table 29. As can be seen from Table 29, more subjects in the noncontingent treatment condition made attributions for success than subjects in the constant failure treatment condition, and more subjects in the constant failure treatment condition made attributions for failure than subjects in the noncontingent treatment condition. In general, subjects in the noncontingent feedback group attributed success to effort, while subjects in the constant failure feedback group attributed success to effort or "don't know". Children in the noncontingent feedback group tended to attribute failure to a lack of effort, while children in the constant failure feedback group tended to attribute failure to a lack of ability. Differences between the two treatment conditions in attributions for failure were evident on all treatment trials.

More subjects in the noncontingent feedback condition reported that they expected to do well on a future task (98% across all blocks of trials) than subjects in the constant failure feedback condition (54% across all blocks of trials). Thus, it appeared that subjects in the constant failure group had lower expectations of future success than subjects in the noncontingent group.

TABLE 28

CHILDREN'S ESTIMATES OF HOW WELL THEY ARE DOING: 3

	Response Category				
	Very Well	Quite Well	Well	Not Very Well	Not At All Well
Block 1					
Noncontingent	5	5	15	3	0
Constant Failure	0	0	3	15	10
Block 2					
Noncontingent	3	14	11	0	0
Constant Failure	1	1	0	12	14
Block 3					
Noncontingent	8	12	4	2	1
Constant Failure	0	1	4	10	13
Block 4					
Noncontingent	6	13	4	3	2
Constant Failure	0	1	0	10	17

TABLE 29

ATTRIBUTIONS OF SUCCESS AND FAILURE: 3

	Success Attributions				Failure Attributions			
	Fair Experimenter	Effort	Ability	Don't Know	Unfair Experimenter	Effort	Ability	Don't Know
Block 1								
Noncontingent	1	17	4	4	0	5	4	8
Constant Failure	2	6	0	8	0	1	15	10
Block 2								
Noncontingent	2	21	2	3	0	7	5	4
Constant Failure	2	3	1	11	1	1	14	9
Block 3								
Noncontingent	0	19	4	4	0	7	6	4
Constant Failure	1	9	0	8	1	3	10	9
Block 4								
Noncontingent	3	19	3	1	0	6	6	5
Constant Failure	1	6	1	7	2	3	13	8

In summary, it appears that subjects in the constant failure feedback condition exhibited poorer performance and lower expectation of success on either the treatment or a future task than subjects in the noncontingent feedback condition.

Summary. Over blocks of treatment trials, no differences in either performance or attributions were found between high and low IAR subjects, either across or within treatment conditions. The results contradicted expected results, but were consistent with results of the preliminary study.

Examination of treatment group differences revealed that children in the constant failure feedback condition had poorer performance on each block of trials than children in either the contingent or noncontingent feedback conditions, whose performance did not differ significantly. Attributional data were consistent with performance data: children in the constant failure feedback condition expected not to do well on either the immediate or a future task whereas children in the contingent and noncontingent feedback conditions expected to do well on both the immediate and a future task. Moreover, children in the constant failure treatment group tended to attribute failure to lack of ability, while children in the contingent and noncontingent treatment groups tended to attribute failure to lack of effort.

The lack of differences on all measures between the contingent and noncontingent feedback groups was contrary to hypothesis, but, for the most part, consistent with results of the preliminary study. It appeared likely that differences in results between the preliminary and main studies could be ascribed to procedural differences between the two studies.

The differences on all measures between the contingent and constant failure feedback groups were consistent with hypothesized differences.

Test (Generalization) Phase

Presentation of the results of significance testing of omnibus effects will be followed by presentation of results pertaining to specific hypotheses of interest.

Overall analyses. Mean responses on each of the three dependent measures (i.e., time spent working on the problem, the amount of time to arrive at a correct solution, and number of errors within the block of trials) for each treatment condition (i.e, contingent feedback, noncontingent feedback, constant failure feedback, and control) at each level of IAR score (i.e., high and low) are presented in Table 30. It appears from inspection of Table 30 as though subjects in the noncontingent feedback condition had slower response times and made more errors than subjects in the other treatment conditions. No differences in either response latency

measures or number of errors were evident between subjects who had scored high on the IAR scale and those who had scored low on the IAR scale.

Observations of lack of differences among means were supported by multivariate and univariate analyses of responses collapsed across blocks of trials (Table 31). A 4 (treatment condition) by 2 (IAR score) multivariate analysis on the response measures of time spent on the problem, solution time, and number of errors was conducted. Univariate analyses of variance on each dependent measure also were conducted. No significant main effect of treatment condition, nor significant interaction between treatment condition and IAR emerged (Table 31). In addition, the main effect of IAR score was not significant (Table 31).

Responses also were compared among treatment groups, and at each level of IAR over blocks of test trials, and at each block of test trials. Mean responses for each treatment group on the dependent measures of time spent on the problem, solution time, and number of errors on each block of trials are presented in Figures 4, 5, and 6, respectively. Inspection of Figure 4 suggests that children in the noncontingent feedback condition spent more time on each block design problem than children in other treatment conditions, especially on Blocks 3 and 4 of test trials. Children in all other treatment conditions appeared to spend a similar amount of time on each problem. Inspection of Fig-

TABLE 30

MEAN TEST SCORES FOR EACH TREATMENT CONDITION

Time Spent

	IAR	
	High	Low
Contingent Feedback	25.6	24.8
Noncontingent Feedback	27.0	28.2
Constant Failure Feedback	24.2	22.4
Control	25.5	22.2

Solution Time

	IAR	
	High	Low
Contingent Feedback	30.4	33.8
Noncontingent Feedback	34.9	37.2
Constant Failure Feedback	31.3	28.1
Control	33.9	31.2

Errors

	IAR	
	High	Low
Contingent Feedback	.7	1.0
Noncontingent Feedback	1.0	1.2
Constant Failure Feedback	1.0	.7
Control	1.0	.9

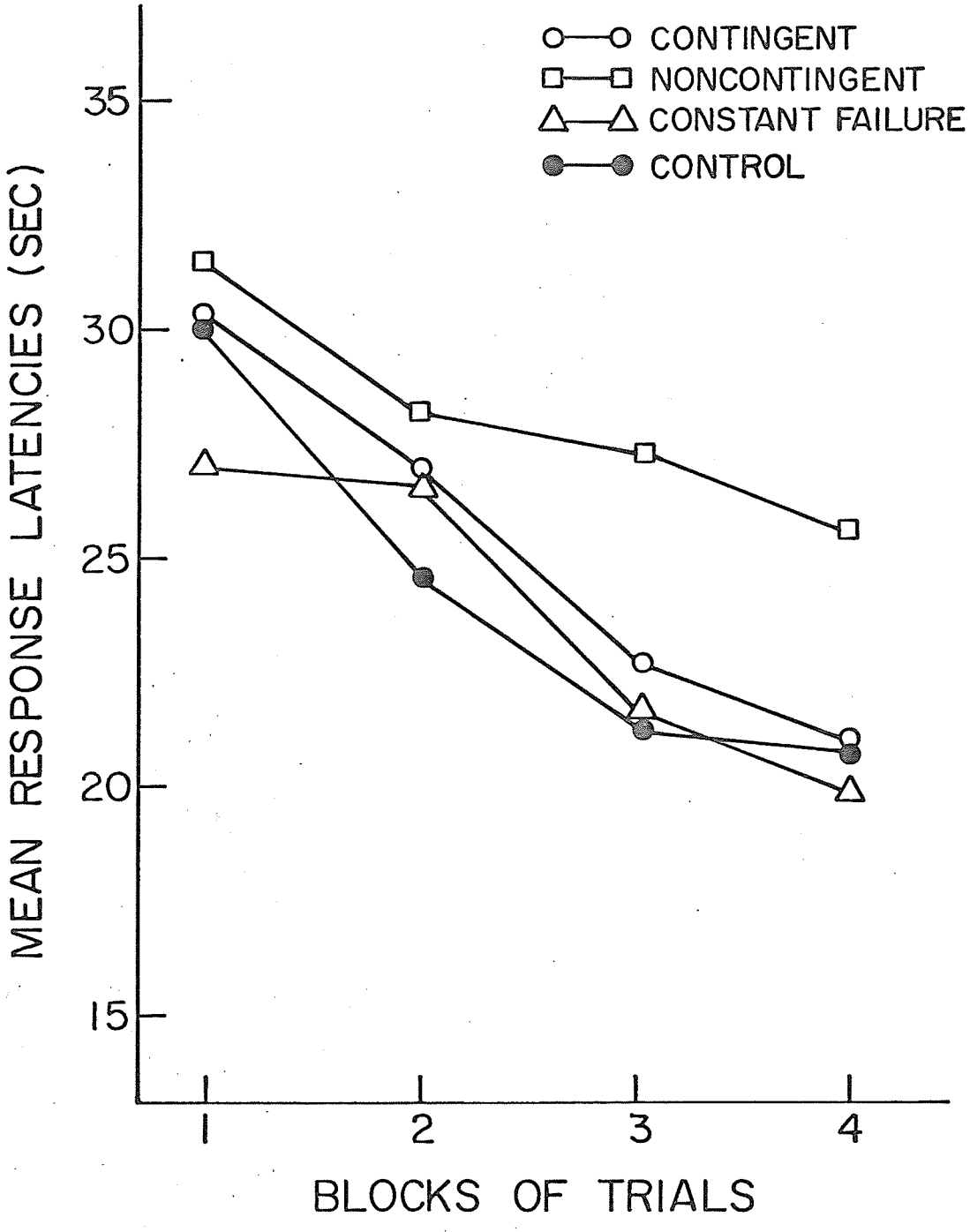
TABLE 31

ANALYSES OF TEST SCORES

Source	df		Multivariate F
Treatment	9,248		.84
IAR	3,102		.29
Treatment x IAR	9,248		.46
		Mean Square	Univariate F
Treatment			
Time Spent	3,104	1621.22	.99
Solution Time	3,104	3052.09	1.15
Errors	3,104	7.23	.75
IAR			
Time Spent	1,104	388.89	.24
Solution Time	1,104	1.02	.00
Errors	1,104	.57	.06
Treatment x IAR			
Time Spent	3,104	476.04	.29
Solution Time	3,104	1309.54	.50
Errors	3,104	7.67	.80

* $p \leq .10$
** $p \leq .05$
*** $p \leq .01$

Figure 4: Time spent working on test problems.


CONTINGENT
NONCONTINGENT
CONSTANT FAILURE
CONTROL
MEAN RESPONSE LATENCIES (SEC)
35
30
25
20
15
1
2
3
4
BLOCKS OF TRIALS

ure 5 suggests that children in the noncontingent feedback condition had longer solution times than children in other treatment conditions on each block of test trials, and that children in the constant failure feedback condition had shorter solution times than children in other treatment conditions on each block of trials. Subjects in the contingent feedback and control conditions appear not to differ in their solution times. Inspection of Figure 6 suggests that children in the noncontingent feedback condition made more errors than children in all other treatment conditions, except on the last block of test trials. All other groups of children appeared to make approximatly equal numbers of errors. Inspection of Figures 4, 5, and 6 also suggests that in all treatment conditions subjects spent less time on the problems, had faster solution times, and made fewer errors as blocks of trials progressed.

A 4 (treatment condition) by 2 (IAR score) multivariate repeated measures analysis of variance on the dependent measures of time spent on the problem, solution time, and number of errors was conducted. However, singularity of the matrix associated with the dependent measures prevented examination of multivariate effects across blocks of test trials. Thus, less powerful univariate mixed model analyses of variance on each dependent measure were calculated across blocks of test trials (Tables 32, 33, and 34). In addition, multivariate and univariate analyses of variance were calcu-

Figure 5: Solution times on test problems.

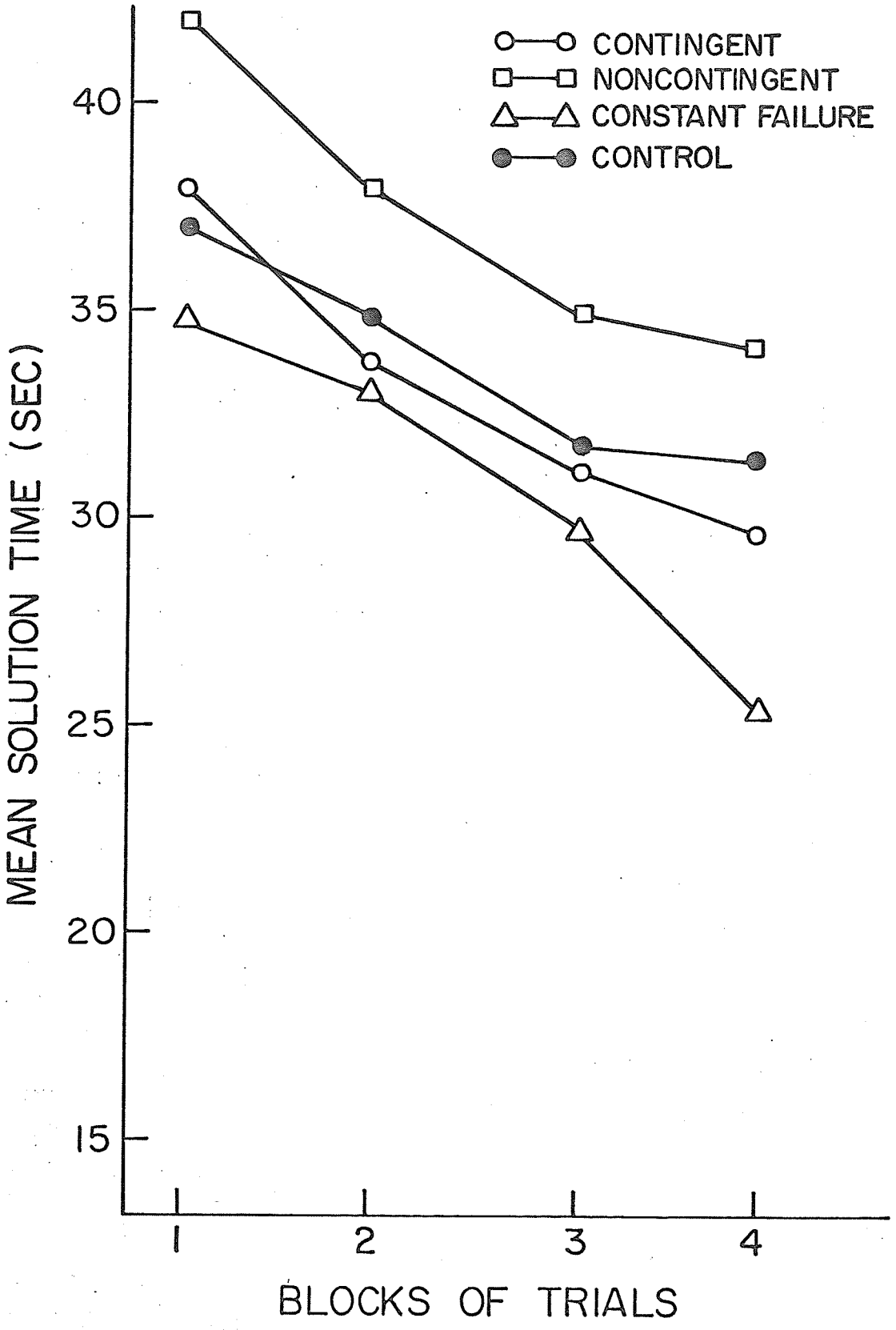
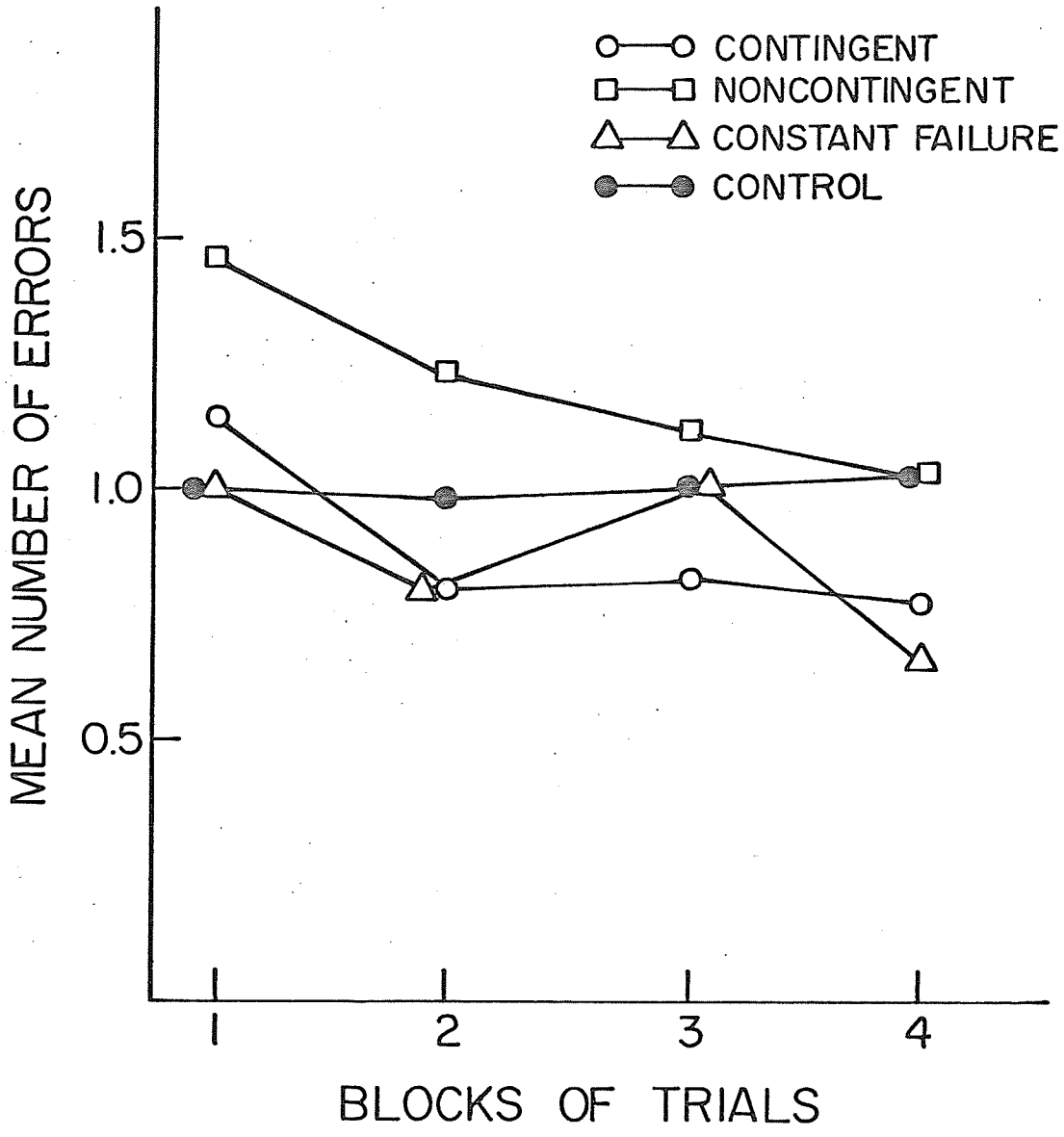

CONTINGENT
NONCONTINGENT
CONSTANT FAILURE
CONTROL
40
35
30
25
20
15
MEAN SOLUTION TIME (SEC)
1
2
3
4
BLOCKS OF TRIALS

Figure 6: Number of errors on test problems.


CONTINGENT
NONCONTINGENT
CONSTANT FAILURE
CONTROL
MEAN NUMBER OF ERRORS
1.5
1.0
0.5
1
2
3
4
BLOCKS OF TRIALS

lated for individual blocks of test trials (Table 35). No significant treatment main or interaction effects were found in any of the analyses (Tables 32 through 35). In addition, no effects of IAR could be detected (Tables 32 through 35). However, the observation that all subjects spent less time on the problems, had faster solution times, and made fewer errors over trials was supported (F 's (3,312) = 47.16, 31.08, and 8.03, respectively, all p 's $< .001$) (Tables 32, 33, and 34).

In summary, then, overall analyses revealed no significant effects of treatment condition or IAR, nor any significant interactions among treatment condition, IAR, and trials on any of the dependent measures. The performance of all subjects, however, improved significantly over blocks of trials.

Despite the lack of overall differences among groups of subjects, examination of hypotheses as stated in Chapter Two remained of interest. Trial by trial examination of hypothesized group differences were conducted employing individual estimates of error variance, as in the analysis of treatment differences. As in previous analyses of this nature, alpha was set at .03, yielding a hypothesis-wise error rate of .06. Despite significant differences in comparisons between treatment groups on each block of test trials, the reader is cautioned to remember that no significant omnibus effects were found.

Due to the nominal nature of questionnaire data, chi-square tests of significance among treatment and IAR conditions were conducted at each block of test trials for each question. In addition, t-tests comparing the number of subjects in each condition who reported that they could solve the puzzle were conducted. Examination of effects for the full model revealed no significant interaction effects between IAR score and treatment condition. Significant differences between high and low IAR score subjects, and among treatment groups were found for Question 5 (i.e., If you think that you're not doing well on this task, why do you think that is?). In addition, differences in the number of subjects reporting that they could solve the test problem were found among treatment groups. Differences among treatment groups also were found on each block of trials for Question 6 (i.e., If I asked you to go back and try the first puzzle, how well do you think that you would do?). In general, subjects reported that they thought that other children their age could solve the problem (Question 2), that they were doing well on the problem (Question 3), and that they were succeeding on the problem because they were trying hard (Question 4).

Because no treatment differences were found on Questions 2, 3, and 4, results of responses to those questions will not be discussed further. In Question 6 all results reflected that subjects in the constant failure condition

did not expect to do well if asked to perform the first problem again whereas subjects in the contingent and noncontingent conditions did expect to perform well. Details of experimental group differences are outlined below in conjunction with the appropriate hypothesis for Questions 1 and 5.

Hypothesis 1. The first hypothesis was that subjects who scored above the median on IAR scale items of failure pertaining to effort would not show differential effects of treatment condition on behavioural and attitudinal measures of helplessness. Subjects who scored below the median, however, were expected to show differential effects of treatment condition on measures of helplessness. The hypothesis was not confirmed by the results of the analysis, as follows.

Mean amounts of time spent working on the problem, solution times, and number of errors for subjects in each treatment condition at the high and low levels of IAR are presented in Table 30. Inspection of Table 30 suggests that no differences in performance occurred between the high IAR and low IAR groups of children either across treatment conditions, or within treatment conditions. Results of analyses supported observation of similar performance between the groups of subjects. No significant main or interaction effects were found in any of the multivariate or univariate

TABLE 32

REPEATED MEASURES ANALYSIS OF TIME SPENT

Source	df	Mean Square	F
Treatment	3	405.31	1.00
IAR	1	97.22	.24
Treatment x IAR	3	119.01	.29
ERROR	104	406.98	
Blocks	3	1960.45	47.16***
Blocks x Treatment	9	35.41	.85
Blocks x IAR	3	9.41	.23
Blocks x Treatment x IAR	9	19.86	.48
ERROR	312	41.57	

* $p \leq .10$
** $p \leq .05$
*** $p \leq .01$

TABLE 33

REPEATED MEASURES ANALYSIS OF SOLUTION TIME

Source	df	Mean Square	F
Treatment	3	763.02	1.15
IAR	1	.26	.00
Treatment x IAR	3	327.38	.50
ERROR	104	660.92	
Blocks	3	1698.28	31.08***
Blocks x Treatment	9	25.90	.47
Blocks x IAR	3	13.35	.24
Blocks x Treatment x IAR	9	38.35	.70
ERROR	312	54.57	

* $p \leq .10$
** $p \leq .05$
*** $p \leq .01$

TABLE 34

REPEATED MEASURES ANALYSIS OF NUMBER OF ERRORS

Source	df	Mean Square	F
Treatment	3	1.81	.75
IAR	1	.14	.06
Treatment x IAR	3	1.92	.80
ERROR	104	2.40	
Blocks	3	2.49	8.03***
Blocks x Treatment	9	.24	.79
Blocks x IAR	3	.04	.13
Blocks x Treatment x IAR	9	.20	.66
ERROR	312	.31	

* $p \leq .10$
** $p \leq .05$
*** $p \leq .01$

analyses of variance (Tables 32 through 35). In addition, when treatment group differences were calculated within each level of IAR score, no differences in performance were evident between children with high IAR scores and children with low IAR scores.

Examination of scores of high and low IAR groups of subjects revealed no significant differences in amount of time spent working on the problem (t 's(110) = .54, .05, .45, and .75, all p 's > .23, one-tailed, for Blocks 1, 2, 3, and 4, respectively), solution time (t 's(110) = -.01, -.33, .20, and .22, all p 's > .36, one-tailed, for Blocks 1, 2, 3, and 4, respectively), and number of errors (t 's(110) = .00, -.55, -.11, and -.22, all p 's > .29, one-tailed, for Blocks 1, 2, 3, and 4, respectively).

Results of behavioural measures of helplessness are not only contrary to those hypothesized, but also contrary to those found in the preliminary study. One possible explanation for differences between preliminary and main study results is that IAR scores of the two samples of children were different. It is highly unlikely, however, that lack of differences between high and low IAR groups of subjects can be explained by sample differences, as the difference in mean IAR scores for the two levels of scores was greater in the main study (Means = 8.9 for high IAR group and 4.7 for low IAR group) than in the preliminary study (Means = 8.6 for high IAR group and 5.7 for low IAR group). The wider

TABLE 35

SUMMARY OF ANALYSES FOR BLOCKS OF TEST TRIALS

	F-Statistics			
	Block 1	Block 2	Block 3	Block 4
Multivariate Effects				
Treatment	.64	.44	1.07	1.22
IAR	.27	.15	.20	.39
Treatment x IAR	.27	.64	.61	.61
Univariate Effects				
Treatment				
Time Spent	.74	.32	1.33	1.76
Solution Time	1.40	.67	.65	1.34
Errors	1.20	.77	.13	.82
IAR				
Time Spent	.29	.00	.20	.56
Solution Time	.00	.11	.04	.05
Errors	.00	.30	.01	.05
Treatment x IAR				
Time Spent	.16	.41	.60	.14
Solution Time	.07	.61	.82	.68
Errors	.25	1.19	.49	1.34

* $p \leq .10$
** $p \leq .05$
*** $p \leq .01$

spread of scores in the main study would suggest that, all other things equal, the effect of IAR would be greater in the main study than in the preliminary study. However, because of changes in procedure from the preliminary to the main study, everything was not equal between the two studies.

Other possible explanations for the inconsistency in results from the preliminary to the main study are related to treatment group differences. It is possible that, due to changes in procedure across experiments, treatment group differences per se either were not stable enough for IAR differnces to emerge, or were strong enough to obscure any effects of IAR score. Further examination of treatment group differences would be necessary in order to clarify the processes which may be involved in differential effects of treatment as a function of IAR.

Because of the lack of significant differences in performance between high and low IAR score subjects, either across or within treatment conditions, treatment group differences were evaluated with scores collapsed across levels of the IAR score factor.

The only differences between high and low IAR subjects occurred on the first two blocks of test trials. More subjects in the high IAR condition reported that they could solve the test problem than subjects in the low IAR condition on Blocks 1 and 2 (t 's(110) = 2.56 and 2.00, respec-

tively, p 's < .05, one-tailed). No differences were found on Blocks 3 and 4 (t 's(110) = .67 and .78, respectively, p 's > .05, one-tailed). Also, on the first block of test trials, high IAR subjects were more likely to report that failure was due to lack of effort while low IAR subjects were more likely to report that failure was due to lack of ability (χ^2 (3) = 10.99, p < .02). No differences in attributions for failure were found on Blocks 2, 3, or 4 (χ^2 's(3) = 2.49, 1.94, and 4.89, p 's = .48, .58, and .18, respectively). Thus, although no differences in performance were evident, high IAR subjects were more likely than low IAR subjects to expect to solve the test problem and to blame their perceived failure on the first set of problems to lack of effort. Perhaps attitudinal differences occurred only during the first set of test problems because performance differences did not occur. By the second block of trials, the expectations of low IAR subjects had become similar to those of high IAR subjects, consistent with similar performance levels in the two groups of subjects.

Because of the lack of evidence of an interaction effect between IAR score and treatment condition, treatment group differences in responses to questionnaire items were examined summed across levels of the IAR score factor.

Hypothesis 2. The second hypothesis was that subjects in the noncontingent feedback condition would have poorer performance than subjects in the contingent feedback condi-

tion. Moreover, it was hypothesized that, over trials, performance of subjects in the noncontingent feedback condition would become increasingly similar to performance of subjects in the contingent feedback condition. As well, it was predicted that subjects in the noncontingent feedback condition would not expect to succeed on the test task whereas subjects in the contingent feedback condition would expect to succeed on the test task. Predicted differences in performance of subjects in the two treatment conditions were confirmed on one dependent measure. No evidence was found to suggest that the performance of noncontingent feedback subjects became increasingly similar to performance of contingent feedback subjects, thus failing to support the hypothesized result of increased similarity over trials. Some evidence was found to support hypothesized differences for expectations of success. Details of analyses are as follows.

Mean amount of time spent on each problem, in sec, for each block of test trials for the noncontingent and contingent groups of subjects are shown in Figure 4. It appears that subjects in the noncontingent feedback condition spent a longer amount of time working on the puzzles on Blocks 3 and 4 than subjects in the contingent feedback condition. Results of analyses confirmed observation of group differences, although only marginal differences were found (t 's (54) = -1.58 and -1.69, p 's = .06 and .05, one-tailed, re-

spectively for Blocks 3 and 4). Clearly, from the results shown in Figure 4, responses of noncontingent subjects were not becoming increasingly similar to responses of contingent subjects over blocks of trials.

Mean solution times, in sec, and number of errors on each block of test trials for the noncontingent and contingent feedback groups are shown in Figures 5 and 6, respectively. Inspection of Figures 5 and 6 suggests that subjects in the noncontingent feedback condition had longer solution times and made more errors than subjects in the contingent feedback condition. Observed differences, however, were not statistically significant, for either solution times (t 's(54) = -1.17, -1.19, -1.03, and -.93, p 's = .12, .12, 15, and .18, one-tailed, for Blocks 1, 2, 3, and 4, respectively) or number of errors (t 's(54) = -1.08, -1.48, -.60, and -.87, p 's = .14, .07, .27, and .19, one-tailed, for Blocks 1, 2, 3, and 4, respectively).

Thus, it appears that noncontingent feedback subjects had poorer performance than contingent feedback subjects only on the dependent measure of time spent working on the problem. Such a result is contrary to the results of the preliminary study, in that subjects in the noncontingent feedback condition in the preliminary study made more errors but did not spend a longer period of time working on the puzzles than subjects in the contingent feedback condition.

Differences in outcome between the preliminary and main studies may be due once again to the procedural change which was instituted between studies. If the amount of time spent working on a problem is interpreted as an index of motivation as in the first study (see Chapter Three), then it appears as though, in the main study, noncontingent feedback subjects were more strongly motivated than contingent feedback subjects. More likely, in all cases, motivation to perform the block design task was so controlled by rewards in the testing situation (e.g., a pen, missing class), that no differences on any dependent measures occurred as a function of different motivation levels in the treatment groups.

If the amount of time spent working on a problem is interpreted as an index of difficulty in performing the task, then it appears as though a performance decrement in noncontingent feedback subjects as compared to contingent feedback subjects was found in both the preliminary and main studies. But why would a difference in sensitivity of dependent variables occur across experiments? It is possible that a lack of significant difference on the number of errors dependent measure is because of an increased number of errors in the main study from the preliminary study among contingent feedback subjects. Comparison of results suggests that such was the case: by Block 4, in the preliminary study, subjects in the contingent feedback condition were making fewer errors (Mean = .45) than in the main study (Mean = .71). It is

difficult to determine, since a control group of subjects was not included in the preliminary study, whether differences between the experimental outcomes reflect a facilitation effect among contingent subjects in the preliminary study. A facilitation effect may have resulted in the preliminary study since most of the contingent feedback subjects had solved the problem within 32 trials, thus resulting in a further 32 trials of positive feedback. The procedural change in the main study ensured that most subjects received at least one failure trial within each block of treatment trials. Thus, a facilitation effect would be less likely in the main study than in the preliminary study. In fact, no evidence of significantly facilitated or impaired performance was found among contingent feedback subjects in the main study (see below, Hypothesis 6, for details).

Numbers of subjects in each treatment condition who reported that they expected to solve the problem on each block of trials are presented in Table 36. Inspection of the table suggests that more subjects in the contingent feedback condition expected to be able to solve the problem than subjects in the noncontingent feedback condition on each block of test trials. Analysis partially supported observation, as follows. Differences were not significant on Block 1, and were only marginally significant on Block 3 (t 's(54) = .79, 1.92, 1.38, and 1.83, $p > .10$ on Block 1, $p < .05$ on

Blocks 2 and 4, and $p < .10$ on Block 3, one-tailed). Thus, it appears as though slightly more subjects in the contingent feedback condition than in the noncontingent feedback condition expected to be able to solve the problem on the last three blocks of test trials.

Attributions for failure by subjects in each treatment condition are displayed in Table 37. Inspection of Table 37 suggests that subjects in the contingent feedback condition tended to attribute failure to lack of effort whereas subjects in the noncontingent feedback condition tended to attribute failure to lack of ability. Observed differences were substantiated by the analysis, χ^2's(2) = 15.14, 9.57, 10.97, and 7.46, p's = .0005, .008, .004, and .02, respectively for Blocks 1, 2, 3, and 4. It appears from the results as though children in the contingent feedback condition attributed their failure to a cause which was under their control; that is, they attributed failure to their lack of effort. In contrast, children in the noncontingent feedback condition appeared to be attributing their failure internally to a cause which was beyond their control; that is, they attributed failure to their lack of ability to solve the problems. Thus, it seems that hypothesized differences in perceptions of control, expectations of success, and attributions for failure occurred between contingent and noncontingent feedback subjects. However, differences emerged during the test phase of the study rather than dur-

TABLE 36

NUMBER OF SUBJECTS EXPECTING TO SOLVE TEST TASK

	Block of Trials			
Condition	Block 1	Block 2	Block 3	Block 4
Contingent	15	17	19	22
Noncontingent	12	10	14	16
Constant Failure	17	16	18	20
Control	17	13	14	18

ing the treatment phase, as was expected. Differences in perceptions, expectations, and attributions likely were reflected in differences in performance which were marginally significant on the last two blocks of test trials.

In summary, then, subjects in the noncontingent feedback condition spent more time working on block design problems than subjects in the contingent feedback condition, consistent with the hypothesis. Contrary to hypothesized results, no differences between treatment conditions were found in solution times or number of errors. Also contrary to the hypothesis, differences which were found between contingent and noncontingent feedback groups occurred on the last two blocks of test trials.

Further differences between the two treatment groups emerged on responses to questionnaire items. More subjects in the contingent feedback condition than in the noncontingent feedback condition reported that they expected to solve the problem. In addition, children in the contingent feedback group tended to attribute their failure to effort (i.e., a controllable cause) whereas children in the noncontingent feedback group tended to attribute their failure to ability (i.e., an uncontrollable cause). Therefore, it appeared as though subjects in the contingent feedback condition had greater expectations of success on the task, made different attributions for failure, and had more perceptions of control over the outcome than subjects in the noncontingent feedback condition.

TABLE 37

ATTRIBUTIONS FOR FAILURE BY TREATMENT CONDITION

	Attributions (%)			
	Unfair Experimenter	Lack of Effort	Lack of Ability	Don't Know
Block 1				
Contingent	0	58	8	33
Noncontingent	0	11	58	32
Constant Failure	0	6	33	61
Control	6	35	41	18
Block 2				
Contingent	0	52	16	32
Noncontingent	0	16	58	26
Constant Failure	0	13	31	56
Control	6	44	28	22
Block 3				
Contingent	0	46	12	42
Noncontingent	0	22	61	17
Constant Failure	0	13	33	53
Control	6	33	28	33
Block 4				
Contingent	0	58	4	38
Noncontingent	0	29	35	35
Constant Failure	0	14	14	71
Control	11	33	33	22

Hypothesis 3. The third hypothesis was that subjects in the noncontingent feedback condition would have poorer performance than subjects in the control treatment condition. Moreover, it was hypothesized that the performance of noncontingent feedback subjects would become more like that of control subjects over trials. In addition, it was hypothesized that subjects in the noncontingent feedback condition would not expect to succeed on the generalization task whereas subjects in the control condition would expect to succeed on the generalization task. The first and second hypotheses received marginal support, and the third received no support, as follows.

Mean amounts of time spent working on the problems, in sec, are displayed in Figure 4, across blocks of test trials, for subjects in the noncontingent feedback and control conditions. Inspection of Figure 4 suggests that noncontingent feedback subjects spent more time working on the problems than control subjects on Blocks 3 and 4. Observation was supported marginally by the analysis of differences (t's $(54) = 1.74$ and 1.66, p's $< .05$, one-tailed, respectively for Blocks 3 and 4).

Mean solution times, in sec, are shown in Figure 5 and mean number of errors are shown in Figure 6 for the two treatment conditions at each block of trials. It appears as though subjects in the noncontingent treatment condition had longer solution times and made more errors than subjects in

the control condition, especially on the first block of trials. Results of inspection received marginal support from the analysis of differences on the first block of trials for both solution time (t (54) = 1.40, p = .08, one-tailed) and number of errors (t (54) = 1.50, p = .07), one-tailed). No other comparisons were significantly different.

In summary, it appears as though subjects in the noncontingent feedback group may have spent more time working on the problems, may have had longer solution times, and may have made more errors, than subjects in the control condition, thus supporting, but not confirming, the hypothesized differences. Although noncontingent feedback children became more like control children across trials in terms of solution time and number of errors, the two groups of children became less alike in terms of the amount of time they spent working on problems.

Numbers of children in the noncontingent feedback and control treatment conditions who reported that they expected to solve the problem on each block of test trials are shown in Table 36. Observation of Table 36 suggests that more children in the control condition expected to be able to solve the test problem than in the noncontingent feedback condition on Blocks 1 and 2. No differences were evident on Blocks 3 and 4. Analysis revealed only marginal support for observed differences (t 's(54) = -1.29, -.71, p = .10 on Block 1 and $p > .10$ on Block 2, one-tailed).

Attributions for failure for each treatment condition are presented in Table 37. On the basis of inspection, it appears as though subjects in the control condition were about equally likely to attribute failure to effort and ability on Blocks 1 and 2, and to effort, ability, and "don't know" on Blocks 3 and 4. In contrast, subjects in the noncontingent feedback condition were most likely to attribute failure to ability on all blocks of test trials. Observed differences in attributions for failure were not statistically significant (χ^2's (3) = 4.79, 5.61, 4.65, and 2.46, all p's > .10, for Blocks 1, 2, 3, and 4, respectively). The results obtained from subjects in the control condition suggest that, without prior exposure to the testing situation, approximately equal numbers of subjects believed that they were not doing well because of lack of effort or because of lack of ability.

Thus, it appears as though subjects in the control condition did not have significantly different expectations of success or causal attributions for failure than subjects in the noncontingent feedback condition, although differences were in the predicted direction.

Experimental interest 4. In order to determine the relative effects of noncontingent outcomes and failure outcomes to learned helplessness effects, differences in performance between subjects in the noncontingent and constant failure feedback conditions were examined. Also, it was of

interest to explore differences in expectations of performance and attributions between groups of noncontingent and constant failure feedback subjects.

Mean amounts of time spent working on the block design problems, in sec, are shown in Figure 4 for the noncontingent feedback subjects and constant failure feedback subjects over blocks of trials. Inspection of Figure 4 suggests that children in the noncontingent feedback group spent more time working on the problems on Blocks 1, 3, and 4 than children in the constant failure feedback group. Inspection was supported on Block 4, and marginally supported on Blocks 1 and 3 by analyses (t 's (54) = 1.44, 1.67, and 2.00, p 's < .08, .06, and .02, respectively for Blocks 1, 3, and 4).

Mean solution time, in sec, and number of errors on each block of test trials for children in the noncontingent feedback and constant failure feedback conditions are displayed in Figues 3 and 4, respectively. It appears from inspection of Figure 5 that subjects in the noncontingent group had slower solution times on all blocks of trials than subjects in the constant failure group. It also appeared from inspection of Figure 6 that subjects in the noncontingent group made more errors on all blocks of trials except Block 3 than subjects in the constant failure group. Results of analyses partially supported observation of differences in solution time across blocks of trials (t 's (54) =

1.92, 1.24, 1.31, and 1.86, p 's = .03, .12, .10, and .03, one-tailed, respectively). A marginally significant difference in the number of errors between groups was found only on the first block of trials (t 's (54) = 1.66, 1.17, and 1.18, p 's = .05, .12, and .12, one-tailed, respectively, for Blocks 1, 2, and 4).

Numbers of subjects who reported that they expected to solve the test problem are presented in Table 36. Inspection of Table 36 suggests that fewer subjects in the noncontingent feedback condition reported that they could solve the problem than subjects in the constant failure feedback condition on all blocks of test trials. Analyses of differences revealed only marginal significance on Blocks 1 and 2 and no significance on Blocks 3 and 4 (t 's(54) = -1.29,-1.50,-1.00,-1.08, p on Block 1 = .10, p < .10 on Block 2, and p 's > .10 on Blocks 3 and 4, one-tailed).

Attributions for failure on each block of test trials are presented in Table 37. Observations of reported causes of failure reveal that subjects in the noncontingent feedback condition tended to attribute failure to ability while subjects in the constant failure feedback condition tended to attribute failure to "don't know". However, analysis revealed that differences were marginally significant only on the third block of trials (χ^2's (2) = 3.25, 3.36, 4.96, and 4.03, p 's = .20, .19, .08, and .13 on Blocks 1, 2, 3, and 4, respectively).

Thus, it appears that children in the noncontingent feedback condition tended to spend more time working on test problems, had longer solution times, and tended to make more errors than subjects in the constant failure feedback condition. Moreover, poorer performance of noncontingent subjects than constant failure subjects persisted across blocks of test trials.

Differences in expectations of success on the test problems and causal attributions for failure were in a direction which was consistent with performance; that is, constant failure feedback subjects expected to do better on the test task, and had a greater tendency to attribute failure to causes other than ability, than noncontingent feedback subjects. However, attitudinal differences received only marginal support statistically.

Experimental interest 5. Differences in performance and attributions between subjects in the contingent feedback condition and in the constant failure feedback condition were of interest in order to extend the results of previous studies of learned helplessness in children (e.g., Dweck & Bush, 1976; Dweck and Reppucci, 1973).

Mean response latencies (i.e., amount of time spent working on the problem), in sec, are displayed in Figure 4 for contingent and constant failure subjects across blocks of trials. Inspection of Figure 4 suggests that subjects in the contingent feedback condition spent more time working on

the problem than subjects in the constant failure condition on the first block of trials. Inspection was not supported by the analysis (t (54) = 1.16, p = .12, one-tailed).

Mean sclution times, in sec, and number of errors for the treatment conditions are displayed in Figure 5 and 6, respectively. It appears as though contingent feedback children may have had longer solution times than constant failure feedback children on Blocks 1 and 4. No differences in mean number of errors were evident. Analysis of solution times revealed no differences on Blocks 1 and 4 between contingent and constant failure children (t 's (54) = .88 and 1.08, p 's = .19 and .14, respectively, for Blocks 1 and 4).

From inspection of numbers of subjects in the contingent feedback and constant failure feedback conditions who expected to be able tc solve the test problem (Table 36), no differences between the two treatment groups were evident. Observation was supported by analysis (t 's(54) = -.5, .29, .31, and .67, all p 's > .05, respectively for Blocks 1, 2, 3, and 4).

Attributions for failure are presented in Table 37. As can be seen from the table, subjects in the contingent feedback condition tended tc attribute failure to effort on all blocks of trials while subjects in the constant failure feedback condition tended to attribute failure to "don't know" on all blocks of trials. Differences were significant on Blocks 1 and 4, and marginally significant on Blocks 2

and 3 (χ^2's (2) = 13.15, 6.58, 5.15, and 7.26, p 's = .001, .04, .08, and .03, respectively,on Blocks 1, 2, 3, and 4).

Thus, no differences in performance were found between subjects in the contingent feedback condition and subjects in the constant failure feedback condition. Differences were found, however, in attributions for failure. Subjects in the contingent feedback condition tended to attribute their failure to lack of effort (i.e., a controllable cause). In contrast, subjects in the constant failure feedback condition tended to attribute their failure to "don't know". Although at first glance, "don't know" would appear to be an uncontrollable cause of failure, performance expectations on the test task did not reflect the effects of uncontrollable failure. Subjects in the constant failure treatment condition reported that they were doing well on the task and that they expected to solve the problem. Thus, under the circumstances of apparent success, reasons for poor performance would be obscure to the subjects. Therefore, considered in conjunction with performance results, and expectations for success, it would seem reasonable to assume that subjects in the constant failure feedback condition would view failure as due to an unidentifiable, uncontrollable cause. However, it appears that because they were not expecting a failure outcome, the performance of constant failure feedback subjects was not impaired in comparison to the performance of contingent feedback subjects.

Experimental interest 6. Differences in performance between subjects in the contingent feedback condition and subjects in the control condition were of interest in order to ensure that performance in the test phase by contingent subjects was neither facilitated nor impaired by performance on the treatment task. In addition, it was predicted that subjects in both the contingent feedback condition and the untreated control condition would expect to succeed on the test task.

Mean response latencies, in sec, solution times, in sec, and number of errors for children in the contingent and control conditions across trials are presented in Figures 4, 5, and 6, respectively. Inspection of Figures 4, 5, and 6 suggests that no differences in performance occurred between the two groups of subjects. Analyses supported the observed similarity in performances.

Expectations of solving the test problem are shown in Table 36 for subjects in the contingent feedback and control conditions. It appears from inspection of Table 36 that more subjects in the contingent feedback condition expected to solve the problem than subjects in the control condition on Blocks 2, 3, and 4. Analyses of differences revealed marginal support of observation on only the third block of trials ($\underline{t}$'s(54) = 1.00, 1.38, and 1.20, respectively for Blocks 2, 3, and 4, $p < .10$ on Block 3, and p 's $> .10$ on Blocks 2 and 4, one-tailed.).

Attributions for failure on each block of test trials are shown in Table 37. Subjects in the contingent feedback condition tended to attribute failure to effort. In contrast, subjects in the control condition tended to attribute failure to either effort or ability on Blocks 1 and 2, and to effort, ability, or "don't know" on Blocks 3 and 4. Analyses revealed that differences in attributions were marginally significant on the first block of test trials, and significant on the last block of test trials (χ^2's (3) = 8.30, 2.56, 3.19, and 10.04, p's = .04, .46, .36, and .02, respectively for Blocks 1, 2, 3, and 4).

Thus, it appears as though, despite similarity in performance, subjects in the contingent feedback condition had greater expectations of success on the test problems and a greater tendency to attribute failure to effort following success during treatment than subjects in the untreated control condition.

Experimental interest 7. Differences in performance between subjects in the constant failure feedback condition and subjects in the control condition were examined in order to determine whether constant failure during treatment had caused either a facilitation or an impairment of performance during the generalization phase. In addition, it was of interest to determine differences in expectations for performance and attributions for failure.

Mean amounts of time spent working on the problem, in sec, for both the constant failure and control conditions are presented in Figure 4 for each block of trials. No differences between the two treatment groups are evident from inspection of Figure 4. Analyses supported observation.

Mean solution times, in sec, and number of errors for each block of trials of children in the constant failure and control treatment conditions are displayed in Figures 5 and 6, respectively. Inspection suggests that control subjects had slower solution times and made more errors on Block 4 than constant failure subjects. Observed differences were only marginally supported by analysis of solution times ($t(54) = 1.48$, $p = .07$, one-tailed and errors $t(54) = -1.34$, $p = .09$, one-tailed).

Numbers of subjects who expected to solve the test problem are displayed in Table 36 for each block of test trials. No differences between subjects in the constant failure feedback condition and subjects in the control condition were evident from inspection of Table 36. Analyses supported observations (t's$(54) = 0.00$, $.79$, 1.00, and $.54$, for Blocks 1, 2, 3, and 4, respectively, all p's $> .03$, one-tailed).

Attributions for failure on each block of test trials are shown in Table 37 for subjects in the constant failure and control treatment conditions. It appears, on the basis of inspection of Table 37, that subjects in the constant

failure treatment condition were more likely to attribute failure to "don't know" than subjects in the control treatment condition. Analyses revealed that differences were significant on Block 1, and marginally significant on Blocks 2 and 4 (χ^2's (3) = 9.20, 6.43, 3.04, and 8.20, p 's = .03, .09, .39, and .04 on Blocks 1, 2, 3, and 4,respectively).

Thus, it appears that there was a tendency by the last block of test trials for subjects in the constant failure feedback condition to display faster solution times and make fewer errors than subjects in the untreated control condition. Although no differences in expectations for successful performance were found, subjects in the constant failure feedback condition displayed a greater tendency to attribute failure to "don't know" (i.e., an uncontrollable cause) than subjects in the untreated control condition.

Summary. No differences in performance were found as a function of IAR level, either across or within treatment conditions. It is possible that the influence of IAR scores was obscured by the change in procedure from the preliminary to the main study which resulted in more failure trials for subjects participating in the second study. Although attitudinal differences were found on the first two blocks of trials, it appeared as though expectations of low IAR subjects had become similar to the expectations of high IAR subjects by the third block of trials, consistent with simi-

lar performance levels in the groups of subjects. Effects of IAR will be discussed in greater depth in the General Discussion (Chapter Five).

Treatment group differences in performance revealed, on the whole, that subjects in the noncontingent feedback condition did not make more errors than subjects in the contingent feedback or control conditions, but did take longer to arrive at a correct solution, especially after two blocks of trials. As well, it appeared as though subjects in the contingent feedback condition had greater expectations for success on the task, were more likely to make attributions for failure to lack of effort rather than ability, and were more likely to have perceptions of control over the outcome than subjects in the noncontingent feedback condition. Differences in performance between the contingent feedback and untreated control conditions were not found, indicating that differences between the noncontingent and contingent groups of subjects were likely due to impaired performance among noncontingent feedback children. On all measures of performance, subjects in the noncontingent feedback condition performed more poorly than subjects in the constant failure feedback condition. However, expectations for success, and attributions for failure were not significantly different between the two groups of subjects. The performance of constant failure feedback subjects was not different than that of contingent feedback or control subjects. However, sub-

jects in the constant failure feedback condition were more likely to attribute failure to an uncontrollable cause than subjects in either the contingent feedback condition or the control condition.

CHAPTER FIVE: GENERAL DISCUSSION

To recapitulate, the main purposes of the investigation were to determine (1) whether young children perceive independance between responses and outcomes; (2) whether young children form expectations regarding independence of future responses and outcomes; and (3) whether perceived independence between responses and outcomes produces learned helplessness in young children. In addition, it was of interest to explore differences between the effects of noncontingent feedback and constant failure feedback. The influence of reinforcement responsibility also was of interest. In order to facilitate discussion of the various purposes of the study, the remainder of the chapter is divided into three major sections. The sections include a discussion of (1) learned helplessness effects; (2) noncontingency versus failure effects; and (3) reinforcement responsibility effects. A summary concludes the chapter.

Learned Helplessness Effects

Discussion of learned helplessness effects is restricted only to the treatments which reflect the original hypothesis of the learned helplessness model (Maier & Seligman, 1976; Seligman, 1975). In the original hypothesis, it

was proposed that objective noncontingency in the environment is perceived by an individual. The individual then forms a cognitive representation of the noncontingency between responses and outcomes. The cognitive representation of noncontingency is hypothesized to result in performance deficits in a situation which is different than the noncontingent situation. Because the original hypothesis focussed on the effects of uncontrollability per se, only the results from the noncontingent feedback, rather than the constant failure feedback, condition are included in the discussion of effects in the present section. Thus, only results from the two treatment conditions in the preliminary study and the contingent feedback, noncontingent feedback, and control treatment conditions in the main study are discussed. The learned helplessness effects which are of interest are the perception of independence, (i.e., uncontrollability), expectations for future performance, and effects on performance.

Perception of Independence

It was hypothesized that subjects in the noncontingent feedback condition would perceive response-outcome independence (i.e., uncontrollability) during the treatment phase of the experiment. In contrast, subjects in the contingent feedback condition were not expected to perceive independence of responses and outcomes since outcomes were contin-

gent on subjects' responses. Perceptions of independence were inferred from questions which asked the subject whether (s)he expected to be able to solve the puzzle, whether (s)he expected other children to be able to solve the puzzle, how well (s)he was doing on the task, and the type of causal attribution for failure which was reported. Likeliness to attribute failure to a cause also was evaluated.

Treatment phase. In the preliminary study, subjects in the noncontingent feedback condition compared to subjects in the contingent feedback condition, were less likely to report that they could solve the treatment phase puzzle. Moreover, subjects in the noncontingent feedback condition were more likely to attribute failure to a cause than subjects in the contingent feedback condition, although no differences were found in the type of attribution made (i.e., effort, ability, don't know). In the main study, subjects in the noncontinent feedback condition were less likely than subjects in the contingent feedback condition to report that they could solve the treatment puzzle, but only on the first puzzle. In contrast to the preliminary study, during the main study, subjects in the contingent feedback condition were more likely to attribute failure to a cause than subjects in the noncontingent feedback condition. Once again, no differences in types of attribution made for failure were noted. In both studies, most subjects in the contingent and noncontingent feedback conditions believed that other chil-

dren could solve the puzzles and that they were doing well on the treatment task. Thus, no strong evidence of perceived noncontingency between responses and outcomes was found during the treatment phases of the study.

Weisz (1980) has shown that by the fourth grade children can distinguish noncontingency between events. Children played a card game in which they predicted that either a yellow or a blue card would be picked from a shuffled deck of cards. When asked to estimate the winnings of other children under a variety of circumstances, children in the fourth grade emphasized the role of luck in determining outcomes. However, even children in the fourth grade suggested that age, practice, intelligence, and effort would influence outcomes to some degree (Weisz, 1980). Given that children in the present investigation were in the fifth grade, it is surprising that a more potent effect of noncontingency between responses and outcomes was not found. Very few children in the noncontingent feedback condition in either study reported that they could not solve the problem, or that they were not doing well. Allen and Jenkins (1980), however, have shown that, in a group of college students, independence between responses and outcomes was judged more accurately by subjects when one alternative was no reponse. Thus, subjects recognized that success or failure outcomes occurred whether or not they responded. In the present study, very few children failed to respond on any trial. It

is quite possible, therefore, that even though children in the fifth grade were capable of perceiving response-outcome independence, they did not do so in the present investigation because of the nature of the task.

The results also are not supportive of the theoretical positions of Abramson et al., (1978), Miller and Norman (1979), or Roth (1980). All of the above theorists assume that perception of noncontingency is a crucial step in the development of learned helplessness. If perceived noncontingency between responses and outcomes is one component of the learned helplessness effect, then subjects in the present study did not demonstrate the learned helplessness effect during treatment.

Differences in attributions also were expected, given the findings of previous investigators. Rholes, Blackwell, Jordan, and Walters (1980) examined learned helplessness effects among children of different ages. They found that, among their subjects who were in the fifth grade, children in the noncontingent failure condition rated the task as more difficult, thought that they did not work as hard, rated their ability as lower, and perceived that they had worse luck than subjects in the success condition. Although in the present study subjects in the noncontingent and contingent feedback conditions did not report differential attributions for performance, differences in findings between the present study and those reported by Rholes et al., (1980)

are not difficult to explain. First, the type of questions asked in the two studies were different. In the present study, subjects were asked to choose one reason for their success and/or failure. Rholes et al., (1980) asked their subjects to rate the degree of their ability, their luck, their effort, and the difficulty of the task. If similar questions had been asked in the present study, then similar answers might have been found. However, using a forced-choice procedure for a single attribution for either successful or unsuccessful performance was more consistent with the objectives of the investigation.

However, a difference in responses to questions of degree between the Rholes et al. (1980) study and the present study may have been found because of differences in procedure between the two studies. For example, in the present study, subjects in the noncontingent feedback condition received the same number of success and failure trials as subjects in the contingent feedback condition. Thus, if perceptions of success or failure were determined by the relative number of success or failure trials, then no differences between noncontingent and contingennt subjects in either their perceptions of success or failure or their attributions would be expected. In contrast, in the Rholes et al. (1980) study, subjects in the failure condition had the same number of successes in the success condition, but many more failure trials. Indeed, subjects in the failure condi-

tion were led to believe that they had eight or nine failures out of a possible 10 correct answers per puzzle, while subjects in the success condition were led to believe that there were only one or two correct answers possible per puzzle. Thus, subjects in failure condition most likely would have a greater perception of failure than subjects in the success condition. Miller and Norman (1979) argued that situational cues, such as instructions to subjects which define expectations, are an integral component in the development of learned helplessness within the laboratory. Differences in perception of success or failure which were manipulated using instructions may have produced the differences in attributions which were found (Rholes et al., 1980).

To recapitualte, it appears as though subjects in the noncontingent feedback condition did not perceive response-outcome independence to a large degree during treatment, although it is likely that children in the fifth grade are capable of perceiving noncontingency of events (Weisz, 1980). The procedure employed in the present study may have obscured the lack of relationship between responses and outcomes in the noncontingent feedback condition. It also appeared as though perceptions of success and attributions for successful and unsuccessful performance may be related to the relative number of success and failure trials experienced during treatment, rather than perceptions of noncontingency.

Test phase. During the main study, subjects in the contingent feedback condition had greater expectations for success on the task, and were more likely to make attributions for failure to a lack of effort than subjects in the noncontingent feedback condition. Thus, it appeared as though contingent feedback subjects had perceptions of control over the outcome, whereas noncontingent feedback subjects did not. In other words, perceptions of noncontingency were reported, not during treatment as hypothesized in theories of learned helplessness (Abramson et al., 1978; Maier & Seligman, 1976; Miller & Norman, 1979; Roth, 1980), but during test. Because subjects' perceptions were measured through questionnaire responses, it is possible that subjects perceived response-outcome independence before they reported the perception. However, the abrupt change in expectations for success and attributions for failure from treatment to test among noncontingent feedback subjects suggests that perceptions of noncontingency did not occur until subjects attempted the test task. Therefore, it appears that subjects in the noncontingent feedback condition did perceive response-outcome independence, consistent with hypothesis; but, perceptions of uncontrollability were not evident until the test phase of the study, contrary to hypothesis.

Expectations for Future Performance

It was hypothesized that subjects in the noncontingent feedback condition would expect response-outcome independence in the future. It also was hypothesized that subjects in the contingent feedback condition would not expect noncontingency in the future. Expectations of noncontingency were inferred during treatment from subjects' estimates of their performance on another task, the nature of which was unspecified. During test, expectations of noncontingency were inferred from subjects' expectations of success on the task, and from type of causal attribution for failure (i.e., a controllable or uncontrollable cause).

Treatment phase. Subjects were asked how well they expected to do if the experimenter asked them to try a different kind of puzzle. All subjects in both treatment conditions in both experiments reported that they expected to do well on a subsequent task. The result was not particularly surprising given that subjects in both conditions had reported that they were doing well on the treatment task. However, the result was inconsistent with Abramson et al.'s (1978) and Roth's (1980) reformulated theories of learned helplessness. (Miller and Norman (1979), based on a review of the literature, concluded that helplessness does not affect future events.) According to both Abramson et al., (1978) and Roth (1980), expectancy of response-outcome independence in the future is crucial to the development of

learned helplessness behaviour. However, in the present investigation, children did not display convincing effects of response-outcome independence during treatment. In addition, children did not report expectations of noncontingency in the future.

Test phase. As noted above, subjects in the contingent feedback condition had greater expectations for success on the test task than subjects in the noncontingent feedback condition. In addition, subjects in the contingent feedback condition tended to attribute failure to a controllable cause (i.e., effort) while subjects in the noncontingent feedback condition tended to attribute failure to an uncontrollable cause (i.e., ability). Given that subjects' expectations of success and attributions of causality were measured after at least one administration of the test problems, it seems that children formed their expectations after they had attempted the problems. The only difference between subjects in the contingent and noncontingent conditions prior to test was contingency or noncontingency, respectively, of responses and outcomes during treatment; thus, it is likely that differences were due to treatment differences. Therefore, it appears that subjects in the noncontingent feedback group did have greater expectations of future noncontingency of responses and outcomes than subjects in the contingent feedback group, consistent with hypothesis. However, expectations of future response-outcome

independence were not evident until the test phase of the study, contrary to hypothesis.

Effects on Performance

Treatment phase. During the treatment phase, subjects in the noncontingent treatment condition were expected to have poorer performance than subjects in the contingent treatment condition as perceptions of noncontingency developed among noncontingent feedback subjects. A difference in performance between noncontingent feedback and contingent feedback subjects was found only on the last block of treatment trials in the preliminary study. The slower response latencies of subjects in the noncontingent treatment condition than in the contingent treatment condition were attributed to noncontingent subjects taking more time to consider their response. No significant performance deficit by noncontingent feedback subjects was evidenced during treatment in either experiment.

At first glance, such a result appears to be contrary to the learned helplessness theory of Miller and Norman (1979). However, the lack of a performance deficit was not surprising, in terms of the theory, given the lack of perception of response-outcome independence among noncontingent subjects. In addition, neither differential attributions nor differential expectancies of success between treatment conditions were found. Thus, from the theory of

Miller and Norman (1979), differential performance would not have been predicted.

Test phase. During the test phase, subjects in the noncontingent treatment condition were expected to have poorer performance than subjects in both the contingent treatment condition and the untreated control condition. Moreover, helplessness effects were expected to dissipate over time as noncontingent subjects developed a perception of response-outcome contingency over trials. Evidence of a performance deficit was found among noncontingent feedback subjects in comparison to contingent feedback subjects (preliminary and main studies) and control subjects (main study).

Results of the test phase performance in both studies were supportive of Seligman's (1975) original formulation of the learned helplessness model, as well as the more recent theoretical position of Abramson et al., (1978) and Roth (1980). Results were contradictory to the theoretical position that effects of noncontingency do not generalize to a second task (Miller & Norman, 1979).

In both the preliminary study and the main study, effects of noncontingency were not found on the first test trial. Maier and Seligman (1976) have suggested that if the test task is too simple, then both contingent and noncontingent subjects will master the task promptly. In such cases, no evidence of a learned helplessness effect would be found.

It appears, however, that in addition to a challenging test task, a few trials must elapse before differences in performance become noticeable.

A question remains if whether the delayed effect reflects gradual improvement among contingent feedback subjects or a gradual development of learned helplessness among noncontingent feedback subjects. The amount of delay in expression of performance deficits appeared to be related to the amount of failure during treatment. For example, in the preliminary study, in which fewer failure trials during treatment were experienced , differences in performance between noncontingent and contingent subjects appeared on the second block of test trials. In the main study, in which more failure trials during treatment were experienced differences in performance between contingent and noncontingent subjects appeared on the third block of test trials. It is possible that, during the main study, contingent subjects were slower to improve their performance because of the increased number of failure trials during treatment, in comparison to the preliminary study. It also is possible that effects of helplessness developed across trials as perceptions and future expectancy of response-outcome independence developed; that is, helplessness effects emerged over time, as long as mastery was not experienced immediately. The former explanation is more parsimonious; the latter explanation is not consistent with any theory of learned helpless-

ness (Abramson et al., 1978; Miller & Norman, 1979; Roth, 1980; Seligman, 1975). In the main investigation, comparisons between control subjects (who did not experience previous failure) and noncontingent subjects revealed that some helplessness effects did emerge on the first block of test trials. Such a result suggests that helplessness effects are present at the beginning of the test phase. Moreover, the response latencies and performance of subjects in the noncontingent condition improved over trials, which is inconsistent with a developmental hypothesis of helplessness effects. In support of a developmental hypothesis, performance deficits among noncontingent subjects developed in conjunction with perceptions of noncontingency, and expectations of noncontingency in the future. It is impossible, however, to determine unequivocally the relative contribution of each explanation from the evidence available from the present investigation, since support can be found for each.

Nevertheless, the gradual emergence of helplessness effects across trials which were found in the present study was not consistent with a hypothesis of gradual dissipation of effects. Perhaps dissipation of effects would have been found if more test trials had been administered.

Miller and Norman (1979) have reported that, based on a review of the human learned helplessness literature, no evidence of generalization of helplessness effects could be

found. Demonstration of generalization effects in the present study were consistent across experiments, but limited. In all cases, although the task changed from treatment to test phases, the experimenter and experimental situation were consistent.

The hypothesized lack of generalization effects even across tasks (Miller & Norman, 1979), however, is inconsistent with the results of the present study. One possible explanation for the emergence of learned helplessness in the present study is the structure of the test task. No feedback was provided to subjects concerning their performance. Although subjects usually could judge whether their answer was correct, they did not know how satisfactory their performance time was. Thus, subjects had to judge their success or failure on the task for themselves. Subjects in the noncontingent feedback condition may have been uncertain enough of their mastery of the problems for a response decrement to emerge.

To recapitulate, only one performance difference between noncontingent and contingent subjects was noted during treatment. The difference was assumed not to be the result of impaired performance, but of more careful consideration of responses among noncontingent feedback subjects. Performance deficits consistent with most theories of learned helplessness (Abramson et al., 1978; Roth, 1980; Seligman, 1975), were found among noncontingent feedback subjects dur-

ing the test phase of both studies. (Abramson et al., 1978; Roth, 1980; Seligman, 1975).

Implications for Learned Helplessness Theory

Behavioural evidence of learned helplessness was found in the test phase of each experiment, but very limited support was found for perception of noncontingency and no support was found for treatment differences in attributions or expectations of future independence of responses and outcomes, during the treatment phase of each study. However, when feedback effects on attributions and expectations were evaluated in the main study during the test phase, differences were found in the predicted direction.

Thus, the results of the present investigation supported the original formulation of learned helplessness theory (Maier & Seligman, 1976; Seligman, 1975). The effect, however, was fragile. Not all subjects in the noncontingent condition displayed behavioural effects of learned helplessness. Maier and Seligman (1976) noted that approximately two thirds of subjects, either animal or human, showed effects of learned helplessness training. Thus, it is not surprising that the effect appears to be fragile.

Little support was offered by the present results for those theories which include perceptions of noncontingency, attributions for performance, and expectations of future noncontingency during treatment (Abramson et al., 1978;

Miller & Norman, 1979; Roth, 1980). Subjects in the noncontingent feedback condition did display perceptions of uncontrollability and expectations of uncontrollability in the future, in comparison to subjects in the contingent feedback condition. However, contrary to each of the theories listed above, effects were found in the test phase of the study rather than in the treatment phase. It appeared as though children in the noncontingent feedback condition attempted the test problems, formed expectations for their performance on the task, and attributed failure on the test task to a stable, uncontrollable cause (i.e., lack of ability). It cannot be determined conclusively whether poor performance influenced perceptions and expectations, or whether perceptions and expectations of noncontingency interfered with performance level. Evaluation of children's verbalizations during treatment and test phases as conducted previously by Deiner and Dweck (1978) might assist in evaluating the relative contribution of performance and expectancy effects.

Given that most of the above theories were based on experiments in which adult subjects were employed (Abramson et al., 1978; Miller & Norman, 1979; Roth, 1980), it is possible that the lack of attributional support is due to differences in the ages of subjects between the present and past studies. That is, children may evaluate the difficulty of each task individually, even though their behaviour may be influenced by results of the previous task. In contrast,

adults may evaluate their own behaviour generally, rather than the nature of individual tasks, in determining perceptions and future expectations of noncontingency. If such is the case, no differences across age levels would be expected on performance measures. However, age differences in the formulation of expectations might be found during treatment. Because children only participated as subjects in the present study, evidence is not available to test effects of age differences.

Noncontingency versus Failure Effects

Because a constant failure treatment condition was included only in the main study, results of the main study only are discussed in the present section of this chapter.

Perception of Independence

It was hypothesized that subjects in the constant failure feedback condition and in the noncontingent feedback condition would perceive response-outcome independence (i.e., uncontrollability) during the treatment phase of the experiment. Furthermore, it was hypothesized that subjects in the contingent feedback condition would not perceive response-outcome independence. Perceptions of independence were inferred from (1) expectations of solving the puzzle; (2) expectations of other children's success in solving the puzzle; (3) perceptions of success on the puzzle; and (4)

the type of causal attribution for failure which was reported.

Treatment phase. Subjects in the constant failure treatment condition were less likely than subjects in the contingent treatment condition or in the noncontingent treatment condition to report that they were able to solve the puzzle, or that they were doing well on the treatment task. In addition, subjects in the constant failure feedback condition were more likely to attribute their failure to lack of ability (i.e., an uncontrollable outcome), whereas subjects in the contingent feedback and noncontingent feedback conditions were more likely to attribute their failure to lack of effort.

The results obtained from constant failure subjects are not surprising. Subjects in the constant failure treatment condition endured 64 consecutive failure trials. In fact, it would have been surprising if subjects had stated that they could solve the puzzle or that they were doing well. Attributions of failure to ability, rather than effort, also are understandable given the constant evidence provided to each subject that they could not solve the puzzle. An attribution to a stable, uncontrollable factor such as ability, moreover, is believed by some theorists to be related to perceptions of future noncontingency, either on the same task (Miller & Norman, 1979) or on the alternate task (Abramson et al., 1978; Roth, 1980). In general, results of

constant failure subjects were consistent with theories of learned helplessness, in that subjects seemed to perceive noncontingency of responses and outcomes during treatment (Abramson et al., 1978; Miller & Norman, 1979; Roth, 1980).

Test phase. Subjects in the constant failure treatment condition had expectations of success which were similar to those of subjects in the contingent treatment condition during test. However, differences in causal attributions for failure were found. That is, constant failure subjects tended to attribute failure to "don't know", which would appear to be an uncontrollable cause. However, it is uncertain whether uncontrollability of outcomes was perceived, or whether subjects in the constant failure treatment condition were convinced of their success and therefore "didn't know" why they would fail. Contingent subjects tended to attribute failure to lack of effort, which is a controllable cause of outcomes.

A tendency emerged for subjects in the constant failure condition to be more likely than subjects in the noncontingent condition (1) to expect to succeed on the test task; and (2) to attribute failure to causes other than a lack of ability.

Test phase results suggest that when the task changed from treatment to test phases of the experiment, that the perceptions and expectations of uncontrollability of subjects in the constant failure feedback condition quickly

dissipated. Such results are particularly supportive of Miller and Norman's (1979) model of learned helplessness, in that it appears as though effects of noncontingency did not generalize to another task following constant failure treatment.

The reader also should note that attributions, perceptions, and expectations were formulated during the treatment phase and not during the test phase, consistent with previous studies of learned helplessness in which adult subjects were employed (cf., Miller & Norman, 1979). Thus, it appears that differences in results between the present and previous studies cannot be accounted for simply by differences in the ages of the samples.

Expectations for Future Performance

It was hypothesized that, during treatment, subjects in the constant failure and noncontingent feedback conditions would expect noncontingency in the future, while subjects in the contingent feedback condition would not expect noncontingency in the future. During treatment, expectations of noncontingency were inferred from children's estimates of their performance on another task. During test, expectations of noncontingency were inferred from children's expectations of success on the task, and from the type of causal attribution for failure.

Treatment phase. Subjects in the constant failure feedback condition were more likely than subjects in either the contingent feedback condition or the noncontingent feedback condition to report that they expected not to do well on a future task. The result was probably due to the evidence of poor performance on the first task. Constant failure subjects' reports were consistent both with their attributions of failure to ability, and the hypothesis of Abramson et al., (1978) and Roth (1980) for expectations of future independence of responses and outcomes. That is, subjects in the constant failure feedback condition perceived response-outcome independence during treatment, and expected independence on a future (i.e., generalization) task.

Test phase. Subjects in the noncontingent feedback condition were less likely than subjects in either the contingent feedback condition or the constant failure feedback condition to report that they expected to be able to solve the test puzzles. Moreover, children in the noncontingent group were more likely than children in the contingent and constant failure groups to attribute their failure to ability (i.e., an uncontrollable cause). As with perceptions of noncontingency, it appeared as though subjects in the constant failure feedback condition did not generalize effects of independence from the treatment to test phases of the study. Although the results were supportive of Miller and

Norman's (1979) position that the effects of noncontingency do not generalize, they were not consistent with theoretical positions which state that the effects of noncontingency do generalize to a different task or situation (Abramson et al., 1978; Roth, 1980).

Effects on Performance

No hypotheses were formulated concerning the relative performance levels between subjects in the constant failure treatment group and subjects in the contingent and noncontingent treatment groups.

Treatment phase. A response deficit among constant failure feedback subjects was prominent on almost every block of treatment trials when compared to the performance of contingent feedback subjects and noncontingent feedback subjects. The poor performance of subjects in the constant failure feedback condition was consistent with findings of previous studies of learned helplessness in children in which a constant failure treatment was employed (Deiner & Dweck, 1978; Dweck & Bush, 1976; Dweck & Reppucci, 1973). Results of constant failure subjects also were consistent with Miller and Norman's (1979) theory of learned helplessness.

Test phase. Performance of subjects in the constant failure treatment condition was better than that of subjects

in the noncontingent treatment condition on most blocks of test trials. Moreover, constant failure subjects did not perform differently than subjects in the contingent or control treatment conditions, except for a trend toward better performance than subjects in the control treatment condition.

The lack of generalization of poor performance from treatment to test phases of the study suggests that constant failure does not produce generalization of learned helplessness, as defined by Seligman (1975). Indeed, subjects in the constant failure condition may have learned that failure leads to more failure. However, they did not learn that success may or may not lead to success in the future. Thus, it seems reasonable to infer that when constant failure subjects were successful during the test phase, their "helplessness" (i.e., cognitive representation of response-outcome independence), which had resulted from treatment, quickly dissipated. In contrast, subjects in the noncontingent feedback condition may have learned that success or failure is not predictable on the basis of previously encountered outcomes. Thus, it appears that outcomes on the generalization task may have acted as discriminative stimuli for subjects. Among constant failure children, a successful outcome likely would have predicted response-outcome dependence for subjects. In contrast, among noncontingent children, a successful outcome either would have yielded no information.

or would have predicted response-outcome independence.

Results from the test phase appear to demonstrate clearly that noncontingency (i.e., uncontrollability) of failure and success, rather than amount of failure per se, produce the effect of learned helplessness on a generalization task. The result is consistent with several theoretical formulations of learned helplessness (Abramson et al., 1978; Maier & Seligman, 1976; Roth, 1980; Seligman, 1975). That is, all theorists maintain that response-outcome noncontingency rather than failure per se produced learned helplessness effects in a different situation than in the original situation.

Implications for Learned Helplessness Theory

Within the constant failure feedback condition, attributions and behaviour during treatment were found which were consistent with Miller and Norman's (1979) theory of learned helplessness. In addition, results were consistent with Abramson et al.'s (1978) reformulated theory of learned helplessness, except that impaired performance was found only during the treatment phase of the study and not during the generalization (i.e., test) phase. Because motivation levels were not evaluated, the design provided an inadequate test of Roth's (1980) model. In contrast to the above, within the noncontingent feedback condition, neither attributions nor behaviour during treatment were found which were

consistent with Abramson et al.'s (1978) or Miller and Norman's (1979) theories. However, perceptions of noncontingency and impaired performance in the generalization phase provided support for the original formulation (Seligman, 1975), as well as some support for the revised formulation (Abramson et al., 1978) of learned helplessness theory, as follows.

It appears that subjects in the noncontingent feedback condition may have learned that successful outcomes do not predict necessarily future control of success. Thus, even though noncontingent subjects may have experienced some success during the test phase, they formulated perceptions of uncontrollability as well as expectations for future uncontrollability after they had encountered a challenging test task. Because subjects in other treatment conditions did not formulate similar perceptions and expectations, it seems reasonable to infer that cognitive and performance effects of helplessness during test were influenced by response-outcome independence during treatment.

The data suggest that theories of learned helplessness which include attributions for outcomes (Abramson et al., 1978; Miller & Norman, 1979; Roth, 1980) require re-evaluation in terms of their applicability to the effects of noncontingency of responses and outcomes and to the effects of failure, separately. It appears that theories which include the formulation of attributions as a crucial component in

the development of helplessness are based on results of studies in which a constant failure treatment was employed in order to induce helpless behaviour. In particular, factors which may contribute to lack of generalization of effects, and to temporal position of attributions and expectancies should be evaluated. For example, within a sample of children, noncontingency between responses and outcomes, rather than constant failure, seemed to produce generalization of performance effects, as well as development of cognitive effects during the test, rather than the treatment, phase of the study.

Perhaps the most surprising finding of the present study was that subjects in the noncontingent feedback condition formulated a cognitive representation of uncontrollability after test trials had begun, rather than before. Results were inconsistent with all theories of learned helplessness in which attributions and expectancies determine the extent of learned helplessness effects. Most careful consideration needs to be given to factors which are involved in generalization of effects, such as the role of outcome as a discriminative stimulus for response-outcome independence. As well, further exploration of the relative temporal development of cognitions and behaviour are needed in order to clarify the nature of the relationship between cognitive and behavioural effects of noncontingency (i.e., does behaviour precede cognitions, do cognitions precede be-

haviour, or do behaviour and cognitions develop concurrently?).

Implications for Treatment

Although effects due to constant failure feedback did not produce learned helplessness behaviour during the test phase, observations of the effects of failure during treatment and in other studies of the effects of failure in a sample of children (Deiner & Dweck, 1978; Dweck & Bush, 1976; Dweck & Reppucci, 1973; Rholes et al., 1980) have demonstrated that the effects of failure on some children can be severe. However, the effects of failure did not appear to generalize readily to another task even when the agent of failure (i.e., the experimenter) and setting remained the same.

Generalization of cognitive and performance learned helplessness effects possibly have not been found in previous studies of the effects of constant failure (cf., Miller & Norman, 1979) because success on the generalization task has cued the subject to the controllable nature of outcomes. If such is the case, then an appropriate treatment strategy for the effects of constant failure would be to introduce success on a task.

One aspect of generalization of effects of constant failure, however, should be noted. Within the laboratory, generalization tasks usually are soluble. Thus, subjects

are likely to succeed on the task at some point, and conclude that outcomes are controllable. In contrast, within the "real world", generalization tasks are not always soluble for the individual. Thus, failure outcomes on a second task may cue the individual to believe that outcomes are uncontrollable, regardless of the true nature of the outcomes. If such is the case, then strong generalization of the negative cognitive and performance effects of the original task to the subsequent task would be expected. Treatment strategies may need to be developed which take into account the extent of generalization of the effects of constant failure.

In contrast, although effects of noncontingency of responses and outcomes appear to be less reliable and/or less stable than the effects of failure, the effects of noncontingency also appear to be more insidious than the effects of failure. Even though subjects in the noncontingent feedback condition reported that they were able to solve the puzzle, that they were doing well, and that they expected to do well on a future task, they demonstrated performance deficits and cognitive representation of uncontrollable outcomes on the test task.

If the effects of noncontingency of success and failure outcomes generalize to another situation because success does not predict controllability, then the introduction of success into a treatment situation would not alleviate the helplessness effects. Instead, retraining children to at-

tribute negative outcomes to controllable, rather than uncontrollable, causes (e.g., Chapin & Dyck, 1976; Dweck 1975) may be an effective treatment. Once success becomes a cue for controllability, and failure becomes an item of information which can lead to a positive outcome, then the effects of uncontrollability on a task are not likely to generalize to subsequent tasks.

Thomas (1979), in a discussion of the relationship between learned helplessness and learning disabilities, has noted that some children are able to retain a sense of competency despite academic failure because they are able to experience success in other, nonacademic, areas of their lives. Such children are not likely to generalize feelings of helplessness outside of the academic setting. Other children tend to generalize their academic failure to other areas, thus demonstrating helpless behaviour in all aspects of their lives. It appears, from the results of the present investigation, as though the former children may have been exposed to constant failure in an academic setting, followed by success in a non-academic setting. Thus, children may view academic outcomes as uncontrollable, and non-academic outcomes as controllable. In contrast, the results of the present study suggest that the latter children may have been exposed to noncontingency between their responses and outcomes. Thus, success outside of school would not predict controllability, and children's beliefs in uncontrollability of outcomes would generalize to other situations.

One method of identifying children who are exhibiting learned helplessness behaviour may be to query the children about situational control rather than success or failure on a task. That is, within the present investigation, attributions of causality for failure were found to be a more sensitive indicator of helplessness than expectations of success. Attributions for failure may also prove to be a sensitive measure during clinical assessment of helplessness effects. Although the method of identification requires further research, it may prove to be useful in discriminating between children who demonstrate impaired performance due to failure and children who demonstrate impaired performance due to perceived independence of responses and outcomes.

Reinforcement Responsibility

As a measure of children's reinforcement responsibility for failure, Crandall et al.'s (1969) Intellectual Achievement Responsibility (IAR) scale was employed. Abramson et al. (1978), Miller and Norman (1979), and Roth (1980) all have suggested that individual differences play a role in the development of learned helplessness. Moreover, Dweck and Reppucci (1973) and Deiner and Dweck (1978) have shown that scores for failure items on the IAR scale are significant predictors of helplessness effects on a constant failure task.

It was hypothesized that children who demonstrated a high degree of reinforcement responsibility (i.e., had high IAR scores) would not show differential effects of treatment. In contrast, it was hypothesized that children who demonstrated a low degree of reinforcement responsibility (i.e., had low IAR scores) would show differential effects of treatment. Because scores on the IAR scale were employed as a measure of reinforcement responsibility in both the preliminary and main studies, results of both studies will be included in the discussion of the effects of reinforcement responsibility.

In the preliminary study, subjects with low levels of personal reinforcement responsibility demonstrated effects of noncontingency. Subjects with high levels of personal reinforcement responsibility failed to demonstrate effects of noncontingent feedback treatment. In fact, comparison of effects between the two studies revealed that high IAR subjects behaved like low IAR subjects in the main study.

The lack of reinforcement responsibility effects in the main study are surprising given the strong evidence for an effect found in the preliminary study and in previous studies of learned helplessness in which the IAR scale was employed (Deiner & Dweck, 1978; Dweck & Reppucci, 1973). However, a recent study by Deiner and Dweck (1980) suggests a possible explanation for the lack of effects in the main study. Deiner and Dweck (1980) found that children who

scored below 7 on the IAR scale, when compared to children who scored above 7 on the IAR scale (1) underestimated the number of problems they had solved; (2) judged their performance to be poorer; (3) overestimated the number of problems they had failed; and (4) did not view their current success as a predictor of future success. However, these judgements were formed within a context of intermittent feedback. Thus, subjects were required to interpret the degree of success they had experienced in the situation.

When studies, in which reinforcement responsibility effects were found, were examined more closely, it was found that in all cases subjects could interpret the degree of their success on the treatment task. For example, in the preliminary study, subjects received sufficient success feedback for high IAR subjects to interpret their performance as being successful. Deiner and Dweck (1978) provided feedback only on every fourth trial, thus leaving degree of success to interpretation by the subject. Dweck and Reppucci (1973) also provided subjects with an equivalent amount of success and failure feedback, thus allowing subjects to interpret their level of success. In the main study of the present investigation, however, subjects in the constant failure condition received overwhelming evidence of their failure. Thus, it is quite possible that constant failure subjects did not demonstrate an effect of reinforcement responsibility because all subjects, regardless of IAR score,

believed that they had failed to solve the treatment task. Within the noncontingent condition, all subjects also had received evidence of response-outcome unpredictability. Thus, feedback on every trial may have obscured effects of reinforcement responsibility. It appears that reinforcement responsibilty may be a factor in the development of learned helplessness only under conditions in which the subject must infer success or failure.

Despite the lack of reinforcement responsibility effects in the main study, the influence of individual differences in the results remained. As mentioned previously, not all subjects demonstrated learned helplessness effects in the main study. Abramson et al., (1978), Miller and Norman (1979), and Roth (1980) all have recognized the influence of individual differences on learned helplessness effects. Even Maier and Seligman (1976) noted individual differences in noncontingency effects in dogs, rats, and humans. The development of a new scale by Harter (1981), which appears to tap individual differences in both motivation and cognitive-information processes in children, may prove useful in the identification of individual differences in learned helplessness effects.

Summary

Learned helplessness behaviour as defined by Seligman (1975) was found among subjects who received noncontingent feedback during treatment. That is, noncontingent feedback subjects appeared to develop a perception of uncontrollability, expectations of uncontrollability in the future, and deficits in performance on the test task. However, no strong support was found to suggest that perception of noncontingency between responses and outcomes, attributions for performance, or expectations of noncontingency in the future precipitated helpless behaviour among noncontingent subjects. Indeed, the cognitive representation of helplessness appeared to develop after difficulty was encountered in solving the test task. Such findings failed to confirm reformulated theories of learned helplessness (Abramson et al., 1978; Miller & Norman, 1978; Roth, 1980).

Impaired performance, as well as perceptions, attributions, and expectations consistent with reformulated theories of learned helplessness (Abramson et al., 1978; Miller & Norman, 1979; Roth 1980) were found during the treatment phase among subjects in the constant failure treatment condition. However, subjects failed to display impaired performance on a generalization task.

The results of the investigation suggest that children have a different reaction to noncontingency than to failure. While both effects may have important ramifications for

treatment and education, the effects are different. Within the noncontingent treatment condition, both success and failure were independent of subject's responses. Thus, when both success and failure outcomes were encountered on the generalization task, success did not signal controllability of outcomes to the children. Instead, success mixed with failure appeared to signal further uncontrollability of outcomes, as subjects displayed both cognitive representations of response-outcome independence and impaired performance on the generalization task. In contrast, within the constant failure treatment condition, only failure outcomes to responses were experienced during treatment. Thus, when a success outcome was encountered on the generalization task, success signalled controllability of outcomes to the children. Subjects displayed neither cognitive representations of response-outcome independence nor impaired performance on the generalization task.

Results of the present study suggest that factors affecting generalization of effects, particularly the role of outcomes on subsequent tasks, should be investigated further. Moreover, the temporal development of cognitive representations of uncontrollability may require re-evaluation.

Some evidence was found to support the notion that individual differences in reinforcement responsibility, as measured by IAR scores, affect learned helplessness behaviour. However, it appeared as though such effects were

found only in situations in which children could intepret their degree of success on the treatment task.

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Appendix A

LITERATURE REVIEW

The following literature review is selective rather than comprehensive. The author's aims in writing the review are to acquaint the reader with (1) different theoretical positions within the distinct areas of animal and human learned helplessness research; (2) recent empirical research which supports or questions established theories of learned helplessness effects; and (3) empirical evidence which leaves both the author and the reader with more questions than answers in explaining the learned helplessness effect.

Because theories, methods of investigation, and even aims of empirical research are so different with animal and human subject samples, the two areas of research are presented separately. First, however, the learned helplessness effect (as distinct from learned helplessness theory) will be described for the information of the reader.

The Learned Helplessness Effect

Maier and Seligman (1976) have provided both a review and an interpretation of experiments dealing with the effects of uncontrollable aversive events. They hypothesize that following exposure to inescapable aversive events, an organism

learns that outcomes are independent of its responses, and such knowledge seriously debilitates subsequent learning behaviour. Three deficits have been noted when an animal or human experiences aversive, uncontrollable events. First, the organism displays a lack of motivation to respond when later confronted with aversive events. Second, even if the organism attempts to respond, it will not learn efficiently a new response even if relief from the aversive stimulation is experienced. Third, the emotional state of the organism will appear to be altered in that debilitated organisms will seem to be more anxious and depressed than nondebilitated organisms, as measured by a variety of testing procedures. Helplessness also dissipates over time in such a manner that an emotional disturbance appears to be present. The learned helplessness effect appears to generalize to a wide range of behaviours.

Animal Learned Helplessness

Although several different authors have attempted to explain the learned helplessness effect in animals (Bracewell and Black, 1974; Baker, 1976; Glazer and Weiss, 1976a, 1976b; Levis, 1976; Maier and Seligman, 1976; Weiss, Glazer, and Pohorec, 1976), the explanations fall into two main categories: learned response independence and learned response competition. The present author has chosen to represent the response independent viewpoint on the basis of Maier and

Seligman's (1976) position and the response competition viewpoint on the basis of Levis' (1976) position. Clarity of statement of theory and of functions operating in the development of a learned helplessness effect were the bases used to select the authors representative of each theoretical position.

Maier and Seligman's (1976) Theoretical Position

The theory presented by Maier and Seligman (1976) is threefold. First, the organism must gain some information from the environment pertaining to the contingency (i.e., the lack of dependency between a response and an outcome). Second, the organism must form some kind of cognitive representation of the contingency, in the form of learning, an expectation, a perception, or a belief. Third, the behaviour of the organism will be affected by the cognitive representation. The second step is seen by Maier and Seligman (1976) as especially crucial, but easy to overlook. The cognitive representation has been termed "the expectation that responding and an outcome are independent" (Maier and Seligman, 1976, p.17). According to Maier and Seligman (1976), voluntary response initiation is impaired because the animal no longer expects its responses to produce relief. In other words, the expectation of response independence produces deficits in motivation. As well, the associative expectation must be changed before the organism will

learn that its responses will have an effect on its environment. Therefore, learning on subsequent tasks is impaired even if a subject makes a few correct responses. However, if sufficient control has been experienced before response-outcome independence (i.e., if immunization to the effects of uncontrollability has occurred), then the associative expectation of response independence will not be formed, and the learned helplessness effect will not be found. The attendant emotional changes are believed by Maier and Seligman (1976) to be the direct result of the organism learning that it is unable to control the aversive stimulation. Fear is replaced by depression in such a situation.

Levis (1976) Theoretical Position

Levis (1976) begins his statement from a basis of two process learning theory. Shock onset, or presumably the onset of any aversive stimulus, has been thought to elicit two different responses. The first response is the withdrawal of the stimulated area away from the aversive stimulus. Such a reaction is considered reflexive in nature. The second response has an emotional component. In unrestrained animals, an increase in activity and general body movement is found, as well as urination and/or defecation. Shock offset is believed also to produce two effects. First, the reduction in painful stimulation is rewarding to the animal. The maximum reinforcement value of pain reduction is thought

to occur almost immediately after the aversive stimulation ceases. A reduction in fear also occurs. The maximum reinforcement value of fear reduction follows a time course which is dependent, at least in part, on the parameters of the stimulation. Both processes of pain reduction and fear reduction tend to strengthen the responses which occur immediately before the point of maximum reinforcement. Because of the time course related to fear reduction, however, pain reduction is thought to have greater effect on each individual trial.

These assumptions now may be applied more directly to the learned helplessness effect. Over a few trials of uncontrollable shock, a variety of responses are likely to be reinforced by pain reduction. Thus, very little effect on the behaviour of the animal can be expected. However, after a large number of trials, Levis (1976) predicts that immobility (i.e., freezing) will become the dominant response to aversive stimulation. Presumably, systematic punishment of active responses will be occurring over trials. As well, shock may induce freezing in the animals. The response of immobility would then generalize to the next situation in which aversive stimulation was introduced.

Selective Review of Recent Literature

To summarize the theoretical positions associated with the learned helplessness effect, Maier and Seligman (1976) have suggested that the motivational and associative deficits, and the emotional changes that occur after experience with an uncontrollable, aversive stimulus depend on the organism learning that the responses it makes are independent of any changes in the environment. Levis (1976), in contrast, has suggested that the animal learns a specific response which competes with its ability to produce more appropriate responses in a subsequent situation in which an active response would provide avoidance of or escape from the aversive stimulation.

A number of studies have been reported which suggest support for the competing response hypothesis of Levis (1976). Weiss et al., (1976) have suggested a "motor activation deficit" hypothesis. According to their hypothesis, the learned helplessness effect is the result of a central noradrenergic deficiency which impairs the initiation of active motor responding by animals. The time course of learned helplessness, which Maier and Seligman (1976) attributed to a transitory emotional imbalance, is attributed to a physiological imbalance which dissipates over time by Weiss et al. (1976). Their model of the learned helplessness effect cites psychological variables in stressful situations as leading to physiological changes, which in turn

result in behavioural changes. Nine experiments were reported in which the motor activation deficit hypothesis was compared to learning hypotheses among samples of rats.

In the first experiment, a forced warm swim was found to not produce a subsequent deficit in avoidance-escape responding whereas a cold swim was found to produce a large subsequent deficit in avoidance-escape responding. The results seem to indicate that uncontrollability was not the factor which produced the deficit as uncontrollability was experienced by both the warm and cold water swim groups of rats. In the second experiment, the phenomenon of immunization to the learned helplessness effect was investigated. According to the motor activation deficit hypothesis, the animal which has received prior experience in the test situation will not have to expend a great deal of energy testing different responses but can simply emit the already learned correct response. Pretraining on the test task of avoidance/escape in a shuttle box significantly reduced the avoidance/escape deficit found in non-pretrained animals. In the third experiment, the effects of a cold swim were found to dissipate in time, as predicted by the hypothesis of physiological involvement. However, a long term deficit in subsequent avoidance/escape learning was found if the subject had been tested shortly after the swim treatment and again at a later time. In other words, a short term physiological effect appeared to be affecting performance on some

tasks, whereas a long term learning effect appeared to be affecting performance on repeated tasks. Weiss et al. (1976) suggested that a competing motor response was learned in the first test, and then was repeated in the second test situation. The intriguing notion to the present author of such a suggestion is that the competing response is learned during the test phase of the experiment, not the training phase as suggested by Levis (1976).

By raising the height of the barrier which had to be scaled in order to avoid or escape shock, further decrements in learning during the test situation were induced. Neither Levis (1976) nor Maier and Seligman (1976) necessarily would have predicted further decrements by a change in the test situation. In the fifth experiment, no deficit in avoidance/escape behaviour was found following a forced cold swim when the task was to nose poke in the test situation. It appeared that a passive response was not impaired, simply an active response. In the sixth experiment, it was found that a cold swim produced a response deficit of the same magnitude as 4.0 ma of shock, delivered for 2.0 sec, which occurred once in every 20 sec of the experimental treatment, lasting 45 to 50min. In the seventh experiment, shock was found also to not produce a deficit in the nose poke task.

In the eighth experiment, the effects of repeated exposure to shock were investigated. According to the motor activation deficit hypothesis, repeated exposure to shock

should counteract learned helplessness effects since habituation occurs in the central noradrenergic systems. Subjects received either 15 days or 1 day of forced cold swim. The longer period of treatment produced a reduction in the severity of the avoidance/escape deficit which was found in the single swim group. Repeated exposure to either cold swim or inescapable shock was found to attenuate the avoidance/escape deficit in the ninth experiment, whether the test stressor was the same or different than the pretreatment stressor. Neurochemical depletion of norepinephrine was found to result in the learned helplessness effect in a subsequent investigation.

Although the results of Weiss et al. (1976) seem to indicate that the learned helplessness effect is based on physiological processes, it appears that the motor activation deficit hypothesis can account for only short term effects. A learned competing response, as suggested by Levis (1976), was also suggested by Weiss et al. (1976), on the basis of their data to account for long term deficits in responding.

Weiss et al. (1976) suggested that it may be possible, although not likely, that the short term effects accounted for by norepinephrine depletion are actually caused by uncontrollability. That is, uncontrollability in an aversive situation may have produced the reduction of central norepinephrine which in turn produced the learned helplessness ef-

fect. However, Weiss et al. (1976) did not compare changes in norepinephrine level or behaviour following controllable versus uncontrollable aversive stimulation. Therefore, although the results presented by Weiss et al. (1976) appeared to support Levis' (1976) position, a definitive test of response independence or response competition was not presented.

Glazer and Weiss (1976a) have attempted to delineate two types of learned helplessness effects -- a short term effect based on physiological mechanisms, and a long term effect based on learning. In the first experiment a deficit was found in rats which had received high intensity shock 30 min after shock administration, but not after 72 hr after shock administration. In contrast, the response deficit in animals which received low intensity shock occurred only when the animals were tested 72 hr after shock administration, but not when the animals were tested 30 min after shock administration. The low shock effect was thought to be based on learning, but the reason for no effect after 30 min was puzzling. The authors attributed the lack of an effect to arousal which was still evident 30 min after the first shock administration.

In the second experiment, the effect of different shock durations were investigated because it had been noticed that animals were quite active during the first 3 or 4 sec of shock, but quite passive after that amount of time. In oth-

er words, a competing response of passivity was being learned with shock durations of over 4 sec. The results supported the hypothesis. Shocks of 5 and 6 sec duration resulted in an interference of avoidance/ escape learning, but shocks of 2, 3, or 4 sec duration did not interfere with responding in the test situation. In the third experiment, the effect of long duration, low intensity shocks was found a week after pretreatment.

In the fourth experiment, it was found that experimental parameters could be chosen which would produce results in support of either the motor activation deficit hypothesis or a learning explanation of the learned helplessness effect, as follows.

Glazer and Weiss (1976b) attempted to determine whether the animals were learning inactivity or that responses and outcomes were independent of each other. In the first experiment, it was found that rats which had received inescapable shock learned a nose poke escape response more quickly than subjects that had received escapable shock in pretreatment. In the second experiment, in order to test for any treatment effects peculiar to this study, interference in learning was found with a normal shuttle task with neon bulb shock, with an FR2 shuttle response, and with an FR3 bar press response. The inescapable group again showed faster acquisition of the nose poke response to escape shock than the escapable shock pretreatment group. The results clearly

implied that the animals had learned a competing response, instead of the lack of a contingency between responding and shock administration.

Other evidence is more supportive of the Maier and Seligman (1976) learned helplessness hypothesis than of the Levis (1976) competing response hypothesis. Baker (1976) investigated a possible relationship in the learning of a lack of contingency between a stimulus and an aversive outcome and the learning of a lack of a contingency between a response and an aversive outcome among rats. The procedures employed in the investigation were conditioned emotional response (CER) and signalled punishment suppression tasks. The signalled punishment was chosen for three reasons: (1) It is formally similar to the CER paradigm; (2) It can be used to show the generality of the learned helplessness effect; and, (3) Shocks are delivered to the subject in the punishment task only if it responds. Therefore, based on a competing motor response hypothesis, one would predict that suppression would not be as likely in an escapable as in an inescapable group. Based on the learned independence hypothesis, one would predict that suppression would not be as likely in an inescapable group as in an escapable group of subjects.

In the first two experiments, a similarity in the effects of Rescorla's truly random control treatment and random presentation of inescapable shocks were found. However,

it was also found that exposure to random shocks alone could produce a deficit in learning an instrumental contingency, without the effects of suppression which are produced by classical conditioning. In the third experiment, it was found that uncorrelated presentations of noises and shocks interfered to a greater extent in the acquisition of a punishment suppression behaviour if the subject was permitted to emit the to-be-punished response during pretreatment. In the fourth experiment, therefore, animals were allowed to emit the to-be-punished response during pretreatment or not allowed to emit the response, and then tested on either the CER or the punishment task. If the animal was preexposed to random presentation of noises and shocks whether emitting the to- be-punished response or not, CER suppression was impaired. However, random presentation of shocks and noises during pretreatment interfered with punishment suppression only if the animal had been allowed to emit the to-be-punished response. It appears that the animals learned that responses were uncorrelated with aversive outcomes. However, the results also suggested that uncontrollability per se is not necessarily involved since a deficit in the punishment task was found only if the subject was emitting the to-be-punished response during pretreatment.

Goodkin (1976) designed an experiment to determine (1) if learning was bound to one particular stimulus, or whether any generalization of learned helplessness could be found in

rats; and (2) if transfer effects could be found between appetitive and aversive situations. Subjects in the response independent groups received either free food or random shock. All subjects were tested on a nose poke avoidance/escape task. In both response independent groups, subjects did not acquire the response. Goodkin (1976) concluded that interference with learning was not related to a particular reinforcing event. Instead, the subjects learned that reinforcers were independent of their responding. Goodkin (1976) also noted that a facilitation effect occurred in the groups in which reinforcement was dependent on responding during pretreatment. It appeared that those subjects learned that a contingency did exist, in the same manner that the response independent subjects learned that a contingency did not exist. It is interesting to note that these results are in direct opposition to those reported by Glazer and Weiss (1976b).

Burdette, Krantz, and Amsel (1975) attempted to differentiate between learned response independence and learned response competition models of learned helplessnes. They reasoned that if the learned helplessness effect could be alleviated by interpolating counterconditioning treatment between administration of inescapable shock and shuttlebox escape/avoidance test, then the response competition hypothesis would be supported. Rats were trained in a runway under continuous food reinforcement during interpolated

training. Footshock was administered to subjects either in the goal box or in a control cage. Rats which received shock in the runway goal box performed significanly better on the shuttlebox test as measured by mean latency to respond than rats which received shock in the control box. Thus, on first inspection, it appeared that the response competition position was supported. However, when compared to the behaviour of rats which received no interpolated training, the latencies of the group of subjects which received inescapable shock alone did not differ significantly from the latencies of the group of subjects which received inescapable shock followed by shock in the runway goal box. When the evidence was considered in terms of all experimental groups, it appeared that the additional trials of inescapable shock in the control box maintained an expectation of response independence whereas learned helplessness either dissipated or was modified in the remaining groups of subjects. Thus, the response independence position of Maier and Seligman (1976) was supported.

Mullins and Winefield (1977) attempted to demonstrate that the learned helplessness effect and immunization of a subject to the effect could occur in a nonaversive stimulation situation. Using rats as subjects and a visual discrimination task for immunization, training, and test, Mullins and Winefield found both a learned helplessness effect and an immunization effect. Rats which had received insolu-

ble black/white discrimination problems during training needed significantly more trials to learn horizontal/ vertical strips discrimination problems during test than rats which had received soluble black/white discrimination problems during training. Rats which had received immunization training on a black/white discrimination did not show learning deficits in the test phase of the experiment following insoluble training problems. Mullins and Winefield (1977) concluded that their results were consistent with Maier and Seligman's (1976) response independence position. However, they also noted that their results were consistent with the "learned irrelevance" position of Baker (1976). That is, animals in the non-immunized, insoluble training condition may simply have learned that the discriminative stimuli yielded no reinforcement information. Therefore, although Mullins and Winefield's (1977) results do not support Levis' (1976) response competition position, they are at best equivocal in their support of Maier and Seligman's (1976) response independence position.

Maier and Jackson (1977) have presented evidence which clearly supports a response independence interpretation of the learned helplessness effect more than a response competition interpretation. During escape training, rats in the controllable shock condition could terminate shock by a quarter turn of an activity wheel either immediately following shock onset, or .8 sec following shock onset, depending

on experimental condition. Rats in the yoked uncontrollable shock conditions received the same number and distribution of shocks as rats in the controllable shock condition. Subjects in both yoked uncontrollable shock conditions as well as subjects in the immediate offset controllable shock condition had longer escape latencies in a shuttlebox than subjects in the delayed offset controllable shock condition and subjects in the untreated control condition. In part, Maier and Jackson (1977) extrapolated from studies in which human subjects were employed in order to explain the learned helplessness effect among a group of animals that had control over shock offset. When a reflexive response was required of human subjects in order to terminate ankle shock, subjects reported that they did not respond and did not have control over the shock even though movement of their big toe was terminating the shock reliably. Because the quarter turn of the activity wheel immediately followed shock onset qualified as a relexive behaviour (i.e., high probability of occurrence and latency less than .7 sec) it was concluded that rats in the immediate response condition did experience response independence and therefore demonstrated learned helplessness. Although support for learned response independence was tenuous, the results clearly contradict a learned response competition. Subjects were reinforced for activity by shock offset and yet demonstrated a marked learned helplessness effect.

Rosellini (1978) has presented evidence in support of the response independence position in that he demonstrated a learned helplessness effect on an appetitive task following aversive pretreatment. According to the response competition hypothesis (Levis, 1976) immobility generalizes from one aversive situation to another and the degree of response competition during test depends on the similarity of training and test parameters. Following escapable, inescapable, or no shock pretreatment, rats were trained to bar press for a food pellet on a CRF schedule. Animals in the inescapable pretreatment group demonstrated significantly slower interresponse times than animals in either the escapable or no shock pretreatment group. The learned helplessness effect among animals in the inescapable shock group was more clearly demonstrated when a 1 sec interval was introduced between bar press and food delivery. Although the magnitude of the learned helplessness effect was not as large as would have been found with an aversive task, the magnitude difference is explained easily. In an aversive situation, an animal is shocked for failure to respond and in effect receives further uncontrollability training. In contrast, in an appetitive situation, nothing happens to the animal if it does not respond, and therefore it does not receive further uncontrollability training. In addition, each bar press response results in presentation of food in the appetitive situation whereas each running response does not necessarily

result in shock termination unless it is in the right direction. Rosellini (1978) concluded that although his results clearly supported the response independence position, the experiments did not provide a critical test of the response independence versus competition hypotheses.

Alloy and Bersh (1979) have provided further support for the response independence position by demonstrating that control over only one dimension of shock prevented interference on subsequent escape behaviour. Rats in an avoidance training situation could bar press to reduce shock intensity, but shocks could not be avoided. Subjects in the yoked condition received the same number, distribution, and intensity of shocks as the subjects in the avoidance condition to which they were yoked. Another group of rats received no pretreatment. All animals were tested on a shuttle escape task. Half of the subjects received the low intensity shock level during testing and half of the subjects received the high intensity shock level during testing. Rats in the yoked condition demonstrated significantly longer escape latencies than rats in either the avoidance or no shock conditions. Rats in the avoidance condition did not demonstrate significantly longer escape latencies than rats in the no shock condition. In other words, at both shock intensities during test, a classic learned helplessness effect was demonstrated even though subjects in the avoidance condition did not have control over shock termination. According to

the response competition theory, the reinforcing effects of shock termination are integral to the development of the learned helplessness effect. Therefore, in the Alloy and Bersh (1979) study, rats in the avoidance condition should have demonstrated a learned helplessness effect. In fact, Alloy and Bersh (1979) reported what appeared to them to be a transitory response competition deficit among avoidance animals at the low test intensity. Therefore, it appeared that response independence and not response competion determined the learned helplessness effect among yoked subjects.

Lawry, Lupo, Overmier, Kochevar, Hollis, and Anderson (1978) have provided evidence using dogs and rats as subjects which also contradict the response competition position of Levis (1976). Temporal form and shock source were varied and combined factorially in order to investigate methodological problems in learned helplessness research. Both dogs and rats showed the same pattern of responding. The learned helplessness effect was found when ac continuous, ac pulsating, or dc continuous shock was used, but not when dc pulsating shock was used in administering pretreatment shock. Ac continuous shock was used in the testing phase of the experiment. During pretreatment, activity levels of animals were monitored in order to compare results with previous investigations of shock parameter effects on activity level (e.g., Campbell and Teghtsoonian, 1958). In direct contradiction of the response competition hypothesis

(Levis, 1976), activity level was not related to test performance. Activity levels were similar for animals in the ac pulsating and dc pulsating conditions but their test latencies were significantly different. Activity levels were dissimilar for animals in the ac pulsating and ac continuous conditions but their test latencies were very similar. However, equal difficulty was provided for a response independence position (Maier and Seligman, 1976) by such results, as it appears as though only certain types of inescapable shock produce a learned helplessness effect.

Rosellini and Seligman (1978) have provided further evidence for a position of confusion. Shock intensity was varied during both training and test. Rats were pretreated with 80 inescapable shock trails at one of four shock levels ranging from no shock to 2.0 mA. Test consisted of acquisition of a bar press escape response at one of three shock levels. The results demonstrated that rats showed a learned helplessness effect when training and test shock intensities were similar, but not when training and test shock intensities were dissimilar. In addition, all groups which received similar training and test shock intensities demonstrated a similar degree of debilitation in acquiring the escape response. The difficulty the results pose for a response independence position is clear. Uncontrollability rather than uncontrollability of shock at a certain intensity level is supposedly the basis for developing an expecta-

tion of response-outcome independence. The results also are difficult to explain from either a response independence or a response competition position when considered in conjunction with other results (e.g., Rosellini, 1978) which suggest generalization of the learned helplessness effect across reinforcers.

Summary

Maier and Seligman (1976) have presented a response independence hypothesis to account for deficits in learning found when an animal receives response independent aversive stimulation during a pretreatment. Levis (1976) has presented a response competition hypothesis to account for the same effects. Support for both of the hypotheses has been found in the recent literature. On the one hand, Glazer and Weiss (1976a, 1976b) and Weiss et al., (1976) have shown evidence of competing responses in long term helplessness. On the other hand, Maier and Jackson (1977) and Lawry et al. (1978) have provided evidence which directly contradicts the response competition hypothesis. It was found that an animal had to make a prolonged rather than a reflexive control response in order to avoid the effects of response-outcome noncontingency (Maier and Jackson, 1977). Activity level, as a predictor of learned helplessness central to the response competition hypothesis, was found to be unrelated to learned helplessness effects (Lawry et al., 1978). Although

the results of some studies were clearly supportive of the response independence hypothesis, they did not provide a critical test between the response independence and response competition hypotheses (Burdette et al., 1975; Mullins and Winefield, 1977). In addition, the results of a few studies demonstrated evidence of response independence which was difficult to explain within a response competition context (Alloy and Bersh, 1979; Baker, 1976; Goodkin, 1976; Rosellini, 1978). The most confusing results however were not supportive of either the response independence or the response competition hypothesis. Parameters of aversive stimulation were found to influence not only the nature but also the occurrence of the learned helplessness effect (Lawry et al., 1978; Rosellini and Seligman, 1978). Obviously, further studies of experimental parameters must be conducted in order to determine under which conditions a learned helplessness effect can be demonstrated. Only when such knowledge is available will comparative evaluation of theoretical positions be reasonable.

Human Learned Helplessness

Unlike the situation for animal learned helplessness in which research has been conducted in an effort to differentiate two models of learned helplessness (Levis, 1976; Maier and Seligman, 1976), learned helplessness research with humans has focused on developing models which are designed to

accommodate empirical results. Therefore, the format of the human learned helplessness section of the review will be reversed in comparison to the format of the animal learned helplessness section. That is, a short review of empirical results will be followed by the development of theories designed to account for the results.

Review of Recent Research

In his presentation of learned helplessness theory, Seligman (1975) predicted three outcomes as a result of a person perceiving noncontingency between responses and outcomes. First, a decrease in motivation to perform on a subsequent task was predicted. Second, an inability to learn a new association between responses and outcomes (i.e., a cognitive decrement) on a subsequent task was predicted. Third, a swing toward negative affect, especially anxiety and depression, were predicted. Some of the empirical evidence with human subjects supported the original model, some contradicted the original model, and some provided inexplicable results. Each of the predicted effects of learned helplessness training (Seligman, 1975) and associated evidence is outlined below.

Motivational effects. Although Miller and Norman (1979) claim that performance deficits cannot be divided into motivational and cognitive components, results of a study conducted by Sherrod and Downs (1974) suggest that mo-

tivational deficits can be found exclusive of cognitive deficits. No differences in performance on arithmetic problems were found between groups of subjects who had previously received inescapable and escapable noise training. However, subjects in the escapable noise condition worked longer at the subsequent arithmetic problems than subjects in the inescapable noise condition. Therefore, it appears as though motivational deficits occur independently of cognitive deficits.

Cognitive effects. Performance deficits following aversive noncontingent training have been reported by a number of authors (Benson and Kennelly, 1976; Fosco and Geer, 1971; Hiroto, 1974; Hiroto and Seligman, 1975; Klein and Seligman, 1976; Miller and Seligman, 1975; Thronton and Jacobs, 1971; Thronton and Powell, 1974). Although a number of the studies in which a performance decrement following aversive training had methodological flaws or a plausable alternative explanation of the results (see Wortman and Brehm, 1975 for details), serious questionning of the learned helplessness position (Seligman, 1975) was not derived from the above named studies, but from equally flawed studies from which contradictory evidence was gained. Some authors not only failed to find a performance deficit following helplessness training but also found a performance facilitation following helplessness training (Roth and Bootzin, 1974; Roth and Kubal, 1975; Thornton and Jacobs, 1972; Wortman, Panciera,

Shusterman, and Hibscher, 1976). Thus, the learned helplessness position as suggested by Seligman (1975) would have to be revised to account for both impairment and facilitation of performance effects.

Emotional effects. Authors who tapped mood changes during helplessness training generally found that subjects who demonstrated helpless behaviour also reported an increase in anxiety and depression (Griffith, 1977; Miller and Seligman, 1975; Roth and Kubal, 1975). However, when Roth and Kubal (1975) asked subjects about a number of moods, they found that in addition to reporting increased levels of anxiety and depression, subjects reported increased levels of hostility. Increases in hostility could not be accounted for by learned helplessness theory (Seligman, 1975), but could be accounted for by Wortman and Brehm's (1975) revision of learned helplessness theory.

Theories of Learned Helplessness

Four revised theories of human learned helplessness (Abramson, Seligman, and Teasdale, 1978; Bandura, 1977; Miller and Norman, 1979; Wortman and Brehm, 1975) have been postulated to account for evidence from empirical research with humans. The theories will be presented in chronological order.

Wortman and Brehm's (1975) theory. According to Wortman and Brehm (1975) both reactance theory (Brehm, 1966,

1972) and learned helplessness theory (Seligman, 1975) predict reactions to uncontrollable outcomes, but the predictions are quite different and in some instances contradictory. According to reactance theory, an individual becomes motivationally aroused to restore a freedom which has been either denied or threatened. Four parameters determine the extent of the motivational arousal. First, motivational arousal is greater as the individual is more certain that he or she possesses a specific behavioural freedom. Second, more reactance occurs if the freedom is denied than if the freedom is simply threatened. Third, greater arousal occurs as the importance of the freedom to the individual increases. Fourth, the degree of reactance also depends on the extent to which the individual thinks that denial or threat of denial of one freedom has implication for the denial or threat of denial for other freedoms. Four behavioural outcomes of uncontrollability are postulated by reactance theory. First, an individual's motivation to engage in a given behaviour will increase if he or she thinks that the given behavioural freedom is threatened or denied. Second, depending on the cost of doing so, an individual may try to engage in the denied or threatened behaviour. Third, the individual may engage in behaviours which imply that he or she has the freedom to engage in the denied or threatened behaviour. Fourth, hostile or aggressive feelings may be expressed toward the supposed agent of denial.

A comparison of behaviours predicted by reactance theory (Brehm, 1966, 1972) and learned helplessness theory (Seligman, 1975) reveal four contradictory differences between the two theories. Most obvious is the prediction of reactance theory that following exposure to uncontrollability, motivation to respond will increase compared to the prediction of learned helplessness theory that motivation to respond will decrease. Second, reactance theory predicts that an individual will become hostile and aggressive following exposure to uncontrollability while learned helplessness theory predicts that an individual will become depressed and passive following exposure to uncontrollability. Third, while reactance theory predicts a change in the evaluation of an outcome following uncontrollability, learned helplessness makes no such prediction. Fourth, reactance theory concerns loss of specific freedoms rather than more general loss of control as concern learned helplessness theory.

Wortman and Brehm (1975) integrated reactance theory and learned helplessness theory based on the assumptions that reactance would occur only if a person expected control and would occur only to the extent that outcomes are important. According to the integrative model, reactance should occur during the first few trials of helplessness training and helplessness should occur after many trials of helplessness training.

The extent of reactance and helplessness is predicted to be directly proportional to the importance of the outcome in terms of the integrated model.

Although Wortman and Brehm's (1975) interative model accounts for most of the contradictions in the research literature, it does so in a post hoc fashion. Therefore, the integrative model is not useful as a predictor of learned helplessness behaviour. However, Wortman and Brehm's (1975) contribution is far from being valueless. In a section at the end of the paper which the authors title "Conclusions and Theoretical Speculations", Wortman and Brehm (1975) lay the foundation for later attribution models of learned helplessness (Abramson et al., 1978; Miller and Norman, 1979).

Wortman and Brehm (1975) speculated that people who attribute uncontrollability to internal factors may be more affected than people who attribute uncontrollability to external factors. The authors also suggest that an internal attribution may be more reassuring than an external attribution because it implies some form of control (i.e., if I am responsible for a particular loss of control, then I can change myself and exert control in similar situations in the future). Wortman and Brehm (1975) also speculated that if uncontrollability is attributed to stable and unchangeable factors that helplessness would be more severe than if uncontrollability was attributed to variable or changeable factors.

In addition, Wortman and Brehm (1975) speculated on the nature of generalization of learned helplessness effects. They claimed that generalization of learned helplessness effect had not been demonstrated to their satisfaction. Wortman and Brehm (1975) offered two hypotheses concerning generalization of helplessness effects. First, they suggested that generalization of helplessness may vary directly with the similarity of training and test tasks. Second, they suggested that magnitude of helplessness may vary directly with the similarity of training and test tasks. Although the present author knows of no systematic investigation of factors affecting generalization or magnitude of helplessness among human subjects, Cohen, Rothbart, and Phillips (1976) reported generalization to more dissimilar test tasks among externally-oriented subjects than among internally-oriented subjects.

In summary, Wortman and Brehm (1975) developed an integrated model of behaviour following uncontrollability of reactance theory and learned helplessness theory. They suggested that reactance theory accounts for behaviour during the first few trials of helplessness training and that learned helplessness theory accounts for behaviour after repeated trials of helplessness training. The present author suggested that the most important contribution of Wortman and Brehm (1975) was their speculation that attributions of causality were important in determining the extent and magnitude of learned helplessness effects.

Bandura's (1977) self-efficacy theory. Bandura (1977) made an important contribution to a later theory of learned helplessness (Abramson et al., 1978) by distinguishing between outcomes and the individual's belief that the outcome is within his or her personal realm of possibilities. Bandura (1977) defined outcome expectancies as the individual's perception of response-outcome dependency in terms of a specific response leading to a specific outcome. Efficacy expectancies were defined as the individual's expectation that he or she could perform the required response in order to obtain the desired outcome. Efficacy expectations were predicted to influence initiation and persistence of a behaviour. Differences in efficacy expectations were measured in terms of three parameters: magnitude, generality, and strength. Contextual cues such as social, situational, and temporal circumstances would help individuals develop efficacy expectations after processing, weighing, and integrating information from a variety of sources. Following the development of efficacy expectations, it is predicted that people regulate their behaviour in terms of their efficacy expectations. Although Bandura's (1977) self-efficacy theory was much broader in scope than theories discussed previously (Seligman, 1975; Wortman and Brehm, 1975) Bandura (1977) had a specific criticism of Seligman's (1975) learned helplessness theory as follows:

> Theorizing and experimentation on learned helplessness might well consider the conceptual distinction between efficacy and outcome expecta-

> tions. People can give up trying because they lack a sense of efficacy in achieving the required behavior, or they may be assured of their capabilities but give up trying because they expect their behavior to have no effect on an unresponsive environment or to be consistently punished. (Bandura, 1977, pp. 204-205).

Abramson et al. (1978) followed Bandura's (1977) suggestion in their reformulated model.

Abramson, Seligman, and Teasdale's (1978) model. Two major inadequacies of the original learned helplessness theory (Seligman, 1975) prompted Abramson et al. (1978) to propose a reformulated model which they thought accounted for most of the empirical evidence. The first inadequacy of the original model was pointed out by Bandura (1977) in his differentiation of outcome expectations and efficacy expectations. Abramson et al. (1978) developed the notion of personal helplessness versus universal helplessness based on differences in outcome and efficacy expectations. An individual who is personally helpless feels that others can produce the necessary response for the desired outcome, but he or she is personally unable to produce the necessary response (i.e., internal attribution of causality). In Bandura's (1977) terms, then, there is a high outcome expectancy but a low efficacy expectancy in a personal helplessness situation. Lowered self esteem is predicted in the personal helplessness case. An individual who is universally helpless feels that he or she and others are incapable of necessary responses for the desired outcome (i.e., an external

attribution of causality). In Bandura's (1977) terms, then, there is a low outcome expectancy and a low efficacy expectancy in a universal helplessness situation. No lowering in self esteem is predicted in the universal helplessness case. Although the internal-external division accounted for differences in self esteem following helplessness training, the generality and chronicity of helplessness remained an unexplained issue. Abramson et al. (1978) used an attribution framework in order to predict the generality and chronicity of learned helplessness effects.

Causal attributions, besides being internal or external as described above, have two further dimensions which affect the manifestation of learned helplessness effects. According to the revised learned helplessness theory (Abramson et al.,(1978), whether attributions are to a global or specific cause determines the generality of helplessness effects. Generality of helplessness effects would be greater if attributions of causality were to a global rather than to a specific cause. Whether attributions were to a stable or unstable cause determines the chronicity of helplessness effects. Chronicity of helplessness effects would be greater if attributions of causality are to a stable rather than to an unstable cause. The intensity of motivational and cognitive deficits is a direct function of the strength or certainty of the individual's expectation of noncontingency between responses and outcomes.

On the basis of the distinction between personal and universal helplessness and the formulation of attributions, an expanded model of learned helplessness was presented by Abramson et al. (1978). The first two steps in the reformulated model are the same as the first two steps in the original model (Seligman, 1975). First, objective noncontingency must be present in the environment. Second, the individual must perceive noncontingency between responses and outcomes. The third and fourth steps in the reformulated model are new. Third, the individual formulates attributions of causality for the noncontingency perceived to be present in the environment. Fourth, an expectation for future noncontingency in the environment is developed. The last step in the model, symptoms of helplessness, are the same in the original (Seligman, 1975) and reformulated (Abramson et al., 1978) models. An important aspect in the sequence of the reformulated model (Abramson et al., 1978) is that causal attributions predict an expectancy of contingency or noncontingency in the future, but the expectation itself determines whether symptoms of helplessnes will occur.

In summary, Abramson et al. (1978) presented a reformulated model of learned helplessness based on (1) Bandura's (1977) distinction between outcome and efficacy expectations; and (2) attributions of causality to predict the cross-situational generality and the chronicity of learned helplessness effects.

Miller and Norman's (1979) attribution model. In an independent, but parallel, development of a revised model of the original learned helplessness model (Seligman, 1975) Miller and Norman (1979) identified five deficiencies in the original model. First, based on empirical evidence, Miller and Norman (1979) determined that development of the learned helplessness effect required an expectancy of not only response- outcome independence but also an undesirable outcome. Second, factors such as task importance, instructions, and attributions of causality which affect the development of the learned helplessness effect needed to be specified. Third, Miller and Norman (1979) found no substantial evidence of generalization of learned helplessness effects across situations. Fourth, Miller and Norman (1979) believed that individual difference factors needed to be integrated into a theory of learned helplessness. Fifth, attributions appeared to be a major factor in the alleviation of learned helplessness effects although attributions were not included in the original model proposed by Seligman, (1975).

Miller and Norman (1979) were in agreement with the basic tenet of learned helplessness theory. That is, they believed that perception of response-outcome independence led to the development of the learned helplessness effect. Their aim was to refine the theory based on the available empirical evidence. Their attribution model consists of four steps, as follows.

First, the environment can be divided into outcome cues and situational cues. Outcome cues refer to feedback concerning the individual's performance on a given task. Situational cues refer to stimuli which are in the environment and may affect the individual's perception and/or interpretation of outcome cues. Task instructions are an example of situational cues which may influence the interpretation of outcome cues. Second, individual differences are believed to interact explicitly with outcome and situational cues to influence the perception and interpretation of environmental cues. Individual differences believed to be important are achievement motivation, sex, prior expectations, and mood. Third, cognitive processes affect the development of the learned helplessness effect. The type of causal attribution (locus of control, stability, specificity, and importance) and expectancy of outcome are important. A causal attribution with an internal locus of control is expected to result in self depreciation and negative affect whereas a causal attribution with an external locus of control is expected to result in minimal affect changes. Attributions to a stable cause are expected to result in greater cross-situational generalization than attributions to a variable cause. The specificity of an attribution is believed to determines the number of future tasks that will be affected by response-outcome independence expectations. The magnitude of affective and performance deficits is thought to be de-

termined by the importance of the outcome. Each attribution is conceptualized as a continuum rather than a dichotomy. Also, each attribution is subjective in nature. For example, one person may consider luck to be a more stable cause of outcome than another person. Expectancies for both response-outcome dependence or independence and success or failure outcome are important determinants in the development of learned helplessness effects. The fourth and final step in the attribution model is the demonstration of behaviour associated with learned helplessness. Miller and Norman (1979) predict only two deficits associated with learned helplessness: affect and performance. The authors (Miller and Norman, 1979) claim that they could find no evidence that motivational and cognitive deficits were independent, and therefore combined them under the title performance.

In summary, based on available empirical evidence, Miller and Norman (1979) developed a model of learned helplessness, which includes the following steps: (1) outcome and situational cues in the environment which define noncontingency between responses and outcomes; (2) individual differences which may affect the perception and interpretation of noncontingency; (3) attributional and expectancy cognitions which affect the expectancy of response-outcome independence in the future; and (4) affect and/or performance deficits associated with the learned helplessness effect.

Summary

Four theories of human learned helplessness have been advanced to account for disparate results among empirical studies of the learned helplessness effect in humans. Wortman and Brehm (1975) suggested an integration of reactance theory (Brehm, 1966, 1972) and learned helplessness theory (Seligman, 1975). They suggested that during the first few trials of uncontrollability training, people display behaviour consistent with that predicted by reactance theory. However, behavioural manisfestations of learned helplessness occur after many trials of uncontrollability training. The degree of reactance and helplessness is thought to be a function of the degree of importance of the outcome. Although Wortman and Brehm (1975) did not incorporate attributions into their theory, they suggested that the role of causal attributions in the development of the learned helplessness effect should be investigated. Bandura (1977) suggested that outcome expectancies should be evaluated separately from efficacy expectancies.

Abramson et al. (1978) suggested a reformulation of the original learned helplessness model (Seligman, 1975) based on Bandura's differentiation between outcome and efficacy expectations and a revision of attribution theory to account for human learned helplessness behaviour. The five steps involved in the reformulation model are (1) obtaining information regarding the contingency between response and out-

come; (2) perceiving the present or past contingency between response and outcome; (3) attributing the present or past contingency between response and outcome to a cause; (4) expecting the future contingency between response and outcome; and (5) exhibiting symptoms of helplessness.

Based on an evaluation of the available empirical evidence, Miller and Norman (1979) presented a four step model of learned helplessness. The four steps are (1) outcome and situational cues in the environment which define noncontingency between response and outcome; (2) individual difference factors which may affect the perception and interpretation of noncontingency between response and outcome; (3) attributional and expectancy cognitions which may affect the expectancy of response independence in the future; and (4) exhibition of symptoms of helplessness.

Appendix B

THE IAR SCALE

Crandall et al (1965) have developed a scale which was designed to test specifically the amount of responsibility children took for academic success and academic failure. Unlike more global measures of locus of control (e.g., Rotter, 1966), IAR scale items pertain only to academic achievement situations and involve only the child, parents, teachers, and peers as agents of control. The scale is composed of 34 forced-choice items. Test-retest reliability as measured by corrections between overall (I), success (I+), and failure (I-) items on initial and two month follow-up scores was moderately high. Correlations for I, I+, and I- were .69, .66, and .74 respectively, all of which were significant beyond the .001 level (Crandall et al., 1965). Internal consistency was measured by split-half reliabilities for I+ and I- items. Correlations were .54 for I+ items and .57 for I- items, which indicated some degree of heterogeneity among the items (Crandall et al., 1965).

Weiner and Kukla (1970) have suggested one possible reason for the low split-half reliabilities. They pointed out that items of the IAR scale can be further partitioned into ability (e.g., I passed because I am good at arithmetic

problems) and motivation or effort (e.g., I passed because I tried hard) stems (c.f., Dweck and Reppucci, 1973).

Criterion-related validity has been defined by Fiske (1971) as "the extent to which a test is a valid measure of (correlates highly with) a given criterion" (p. 166). Both Dweck and Reppucci (1973) and Deiner and Dweck (1978) have demonstrated that IAR scores for failure due to effort reliably discriminated between children who persisted at a task following failure and children who gave up at a task following failure. Therefore, given a criterion of differentiating between persistent and nonpersistent subjects in a learned helplessness situation, it appears that the IAR scale (Crandall et al., 1965) is a valid instrument. The IAR scale is as follows:

1. If a teacher passes you to the next grade, would it probably be

   a) because she liked you, or

   b) because of the work you did? (I+)

2. When you do well on a test at school, it is more likely to be

   a) because you studied for it, or (I+)

   b) because the test was expecially easy?

3. When you have trouble understanding something in school, is it usually

   a) because the teacher didn't explain it clearly, or

   b) because you didn't listen carefully? (I-)

4. When you read a story and can't remember must of it, is it usually

   a) because the story wasn't well written or

   b) because you weren't interested in the story? (I-)

5. Suppose your parents say you are doing well in school. Is this likely to happen

   a) because your school work is good, or (I+)

   b) because they are in a good mood?

6. Suppose you did better than usual in a subject at school. Would it probably happen

   a) because you tried harder, or (I+)

   b) because someone helped you?

7. When you lose at a game of cards or checkers, does it usually happen

   a) because the other player is good at the game, or

   b) because you don't play well? (I-)

8. Suppose a person doesn't think you are very bright or clever,

   a) can you make him change his mind if you try to, or (I-)

   b) are there some people who will think you're not very bright no matter what you do?

9. If you solve a puzzle quickly, is it

   a) because it wasn't a very hard puzzle, or

   b) because you worked on it carefully? (I+)

10. If a boy, or girl tells you that you are dumb, is it more likely that they say that

    a) because they are mad at you, or

b) because what you did really wasn't very bright? (I-)

11. Suppose you study to become a teacher, scientist, or doctor and you fail. Do you think this would happen

a) because you didn't work hard enough or (I-)

b) because you needed some help, and other people didn't give it to you?

12. When you learn something quickly in school, is it usually

a) because you paid close attention, or (I+)

b) because the teacher explained it clearly?

13. If a teacher says to you "Your work is fine," is it

a) something teachers usually say to encourage pupils, or

b) because you did a good job? (I-)

14. When you find it hard to work arithmetic or math problems at school, is it

a) because you didn't study well enough before you tried them,or (I-)

b) beause the teacher gave problems that were too hard?

15. When you forget something you heard in class, is it

a) because the teacher didn't explain it very well, or

b) because you didn't try very hard to remember? (I-)

16. Suppose you weren't sure about the answer to a question your teacher asked you, but your answer turned out to be right. Is it likely to happen

a) because she wasn't as particular as usual, or

b) because you gave the best answer you could think of? (I+)

17. When you read a story and remember most of it, is it usually

a) because you were interested in the story, or (I+)

b) because the story was well written?

18. If your parents tell you you're acting silly and not thinking clearly, is it more likely to be

a) because of something you did, or (I-)

b) because they happen to be feeling cranky?

19. When you don't do well on a test at school, is it

a) because the test was especially hard, or

b) because you didn't study for it? (I-)

20. When you win at a game of cards or checkers, does it happen

a) because you play real well, or (I+)

b) because the other person doesn't play well?

21. If people think you're bright or clever, is it

a) because they happen to like you, or

b) because you usually act that way? (I+)

22. If a teacher didn't pass you to the next grade, would it probably be

a) because she "had it in for you", or

b) because your school work wasn't good enough? (I-)

23. Suppose you don't do as well as usual in a subject at school. Would this probably happen

a) because you weren't as careful as usual, or (I-)

b) because somebody bothered you and kept you from working?

24. If a boy or girl tells you that you are bright, is it usually

a) because you thought up a good idea, or (I+)

b) because they like you?

25. Suppose you became a famous teacher, scientist or doctor. Do you think this would happen

a) because other people helped you when you needed it, or

b) because you worked very hard? (+)

26. Suppose your parents say you aren't doing well in your school work. Is this likely to happen more

a) because your work isn't very good, or (I-)

b) because they are feeling cranky?

27. Suppose you are showing a friend how to play a game and he has trouble with it. Would that happen

a) because he wasn't able to understand how to play, or

b) because you couldn't explain it well? (I-)

28. When you find it easy to work arithmetic or math problems at school, is it usually

a) because the teacher gave you especially easy problems, or

b) because you studied your book well before you tried them? (I+)

29. When you remember something you heard in class, is it usually

a) because you tried hard to remember, or (I+)

b) because the teacher explained it well?

30. If you can't work a puzzle, is it more likely to happen

a) because you are not especially good at working puzzles, or (I-)

b) because the instructions weren't written clearly enough?

31. If your parents tell you that you are bright or clever, is it more likely

a) because they are feeling good, or

b) because of something you did? (I+)

32. Suppose you are explaining how to play a game to a friend and he learns quickly. Would that happen more often

a) because you explained it well, or (I+)

b) because he was able to understand it?

33. Suppose you're not sure about the answer to a question your teacher asks you and the answer you give turns out to be wrong. Is it likely to happen

a) because she was more particular than usual, or

b) because you answered too quickly? (I-)

34. If a teacher says to you, "Try to do better," would it be

a) because this is something she might say to get pupils to try harder,or

b) because your work wasn't as good as usual? (I-)