

THE EFFECTS OF ATTRIBUTIONAL FEEDBACK REGARDING
MULTIPLICATION PERFORMANCE
ON THE SELF-EFFICACY OF GRADE 5 STUDENTS

Freda O'Sullivan
B.ED., University of Victoria, 1980

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

MASTER OF ARTS

in the Department

of

Educational Psychology

ACCEPTED

FACULTY OF GRADUATE STUDIES



DATE

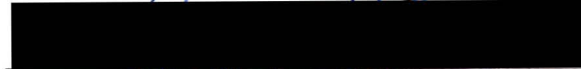
March 17, 1987

DEAN

§§ We accept this thesis as conforming
to the required standard



Dr. B. Harvey



Dr. G. Hett



Dr. L. Acker



Dr. A. Oberg

© Freda O'Sullivan, 1986

UNIVERSITY OF VICTORIA

December 1986

All rights reserved. This thesis may not be reproduced
in whole or in part, by mimeograph or other means,
without permission of the author.

Supervisor: Dr. B. Harvey

ABSTRACT

The purpose of this study is to explore the idea that attributional feedback of effort and ability has differential influence upon students' a) self-efficacy, b) achievement level, and c) attributions for success and failure. Four classes of grade five students participated in this study. Over a six day period the students in each class judged their self-efficacy before attempting a mathematical recall of number facts grid. Each daily task was similar in design. The task involved one hundred multiplication facts for recall, and the students were working under a three minute time constraint.

Two types of attribution feedback were given. Class 1 served as a control class. Class 2 received feedback for the effort they expended, and the emphasis was split between past and future successes. Classes 3 and 4 both received feedback for their ability.

Overall results indicated that ability feedback was most influential in promoting self-efficacy, achievement performance, and attributions for success due to ability.

The control and effort classes scored similarly in self-efficacy, achievement, and attributions for success. This study indicates that the ability feedback condition is superior either to the effort feedback condition or to the no feedback condition in raising the performance and self-efficacy level of children on a task of intermediate difficulty. The results suggest that ability feedback is effective not only for groups of students but also for high achieving students within those groups. Students with high performance levels seem to benefit from an acknowledgement of their achievement ability.

Examiners:

[REDACTED]

Dr. B. Harvey

[REDACTED]

Dr. G. Hett

[REDACTED]

Dr. L. Acker

[REDACTED]

Dr. A. Oberg

CONTENTS

Abstract	ii
Contents	iv
Tables	vi
Figures	vii
Introduction	1
Statement of The Problem	5
Review of the Literature	8
Learned Helplessness	8
Self-Efficacy	18
Self-Efficacy and Attributional Feedback	19
Rationale For The Study	27
Definitions	28
Statement of Research Questions	30
Method	32
Subjects and Setting	32
Instrumentation	33
Self-efficacy Judgements	33
Mathematical Ability	33
General Math Ability.	33
Recall of Multiplication Facts.	33
Attributions/Locus of Control	34
Attribution Assessment	35
Procedures	36
Pretest	36
Training Procedure	37
Posttest	39
Pilot Study	39
Results	41
Canadian Test Of Basic Skills (CTBS)	41
Performance on Multiplication Achievement Tasks	47
Self-Efficacy	55
Self-Efficacy and Achievement	57
Pretest and Posttest Attribution Measures	63

Discussion	68
Implications for Research	82
Educational Implications	84
Conclusion	85
Limitations and Delimitations of The Study	86
Bibliography	88
Appendix A: Letter to Parents	94
Appendix B: Self-Efficacy Pretest	96
Appendix C: Recall of Multiplication Facts Grids	98
Appendix D: The Multidimensional - Multiattributinal Causality Scale and Students' Answer Sheet	105
Appendix E: Posttest Attribution Assessment Scale	112
Appendix F: Multivariate and Univariate Tests of the Interaction Between Group Mean Scores and Multiplication Achievement Tests	114
Appendix G: Multivariate and Univariate Tests of the Interaction Between Group Mean Scores and Self-Efficacy Scores	116

TABLES

1.	Causes of Success and Failure Classified According to Focus, Stability, and Controllability	10
2.	Summary of Daily Activities	40
3.	Group Mean Performance Scores and Standard Deviations on Sections 1 and 2 of the Canadian Test of Basic Skills (Classes, 1, 2, 3, and 4) . .	43
4.	Group Mean Performance Scores and Standard Deviations by Sex on Sections 1 and 2 of The Canadian Test of Basic Skills (Classes 1, 2, 3 and 4)	45
5.	Group Mean Pretest and Posttest Scores and Standard Deviations on the Math Multiplication Grids (Classes 1, 2, 3, and 4)	51
6.	Group Mean Pretest and Posttest Scores and Standard Deviations by Sex on the Math Multiplication Grids (Classes 1, 2, 3, and 4) . .	53
7.	Group Mean Pretest and Posttest Scores and Standard Deviations for Self-Efficacy (Classes 1, 2, 3, and 4)	61
8.	Group Mean Pretest Attribution Scores and Standard Deviations (Classes 1, 2, 3, and 4) . . .	65
9.	Group Mean Posttest Attribution Scores and Standard Deviations (Classes 1, 2, 3, and 4) . . .	66

FIGURES

1. Group Mean Performance Scores on Sections 1 and 2 of The Canadian Test of Basic Skills (Classes 1, 2, 3, and 4)	44
2. Group Mean Performance Scores by Sex on Sections 1 and 2 of the Canadian Test of Basic Skills (Classes 1, 2, 3, and 4)	46
3. Group Mean Scores on the Math Multiplication Grids (Classes 1, 2, 3, and 4)	52
4. Group Mean Scores by Sex on the Math Multiplication Grids (Classes 1, 2, 3, and 4)	54
5. Group Mean Scores for Self-Efficacy (Classes 1, 2, 3, and 4)	62
6. Group Mean Posttest Attribution Scores for Ability, Effort, Luck, and Easy Questions (Classes 1, 2, 3, and 4)	67

INTRODUCTION

Recent advances in instructional psychology have led to growing interest in how students employ feedback during the learning process. Most theories stress the idea that students achievement expectancies affect behavior. Perceived self-efficacy is an important variable in understanding achievement behavior. Self-efficacy refers to a personal judgement of one's capability to organize and implement actions in specific situations that may contain novel, unpredictable, and possibly stressful features (Bandura, 1977).

The learned helpless child needs direction and support from the educational system. Learned helplessness was the original label given to an animal's reaction to aversive, inescapable and uncontrollable shock (Overmier & Seligman, 1967) and later applied to human performance (Glass & Singer, 1972). The learned helplessness phenomenon, in relation to self-efficacy theory, postulates that different modes of influence enhance children's performance and strengthen their self-efficacy. Learned helpless children demonstrate specific behaviors, reduced or inhibited

responding, increased anxiety, general passivity, and a low persistence level when faced with a difficult situation. Learned helplessness occurs as a result of failure, over a series of trials, at a particular task. The children come to believe that, whatever their reaction is to the task, it seems to have no effect on the outcome. A lowered perception of self-efficacy occurs when the children believe that they have no control over the outcome (Deiner & Dweck, 1978). Self-efficacy can be measured in direct relation to learned helpless behaviors. Helpless behaviors described by Diener & Dweck (1978) are disconcertingly similar to behaviors attributed to development and acquisition of efficacy information. In forming a learned helpless attitude and efficacy judgements, students' take into account both personal and situational factors. Examples of these factors include perceived ability, task difficulty, amount of effort expended, amount of outside help needed to succeed, verbal feedback from others, and the pattern of successes and failures.

Incorporated within the learned helplessness phenomenon, and closely related to self-efficacy, is the theory of attribution. Attribution theory postulates that individuals make causal ascriptions for the outcomes of their actions (Heider, 1958; Kelley, 1967). In Weiner's model of

achievement motivation (Weiner, 1974, 1977, 1979) causal attributions for prior outcomes, such as ability, effort, task difficulty, luck and others, are the central influences on future outcome expectancies (i.e. self-efficacy). Attributions may be categorized along three dimensions; stability, locus of control, and controllability. Attributional judgements for success and failure influence performance expectations and affective reactions. In turn, expectancies and affects influence choice of activities and persistence on a task. Self-efficacy and attributional theory both emphasize the cognitive processing of environmental information, factors which address the influence of performance and expectancies on behavior (Schunk, 1984). These two theories differ in the range of judgemental factors that directly influence expectancies. Bandura (1981) suggested that, within the context of self-efficacy, both the amount of effort expended and the judgements of task difficulty operate on performance in an indirect sense through self-perceptions of efficacy. Consequently, success on an easy task conveys less self-efficacy than does success on a difficult task. Self-efficacy judgements are based not only on causal attributions but also on other sources of information. This information may be in relation to temporary patterns of

successes and failures, number of performance aids, situation circumstances under which prior performances occur, psychological indices, social comparative information and forms of persuasion (Bandura, 1981). Within the attribution framework, these factors and others directly influence causal attributions (Weiner, 1974).

Studies need to be done to measure different forms of attributional feedback with children, since attribution feedback is an important contextual influence on students' appraisals of self-efficacy (Schunk, 1984).

Statement of The Problem

Since perceived self-efficacy is an important variable in predicting achievement behavior, the main purpose of this study was to investigate the notions that attributions of ability feedback or attributions of effort feedback given by the teacher would lead to varying levels of self-efficacy in children of the intermediate grades. Children often attribute success to ability and effort. This study attempts to show that students do differentiate between ability attributions and effort attributions, since attributional variables constitute an important influence on self-efficacy.

The results of this study may have implications for teachers of young children. Linking effort with success helps to develop self-efficacy, but as the child develops, ability information becomes increasingly important. Because it is likely that children change their causal attributions with development, knowing how children interpret attributional feedback would allow teachers to structure their feedback so as to obtain optimum performance from their students, while at the same time enhancing their students' self-efficacy.

Little research has been done comparing different forms of attributional feedback, and most of those studies have

used a similar paradigm (Schunk, 1982, 1984, 1986; Dweck & Repucci, 1973; Frieze & Snyder, 1980). Typically, subjects were given feedback on an individual basis by an unknown tester. In contrast, for the present study subjects were tested as a whole class. Most teachers in the public school system are faced with giving feedback to large groups of children. The second purpose of this study, therefore, was to test for differences in self-efficacy levels when students are given feedback at a more general level, as a large group, rather than individually as previously studied. Verbal attribution feedback was given to the students as a group before and after the test period.

The third purpose of this study was to test whether or not providing children with different types of attribution feedback would lead to children attributing that type of feedback to their success or failure on the task. Having the students acknowledge a particular type of feedback as being important would help to raise their self-efficacy level. For example, Schunk (1984) found that providing ability feedback for early successes leads to higher achievement.

Schunk (1983, 1986) also tested students to see if their self-efficacy level correlated with attributing success on a task to effort and/or ability. Those students with high

self-efficacy scores were expected to attribute their success to ability and/or effort and their failure to external causes, such as interference from others, or luck. Conversely, those students with low self-efficacy scores were expected to attribute their success to luck or ease of the task and their failure to internal causes, such as ability.

This study tested students who were enrolled in their fifth year of school. Most other research studies dealing with self-efficacy and attribution feedback have utilized subjects at the second or third grade levels (Miller, Brickman, & Bolen, 1975, Andrews & Debus, 1978, Schunk 1983, 1984a, 1984b, 1985). Previous studies have selected students who were initially lacking in a specific skill. The type of academic task used in this study involves memory recall of multiplication facts. Most other studies in this area have utilized a procedural type task (Schunk & Rice, 1986, Schunk 1982, 1983, Schunk & Hanon, 1985). Cognitive coding would be different for a recall task than a procedural task.

In using a slightly different research design than has previously been used, the results may have direct implications for the general classroom teacher.

REVIEW OF THE LITERATURE

Learned Helplessness

Learned helplessness can be defined and measured by its correlates: a) test anxiety; b) academic self-concept; c) attributions; d) motivation; e) persistence; and f) self-efficacy. Much of the research on learned helplessness stems from the early studies on fear conditioning in animals (Overmier and Seligman, 1967). Martin Seligman has been the dominant researcher and theorist in this area, and he has written on the nature, etiology and importance of the learned helpless paradigm (Seligman, 1973, 1974, 1975). Since 1978, Seligman has broadened his model from dealing only with animal behaviors to dealing with child development. The research on child development has been of interest to scholars in the education and performance field.

In research on learned helplessness in humans, factors which have influenced the level of learned helplessness are varied. These include: the types of attributions students make; their perseverance level on tasks; gender differences; feedback information; and performance strategies and self-statements.

Attributions for success and failure can be classified using Weiner's attributional theory of motivation (1979). Attributions may be classified within three dimensions: a) an internal/external dimension; b) a stable/unstable dimension; and c) a controllable/uncontrollable dimension. The typical classifications of Weiner's attributional theory of motivation are presented in Table 1. Ability is considered to be internal, stable, and uncontrollable. Effort is considered to be internal, generally stable, and controllable, while immediate effort is internal, unstable, and controllable. Physiological factors including mood, are generally unstable and uncontrollable. Task difficulty is external, stable, and uncontrollable and luck is external, unstable and uncontrollable. Classification of cause is subjective and may be perceived differently by individuals. An individual's attributional style is considered to be a function of cognitive development, beliefs, reinforcement history, past successes and achievement needs (Weiner, 1974).

To summarize Weiner's attributional model, internal attributions focus causality within the individual, whereas external attributions place causality within the environment. Stable factors are recurrent and usually long-lived, but unstable factors may be intermittent and short-lived.

Table 1: Causes of Success and Failure Classified According to Focus, Stability, and Controllability

Controllability	Internal		External	
	Stable	Unstable	Stable	Unstable
Uncontrollable	Ability	Mood	Task Difficulty	Luck
Controllable	Typical Effort	Immediate Effort	Teacher Bias	Unusual help from others

Note: From "A theory of motivation for some classroom experiences" by B. Weiner, 1979, Journal of Educational Psychology, 71.

Dweck and her co-workers have contributed much of the research on induced learned helplessness. Dweck and Repucci (1973) reported that children who persevered on tasks believed that their success was due to their own efforts, and they tried harder to succeed. Those children who tended to give up rather than to persist at a task attributed their failure to lack of ability. These same children tended to be more self-oriented than task oriented, negated their successes and overemphasized their failures. Sex differences in learned helpless behaviors were also found. Males generally attributed their success more to their ability and their failures to lack of effort, whereas females tended to attribute their successes to effort, luck and ease of the task and their failures to lack of ability (Dweck & Repucci, 1973; Nicholls, 1975). The sex and age of the child were also factors which influenced the kinds of causal attributions students made. Girls in the intermediate grades had more difficulty coping with the sudden onset of failure than did boys (Dweck, Goetz, & Strauss, 1980). Girls were more impaired by negative feedback from adult female evaluators, whereas boys were more impaired by negative feedback from male peer evaluators (Dweck & Bush, 1976). These findings suggest that both males and females are not responding in the same way to the

environment and that teachers do not treat males and females in the same way. Dweck (1975b) reported that females were given a specific pattern of negative feedback and males were given a generalized pattern of negative feedback. Thus, the regard for negative feedback is high for females, perhaps because of its specificity, and low for males, perhaps due to its generality.

Most of the studies on learned helplessness include elementary or college-age subjects. With regard to the dimensions of task content and type of methodology, most studies have involved achievement-type tasks with both behavioral and projective assessment methods. The tasks are usually non-competitive, and learned helplessness is often cited as being maladaptive in nature.

Different results were obtained in learned helplessness research when dependent variables were behavioral rather than projective (Levine, et al., 1976; Horner, 1968). Furthermore, when students were told that their responses were consistent or inconsistent with sex roles and their responses were expected rather than unexpected, the outcomes were different. Stake (1976) reported that, as the environmental norms or expectancies changed, differential results were obtained. This shows that the expectancies are contingent both on the situation and on the environment of

the experiment. Thus, low performance level or poor behavior are more of a reflection of the situation and expectancies than they are of general personality traits. Learned helplessness, thus, can be thought of as being situationally specific. The value of seeing results as dependent on the situation or within the control of the individual is of particular importance for changing performance or behavior.

Three interrelated areas deal with the nature of learned helplessness. These include motivation, cognition, and emotion. Most studies have used a test task requiring the development and use of cognitive-solving strategies. Although most of these studies have reported a deficit in performance in the test phase, several studies (Roth & Bootzin, 1974; Roth & Kubal, 1975) have reported performance increments following a learned helplessness training phase. No studies thus far have adequately separated motivational and cognitive components of learned helplessness (Miller & Norman, 1979). This leads researchers to believe that performance deficits that are defined as learned helplessness may have either a cognitive or a motivational basis, or they may result from the impairment of both processes.

In studies investigating the emotional aspects of learned helplessness (Miller & Seligman, 1975; Roth & Kubal, 1975), findings have shown that learned helplessness involves feelings of anxiety and depression. Miller and Seligman (1975) and Gatchel et al. (1975) administered the Multiple Affect Adjective Check List (Zuckerman, Lubin, & Robins, 1965) before and after exposure to contingent and noncontingent reinforcement. It was found that, after noncontingent reinforcement was received, there were increases in feelings of depression and anxiety. Two concerns of researchers in assessing learned helplessness are: a) the limited number of types of tasks used, i.e. cognitive-problem solving; and b) the relatively small degree of impairment found in human subjects (Miller & Norman, 1979).

Studies concerning the etiology of learned helplessness indicate that its development requires exposure to environmental conditions in which outcomes are independent of responses and are nondesired or aversive to the individual. Benson and Kennelly (1976) controlled for the amount and type of reinforcement given, and the results of their study showed that noncontingent positive reinforcement does not appear to produce learned helplessness. Their study provided evidence that both the type and the amount of

reinforcement directly influence the development of learned helplessness.

Task importance and instructional set along with attributions of performance are also important variables exerting a significant influence on the development of learned helplessness. Instructions given to students regarding response outcome contingencies have been shown to affect the development of learned helplessness (Glass & Singer, 1972; Hiroto, 1974). In a study by Hiroto (1974), those subjects who were found to be less helpless were given instructions that the onset of an aversive stimulus was contingent on their responses. Subjects who were told that the experimenter was controlling the aversive stimuli were more helpless. According to Glass and Singer (1972), instructions that responses do control outcomes produced a positive expectancy and no deficits in performance. Instructional set, in regard to reinforcement contingencies, seems, thus, to be an important variable for controlling learned helplessness. The development of learned helplessness has also been shown to be influenced by the instructions regarding the relative significance of the task. For example, Roth and Kubal (1975) found that the subjects' perception of the importance of the task can be manipulated by the experimental instructions.

Conclusions from learned helplessness studies need to be interpreted with some caution, however, as there are instrumental, methodological and interpretational concerns. For instance, Dweck and Repucci (1973) may not have observed the phenomenon of learned helplessness. The children were given a task on which they were expected to be successful, and this task was presented by the same experimenter with whom they had recently experienced failure. Operationally, in learned helplessness research, it appears necessary to separate testing and training by changing the experimenters, settings, and tasks in order to validate the study so as to draw generalized conclusions. It seems possible that the children in this study perceived noncontingency between response and outcome for the task only in conjunction with the failure experimenter. In an attempt to retrain students to use attributions in order to alleviate learned helplessness, Dweck (1975a) employed a intermittent stimulus response schedule and interspersed success and failure during retraining. Performance differences, therefore, may not necessarily be attributed to the attribution retraining, but they may be confounded by the reinforcement schedule.

The instrumentation used by Dweck (1975a) is also questionable in its appropriateness. Dweck (1975a) used a

5-item unvalidated effort/ability scale to measure changes in attributions after intervention. In other studies (Diener & Dweck, 1978; Dweck, 1975a; Dweck & Repucci, 1973), Dweck used all or part of the Crandall's Intellectual Achievement Responsibility Questionnaire (IAR) (Crandall, Katkowsky, and Crandall, 1965). The IAR has a forced choice format. The student has a choice between internal and external responses for each item, and there is no differentiation between effort and ability attributions. Dweck (1975a) emphasized the difficulty in assessing the weight a student places on these two factors. Furthermore, because of the forced choice format, Dweck's attempt to apply a scoring distinction between effort and ability is questionable. Dweck scored only those items which implicate effort, and this again is questionable because of the forced choice format.

Other researchers (Andrews & Debus, 1978) have found a weak relationship between students' responses on the IAR scale and their level of persistence. Andrews & Debus (1978) and Tollefson et al. (1982) have questioned the validity of the IAR because of the differences between responses on the IAR and observed, verbal performance on a task. There is also a question of instrument and sample bias on the IAR (Loper & Reeve, 1983); these researchers

questioned the results they obtained with learning disabled students' responses on the test.

In conclusion, learned helplessness appears to be a multidimensional construct that is mediated by a number of variables: a) amount of exposure to the task; b) instructions concerning contingency; c) task importance; and d) attributions. The interaction of these variables has generally been ignored. A lack of replication, difficulties in instrumentation (i.e. IAR; Norwicks-Strickland; and Bailer-Cromwell scales), populations, and methodology (forced choice questionnaires; interviews; post performance assessments; failure manipulations), compounded by a tendency for some researchers either to overgeneralize their findings or to accept uncritically questionable research findings all tend to complicate the problem of identifying helplessness in humans.

Self-Efficacy

According to Bandura's theory of self-efficacy (Bandura, 1977, 1981, 1982), different treatments may change a person's behavior by either creating and/or strengthening percepts of self-efficacy. Perceived self-efficacy is concerned with the judgements of one's capability to perform a specific activity. In this view perceived self-efficacy

affects the choice of activities, effort expended, persistence, and task accomplishments. People acquire information about their self-efficacy from their actual performances, by vicarious experiences, through verbal persuasion, and from physiological indexes (Schunk & Rice, 1986). Although actual performances provide the most reliable efficacy information, efficacy judgements are not mere reflections of those performances. Efficacy appraisal is an inferential process that involves many factors. These factors include: self-perceptions of ability; task difficulty; effort expended; amount of external aid received; situational circumstances under which the performances occurred; and temporal patterns of successes and failures (Bandura, 1977).

Self-Efficacy and Attributional Feedback

Self-efficacy is hypothesized to be affected by attributions or perceived causes of outcomes (Bandura, 1977; Schunk, 1984). Attributions are an important source of efficacy information and influence performance primarily through their intervening effects on efficacy expectations. Attributional theorists of behavior (Heider, 1958; Kelley, 1967; Kelley & Michela, 1980) hypothesize that individuals state causes for the outcomes of their actions in

achievement contexts. Students often believe that their successes and failures are due to such attributions as ability, effort, task difficulty, and/or luck (Frieze, 1980; Weiner, 1979, 1983). Future performance expectancies (i.e. self-efficacy) depend in part upon ascriptions for prior outcomes (Weiner, 1977, 1979; McMahan, 1973). If a student believes that the conditions surrounding the task will remain much the same, attributions to stable causes, such as ability or task difficulty, should result in expecting similar outcomes in the future. When the student makes attributions to more unstable causes, such as effort or luck, then the future expectancies would be shifting (Frieze, 1980; Weiner, 1979). Children often attribute successes to ability and effort (Frieze, 1980; Frieze & Bar Tal, 1980; Frieze & Snyder, 1980). Young children, until about age nine, view effort as the prime cause of outcomes and view ability as closely related to effort. At approximately age nine they begin to conceptualize the difference between ability and effort (Nicholls, 1978). According to Kun (1977) and Surber (1980), children in the third grade use inverse compensation in judging effort from ability inferring less effort is needed as ability level increases. This research conflicts with the results of other studies (Schunk, 1984; and Schunk, 1986). The

students in these studies lacked skills and, realistically, had to expend some effort during training. As such, their actual efforts led to effort attributions regardless of the type of feedback they received. In contrast, children in the Kun (1977) and Surber (1980) studies made attributional judgements of hypothetical persons. Students in the third grade occasionally used inverse compensation in judging ability from effort information (Surber, 1980). Ability attributions become increasingly important with development, and effort attributions tend to decline in importance (Nicholls, 1978, 1979). In the self-efficacy model, attribution feedback constitutes a persuasive means of conveying efficacy information.

Providing feedback was expected to increase self-efficacy and skills compared with not providing attributional feedback (Schunk, 1984). Studies have been done in an attempt to modify children's achievement behavior by providing effort and ability feedback information (Andrews & Debus, 1978; Chapin & Dyck, 1976; Dweck, 1975a; Medway & Venino, 1982; Schunk, 1982, 1984, 1986). Because effort is personally controllable, ascribing past failures to not enough effort should have motivational effects, lead children to increase their performance level, and persist longer on a given task (Schunk, 1983). Dweck (1975a) in

support of this concept had learned helpless children solve arithmetic problems over a series of trials. One group of children always succeeded, and another group of children occasionally failed in solving a criterion number of problems. The failing students were given effort attribution feedback by being told they should have tried harder. The results showed that students who had received the effort feedback either improved or maintained their performances following failure, whereas the performances of children who had always succeeded and were suddenly faced with failure had performance deficits. In contrast to Dweck (1975a) and Schunk (1983) and a number of other investigators who have called for attribution retraining for helpless and learning disabled children (Chapin & Dyck, 1976; Diener & Dweck, 1978; Dweck, 1975), studies have been done which bring into question the efficacy of suggesting that children be taught to attribute failure to effort (Jacobsen, Lowery, & DuCette, 1986a, 1986b). Jacobsen et al. (1986) believed that the recommendation to emphasize effort attributions for failure must always be qualified, because too great an assumption of personal responsibility for failure is characteristic of depression. Jacobsen et al. (1986) studied learning disabled subjects who had more doubts about their ability than did their normal achieving

counterparts. Because these children did not have the ability necessary to complete the task, attributing failure to lack of effort had an averse effect. They recommended that attribution retraining of learning disabled children should occur only after study of their present attributions in real-life situations.

The effects of providing ability attribution feedback for successes has also been researched (Schunk, 1983, 1984; Schunk & Rice, 1986; Miller, Brickman & Bolen, 1975). This type of feedback also has motivational effects on achievement behavior, in that children who attributed their past successes to high ability would expect to be successful in the future and perform at a high level. Miller et al. (1975) gave children attribution or persuasive feedback on their arithmetic assignments. Students in the attribution group received either ability or effort feedback. Results showed that both forms of attribution feedback were significantly more effective than was the persuasive conditions in increasing performance. The two attribution conditions, however, did not differ significantly from one another in their effect on performance outcomes.

Miller et al. (1975) included ability and effort feedback treatments, but they did not assess children's self-efficacy levels. Miller (1975) also used second graders, and as

Nicholls (1978) has shown, children at this age cannot differentiate between ability and effort.

Although attributional feedback is viewed as an influential variable in terms of achievement behavior, there is little research comparing the effects of different types of feedback on self-efficacy and skills (Schunk, 1983). Self-efficacy is theoretically a crucial link between changing children's behavior and the type of attributional feedback they receive. In contrast to Miller et al. (1975), who measured attributional feedback on performance outcome, Schunk (1983) found that ability feedback promoted self-efficacy and achievement more than did effort feedback once children began to form a distinct conception of ability. Schunk (1982, 1983, 1984) also found that providing ability attributional feedback for successful problem solving resulted in significantly higher levels of both arithmetic skill and self-efficacy than did either the effort or no feedback conditions. Similar results were found using subject areas other than math. Children with comprehension deficiencies participated in a training program that included instruction and practise in identifying important ideas (Schunk & Rice, 1986). Schunk and Rice (1986) investigated the importance of sequencing ability and effort attributional feedback over an extended

period. They divided their testing/training design into halves. Children received either all effort feedback, all ability feedback, both effort and ability feedback with ability followed by effort, or both effort and ability feedback with effort followed by ability. These researchers found that children who received ability feedback during the second half of their training (i.e. ability/ability group and effort/ability group) developed higher ability attributions and self-efficacy than did other groups. Furthermore, skill development was not affected by the sequence of attributional feedback. These findings were in contrast to other findings (Schunk, 1984). In the 1984 study, it was found that children who received ability feedback during the first half of training (ability/ability versus ability/effort) developed higher ability attributions, self-efficacy, and skill in subtraction, than did subjects in the effort/ability and effort/effort conditions. The duration of attributional feedback is an important experimental variable and needs to be researched further in order for the effects of sequential feedback to be fully understood.

Combining ability and effort feedback apparently does not promote self-efficacy in an additive fashion (Schunk, 1984). Children discounted the ability information in favor of

effort. The subjects Schunk (1984) used were able to differentiate ability from effort. They may have questioned their level of ability somewhat because of the effort feedback and thereby felt less efficacious than children receiving only ability feedback.

Rationale For The Study

Teachers in the general classroom are on numerous occasions over the course of a day giving feedback to children, in order to increase their performance skill and level of self-efficacy. The rationale for this study is to give classroom teachers some direction as to which type of attribution feedback is more effective. Taking into account the factors such as, age of the child, ability of the child, environmental conditions, and difficulty of the task, teachers should be better equipped to enhance the performance level of their students. It may not always be true that ability feedback is the most effective type of feedback. Effort feedback may be more appropriate in a situation either where the task is difficult and/or novel or during the early stages of skill acquisition. It seems that, when the task becomes more intermediate in difficulty, ability feedback becomes more appropriate in raising the student's self-efficacy level. The instruction level of learning is generally the level where the classroom teachers set their own objectives, and appropriate feedback can be instrumental in raising the children's self-efficacy level and achievement performance.

All too often students are given alternate types of feedback by their teacher simply because educators may be

unaware of the impact that differential types of attribution feedback can have. Apparently, the student who receives general feedback on a particular task does not always benefit from the feedback given. Appropriate specific feedback seems necessary in order for children to utilize it in a positive way, such as enhancing their self-efficacy.

Definitions

self-efficacy - Self-efficacy is self judgements of one's performance capabilities in specific situations that may contain ambiguous, unpredictable and stressful features.

learned helplessness - Learned helplessness can be defined as an attitude children have because they believe that outcomes occur independently of how they behave. Children believe that their behavior has little impact on outcomes.

attributions - Attributions are causal explanations students use to explain success and failure in achievement outcomes.

inverse compensation - Inverse compensation occurs when children infer less effort is needed as ability increases.

outcome expectation - An outcome expectation is a person's estimate that a given behavior will lead to certain outcomes.

efficacy expectation - An efficacy expectation is the conviction that one can successfully execute the behavior required to produce the outcome.

outcome expectation vs. efficacy expectation - Outcome and efficacy expectations are differentiated because individuals can believe that a particular course of action will produce certain outcomes, but question whether they can perform those actions.

STATEMENT OF RESEARCH QUESTIONS

1. Is the recall of multiplication facts by fifth grade students affected over a five day period by differential attribution feedback?
2. Is the self-efficacy of fifth grade students affected over a five day period by differential attribution feedback on a recall of multiplication facts grid?
3. Does the feedback attribution of ability enhance the self-efficacy level of a grade five student more than does the feedback attribution of effort?
4. Does feedback attributing success to effort or ability influence the grade five students level of self-efficacy more than no attribution feedback?
5. Does feedback with a whole class of grade five students have the same effect as individual feedback, as previous research supports?
6. Do students who are given attribution feedback of a) effort or b) ability attribute their success to the type of feedback they receive?
7. Does a class of students with a high self-efficacy level attribute their success on a task to ability, effort, luck or task ease?

8. Does a class of students with a low self-efficacy level attribute their success on a task to ability, effort, luck, or task ease?

METHOD

Subjects and Setting

The sample used for this study consisted of four grade five classes of students of School District #62, Sooke, British Columbia. The total square land area of Sooke (including; Jordon River, Port Renfrew, and East Sooke) is 1486.9 square kilometers, unemployment is high, and the adult population of this area could be described as blue or white collar workers. The people live in rented or self-owned, detached homes. A small proportion of the population lives in apartments or duplexes. The Sooke area has its roots in logging, fishing and agriculture. The community business and personal service industry is also a high employment area.

Of the 98,000 people who live within the Sooke School District boundaries, there are 7,604 enrolled in school. Four high schools enroll 2,968 students, and the nineteen elementary schools combined enroll 4,636 students. For this study four grade five class were chosen to participate. The four classes were matched as closely as possible for general math ability and demographic similarity. Once the particular

classes had been identified, letters of consent briefly outlining the study were sent home to parents (see Appendix 1).

Instrumentation

Self-efficacy Judgements

To test for self-efficacy, children's judgements for solving a multiplication grid were measured. The self-efficacy scale ranged from 1-10 unit intervals from high uncertainty (1), through intermediate values (5-6), to complete certitude (10) (see Appendix 2).

Mathematical Ability

General Math Ability.

The Canadian Test Of Basic Skills (Form 3M - Test M-1: Mathematics Concepts, and Test M-2: Mathematics Problem Solving), was used to assess general math ability.

Recall of Multiplication Facts.

Six teacher made recall of multiplication facts grids were used to measure the students level of math recall (see Appendix 3). The grids were equal in difficulty, and they each contained recall of multiplication facts from the one to the eleven times table. Each of the recall grids was of

moderate difficulty for average ability children of this age group.

Attributions/Locus of Control

The Multidimensional - Multiattributitional Causality Scale, (MMCS) developed by Lefcourt, Van Baeyer, Ware, and Cox (1979), was adapted for use in the present study to measure locus of control and attributions (see Appendix 4). The scale consists of 24 likert-type items with 50% success and 50% failure items. There are four attribution choices within these items. They include: a) six stable internal items focusing on ability; b) six unstable internal items focusing on effort; c) six stable external items focusing on context or environment; and d) six unstable external items focusing on chance or luck factors. Each group of six items was divided into three success and three failure items. Each item was scored on a scale from one to four, in the following manner:

1 = Not true for me

2 = Sometimes true for me

3 = Usually true for me

4 = True for me

The difference between sometimes and usually was clearly defined for the students, in order to avoid confusion between these two choices.

Attribution Assessment

Four scales designed by Schunk and Rice (1984) were adapted for use in this study. Each attribution (ability, effort, task difficulty, or luck) had a score ranging from 1 (nothing to do with my score) to 10 (a whole lot to do with my score). The four scales were labelled (see Appendix 5):

1. good at it (ability);
2. worked hard (effort);
3. easy questions (task difficulty);
4. lucky (luck).

Procedures

Pretest

General Mathematical Ability. The math ability of each student in each of the four classes was assessed using the Canadian Test of Basic Skills, Sections M-1 and M-2. This test is a standardized measurement commonly used in the schools to assess students math ability at the beginning of each grade level. This test was administered, using standardized instructions, to each of the four classes.

Attribution/Locus of Control. Each class was administered the Multidimensional-Multiattributinal Causality Scale (MMCS) by the researcher, and the directions were standardized for all administrations.

Recall of Facts Grid. A brief demonstration was given to show how the grid should be filled out. The grid was similar in form and content to the training grid used. The recall pretest with a time limit of three minutes was administered and included 100 questions ranging from very easy to very difficult. It was expected that no student would complete all the questions in the amount of time given.

Self-Efficacy. Following completion of the pretest, children judged their overall capability to solve multiplication facts. Students were given the self-efficacy

scale as a whole class, but they made their judgements privately by circling an efficacy level from 1 - 10.

Training Procedure

Following the pretests of achievement and CTBS, each class was randomly assigned to one of three treatment groups distinguished by differential attribution feedback. Each class of students was tested for five consecutive days. Class 1, the control class, received no feedback. Class 2 received effort feedback, and Classes 3 and 4 received ability feedback. Feedback was linked with both past and future successes. Periodic attributional feedback was given four times per session, once in written form, twice verbally before the students began working on the grid, and once verbally after the grid was completed. A total of 20 feedback statements were made. Children in Classes 3 and 4, the ability group, received feedback such as: 'You're good at this', and 'This class really knows its math facts'. Children in Class 2, the effort group, received feedback such as: 'You've been working really hard', 'Keep trying', and 'This class puts forth a lot of effort'. The written feedback was given on an individual basis, and the verbal feedback was directed at the class as a group. Written feedback included comments such as; 'You know these facts really well' for Class 3 and 4 students; and 'Keep trying',

'You're working really hard' for Class 2 students. Following feedback from the previous day's task (on Day 2 students received feedback from their pretest), students circled a score from 1 - 10 on the self-efficacy scale to judge their competency level for the current days task and were given another recall of multiplication facts grid to complete. Students were not permitted to change their efficacy score after completion of the multiplication grid.

Students Attributions for their Progress. On the sixth day, students' attributions for their progress during training were assessed. On a separate piece of paper, four scales were presented, each ranging in intervals from 1 - 10. The four scales were labelled: a) good at it; b) worked hard; c) easy; and d) lucky. The researcher explained to the students the four scales. Students were asked both to think about their work in the previous five training sessions and to mark how much they felt each factor helped them recall facts. Students then recorded their ratings on each of the four scales. No attribution feedback was given immediately prior to this assessment.

Posttest

The posttest was administered on the sixth day. The self-efficacy judgements, recall of facts grid, and procedures were the same as the pretest. In each of the three classes the researcher administered all of the tests and scales. A summary of daily procedures is presented in Table 2.

Pilot Study

A pilot study was conducted to determine any difficulties in the procedure and scales being used. A class of 28 students was chosen and divided into three groups. These groups were homogeneous in math ability. Males and females were split equally between groups. Group A consisted of nine children who received ability feedback, Group B consisted of ten children who received effort feedback, and Group C consisted of nine children who received no feedback.

Because of this study, the time limit for the math multiplication grid was increased from two minutes to three minutes and the twelve times table facts were not included.

Table 2: Summary of Daily Activities

Day	Activity
PRETEST	
1	CTBS - Section 1 was administered
2	CTBS - Section 2 was administered
3	a) Pretest for Attributions b) Pretest for Recall of Multiplication Facts
4	a) Self-Efficacy score circled - Grid 2
TREATMENT	
	b) Feedback given on Pretest for Multiplication c) Multiplication Grid 2 - administered
5	a) Feedback given for Multiplication - Grid 2 b) Self-Efficacy score circled - Grid 3 c) Multiplication Grid 3 - administered
6	a) Feedback given for Multiplication - Grid 3 b) Self-Efficacy score circled - Grid 4 c) Multiplication Grid 4 - administered
7	a) Feedback given for Multiplication - Grid 4 b) Self-Efficacy score circled - Grid 5 c) Multiplication Grid 5 - administered
POSTTEST	
8	a) Posttest for attributions administered b) Feedback given for Multiplication - Grid 5 c) Self-Efficacy score circled d) Multiplication Grid 6 - administered

RESULTS

The results will be analyzed as they reflect performance on a) the Canadian Test of Basic Skills (CTBS), b) multiplication achievement tasks, c) self-efficacy scales, and d) performance on pretest and posttest attribution scales.

Canadian Test Of Basic Skills (CTBS)

The mean performance scores and standard deviations for Sections 1 and 2, on the CTBS for the four classes of students, are presented in Table 3 and illustrated in Figure 1. The mean scores and standard deviations for the four classes, by gender, are presented in Table 4 and illustrated in Figure 2.

A multivariate analysis of variance (MANOVA) for overall results was conducted. No significant difference was found in the sex by group interaction, ($p > .05$). The Wilk's Lambda criterion showed a significant group difference, $F(6,188) = 4.4$, $p < .01$. A significant gender difference was also found, $F(2,94) = 7.7$, $p < .001$, females scoring slightly higher than did males in both of the tests across groups.

To determine which groups differed significantly, Tukey's Test was used for each Section. Section 1 (Mathematical Concepts), Class 3 (ability) scored significantly higher than did Class 4 (ability). No significant difference was found between any other classes, $p > .05$. For Section 2 (Problem Solving), both Class 3 (ability) and Class 1 (control) scored significantly higher than Class 4 (ability). The general math ability of Class 4 (ability), as measured by the CTBS, appeared to be very low. Otherwise, the mathematical abilities of the groups appeared to be homogeneous on this pretest measure.

Table 3: Group Mean Performance Scores and Standard Deviations on Sections 1 and 2 of the Canadian Test of Basic Skills (Classes, 1, 2, 3, and 4)

Canadian Test of Basic Skills				
Class	Section 1		Section 2	
	M	SD	M	SD
1	18.07	5.7	14.60	5.2
2	17.68	9.4	12.42	5.0
3	21.36	6.0	14.04	5.2
4	14.04	5.1	9.05	3.2

Figure 1: Group Mean Performance Scores on Sections 1 and 2 of The Canadian Test of Basic Skills (Classes 1, 2, 3, and 4)

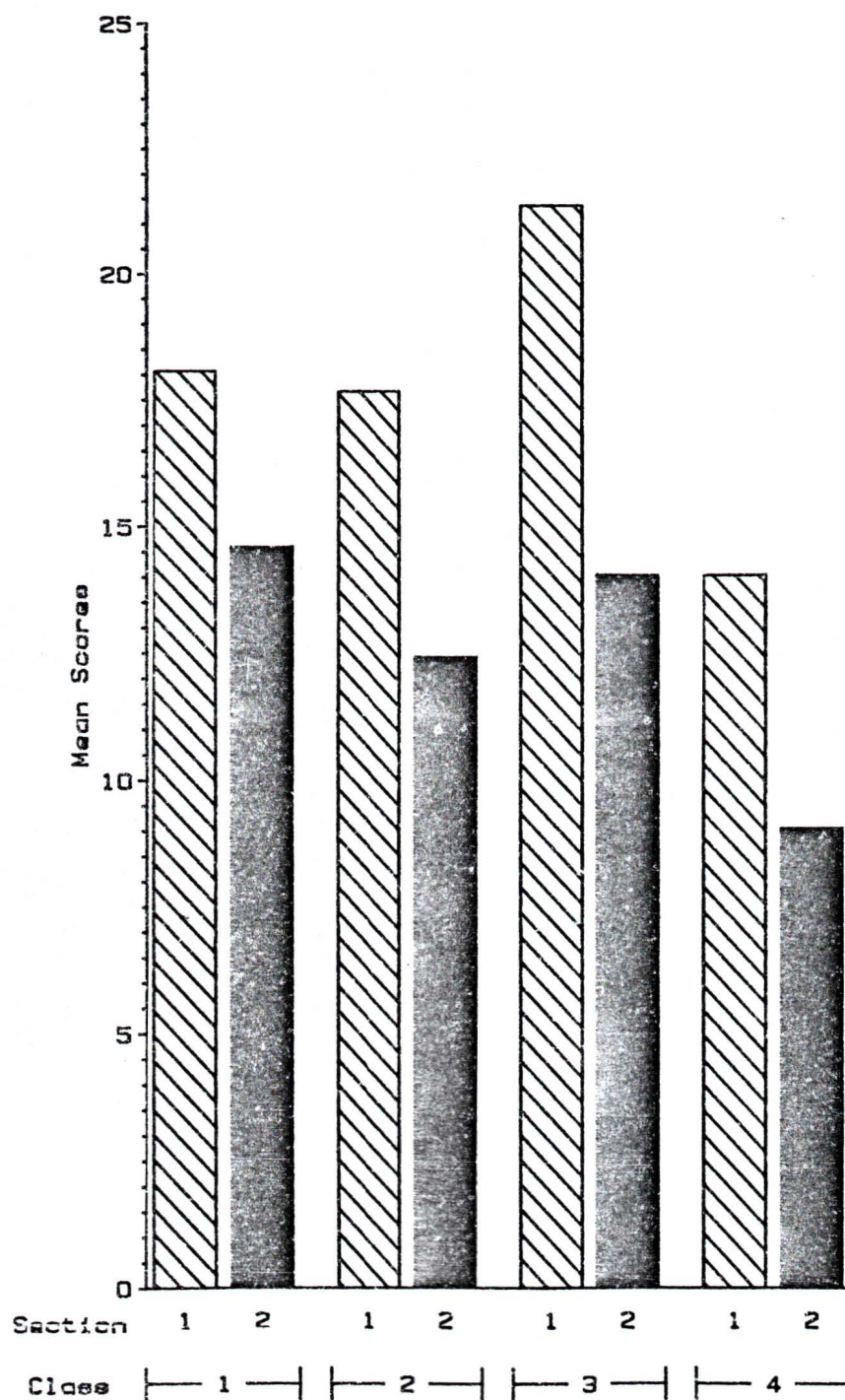


Table 4: Group Mean Performance Scores and Standard Deviations by Sex on Sections 1 and 2 of The Canadian Test of Basic Skills (Classes 1, 2, 3 and 4)

Canadian Test of Basic Skills				

	Section 1		Section 2	
	M	SD	M	SD
	-	--	-	--

Class 1				

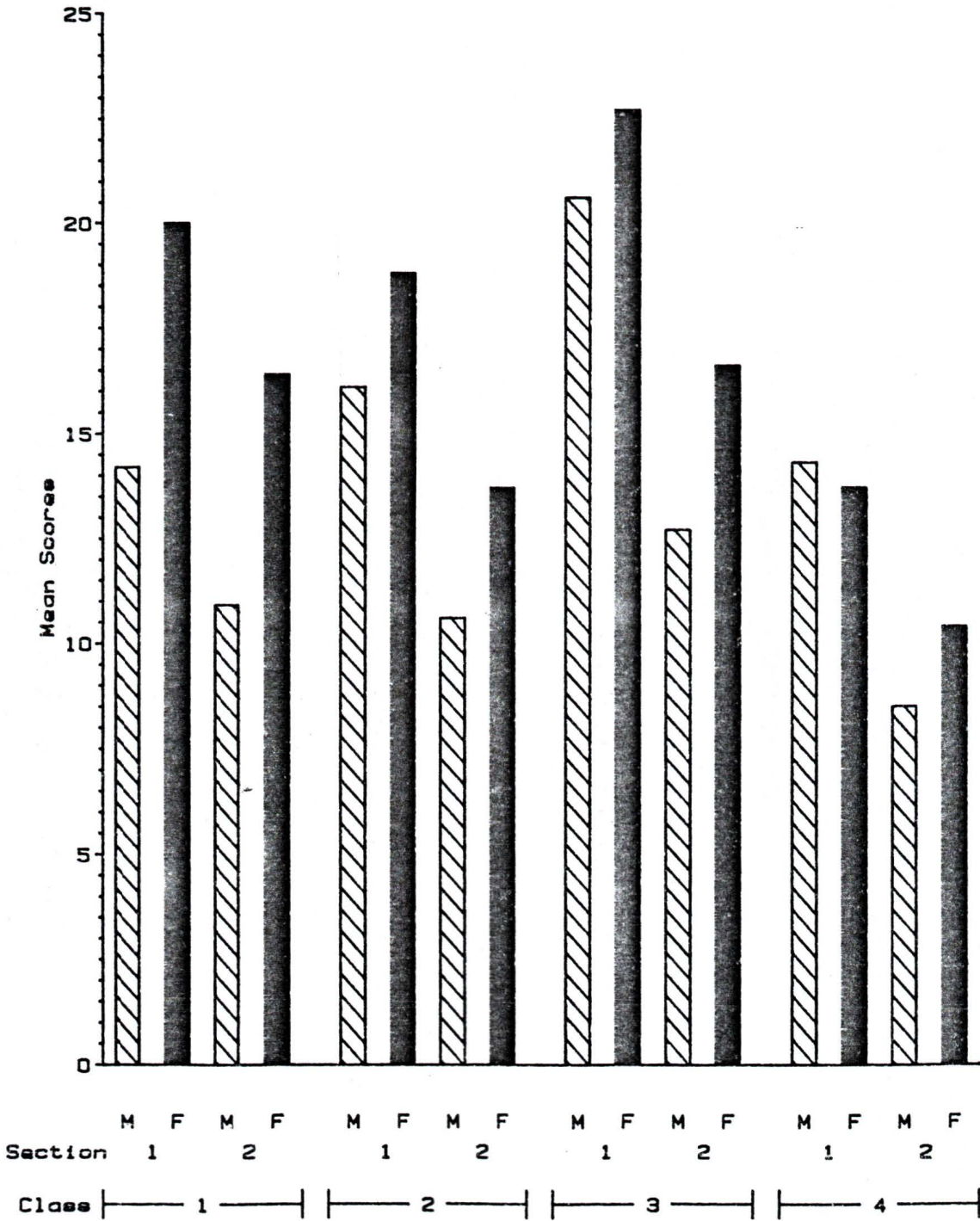
Male	14.2	4.0	10.9	3.1
Female	20.0	5.5	16.4	5.1
Class 2				

Male	16.1	12.0	10.6	5.0
Female	18.8	7.5	13.7	4.7
Class 3				

Male	20.6	5.0	12.7	4.6
Female	22.7	7.8	16.6	5.5
Class 4				

Male	14.3	6.0	8.5	2.7
Female	13.7	4.3	10.4	3.4

Figure 2: Group Mean Performance Scores by Sex on Sections 1 and 2 of the Canadian Test of Basic Skills (Classes 1, 2, 3, and 4)



Performance on Multiplication Achievement Tasks

The mean scores and standard deviations for each class on the pretest and posttest for multiplication achievement are presented in Table 5 and graphed across treatments in Figure 3. Mean multiplication scores by sex are presented in Table 6 and graphed across treatments for sex and groups in Figure 4.

In a Repeated Measures Design using a multivariate analysis of variance (MANOVA), overall results were obtained. The Wilk's Lambda criterion showed a significant group by time interaction, indicating that some classes change differentially over each of the tests, $F(5,251) = 3.45$, $p < .001$. A significant difference was found in measuring the effect of time, $F(5,91) = 75.4$, $p < .001$; the total sample changed their scores significantly from pretest to posttest. Also, a significant group difference was assessed, $F(3,95) = 14.1$, $p < .001$; overall there was a significant difference between each class. A significant gender difference was found, $F(1,95) = 16.6$, $p < .001$, the females scoring higher than did the males across all tests. There was no significant sex by group interaction. On the achievement tasks, females obtained higher scores than did the males for all groups. No significant interaction effect was found among sex with either the group or time factor.

The sexes in each class over time varied in the same way, and the males and females remained parallel in achievement. The sex by time by group effect was non-significant (see Appendix 6).

To explore the group by time interaction effect, a one-way ANOVA was run at each time level with pair wise comparisons of groups using Tukey's Test. Comparing pretest and posttest achievement for the four classes, it can be seen that Classes 1 (control) and 3 (ability) scored significantly higher than did Classes 2 (effort) and 4 (ability) on the pretest. On the posttest, however, Class 4 (ability) showed a marked increase in its performance level and was no longer significantly different from Classes 1 (control) and 3 (ability). Furthermore, Class 2 (effort) still maintained a significantly lower score than did Class 3 (ability). A treatment effect is, thus, indicated.

Specifically, Classes 1 (control) and 3 (ability) scored significantly higher than did Classes 2 (effort) and 4 (ability) on the first four tests. On test five, only Class 4 (ability) was significantly lower than the other three classes, even though the score for this class continued to increase. On the posttest achievement measure, no significant differences existed between Class 4 (ability) and the other three classes, but Class 2 (effort) scored

significantly lower than did Class 3 (ability) (see Figure 3).

Scattergrams and Pearson Product Moment Correlation Coefficients were used to assess the degree of association between the pretest for achievement and the posttest for achievement for each of the four classes. Significant correlations were found for Classes 1 (control), 3 (ability) and 4 (ability). For Class 1 (control) the correlation was .61, ($p < .001$), indicating 37% variance in common. For Class 3 (ability) the correlation was .48, ($p < .004$), indicating 23% variance in common, and for Class 4 (ability), the correlation was .55, ($p < .002$), indicating 30% variance in common. Each of these three classes has a higher degree of association than Class 2 (effort) which had a correlation of .22, ($p < .17$), indicating 4% variance in common. The correlation coefficient for Class 2 (effort) was not significant. Observation of the scattergram shows the random association of scores for this class on this measure. Observing the scattergrams for the three classes with significant correlations, it can be seen that, generally, students who had a low pretest achievement score had an average posttest achievement score. In turn, those students with an average pretest score increased their performance to a high level on the posttest. Overall, the pretest and

posttest achievement scores for Classes 1, 3, and 4, correlated significantly. Class 3, however, showed a non significant correlation.

Table 5: Group Mean Pretest and Posttest Scores and Standard Deviations on the Math Multiplication Grids (Classes 1, 2, 3, and 4)

Class	Pretest		Posttest	
	M	SD	M	SD
1	44.9	17.5	56.0	13.5
2	26.6	12.7	48.7	12.3
3	41.0	12.5	59.2	14.6
4	25.6	15.2	51.2	11.0

Figure 3: Group Mean Scores on the Math Multiplication Grids (Classes 1, 2, 3, and 4)

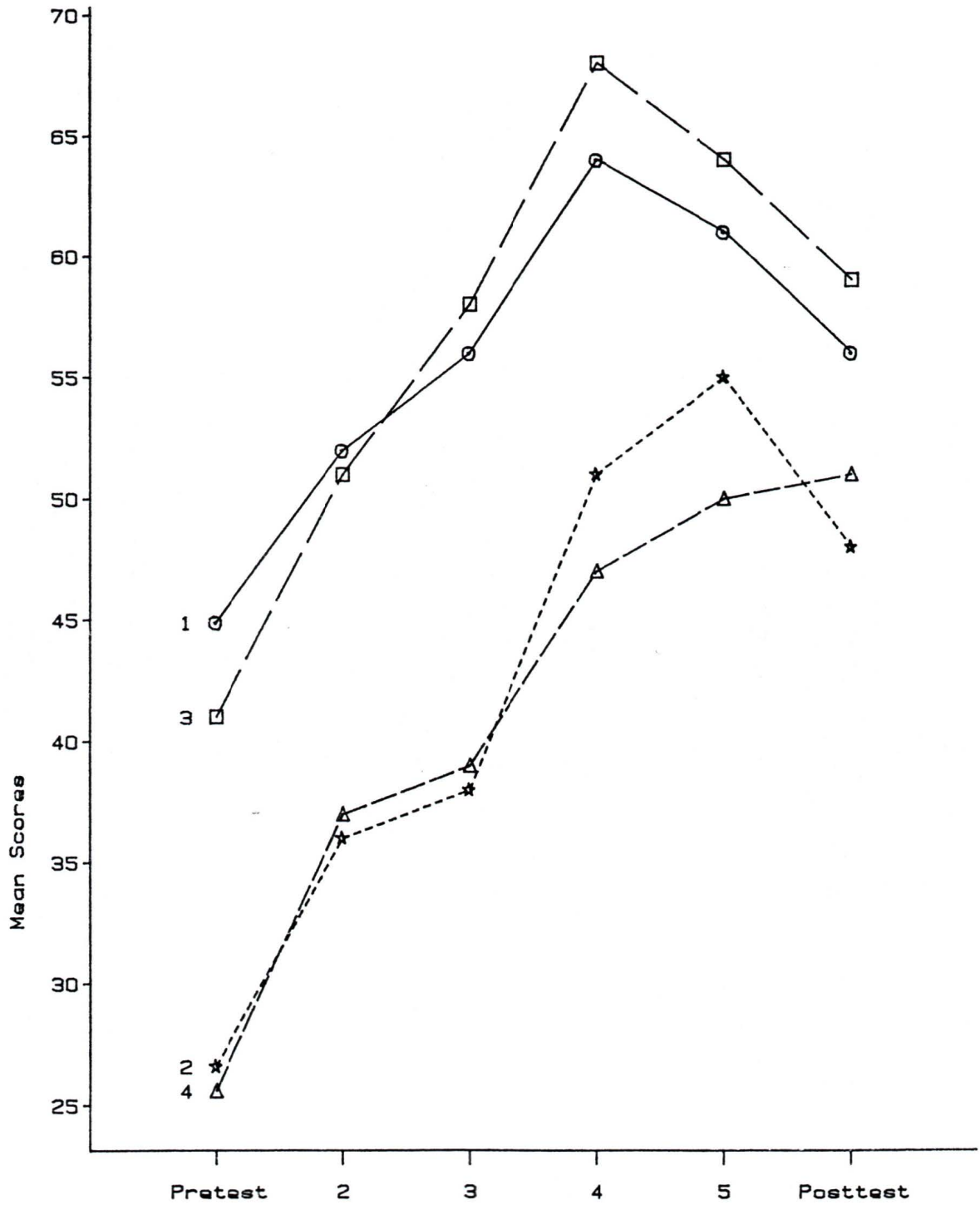


Table 6: Group Mean Pretest and Posttest Scores and Standard Deviations by Sex on the Math Multiplication Grids (Classes 1, 2, 3, and 4)

	Pretest		Posttest	
	M	SD	M	SD

Class 1				

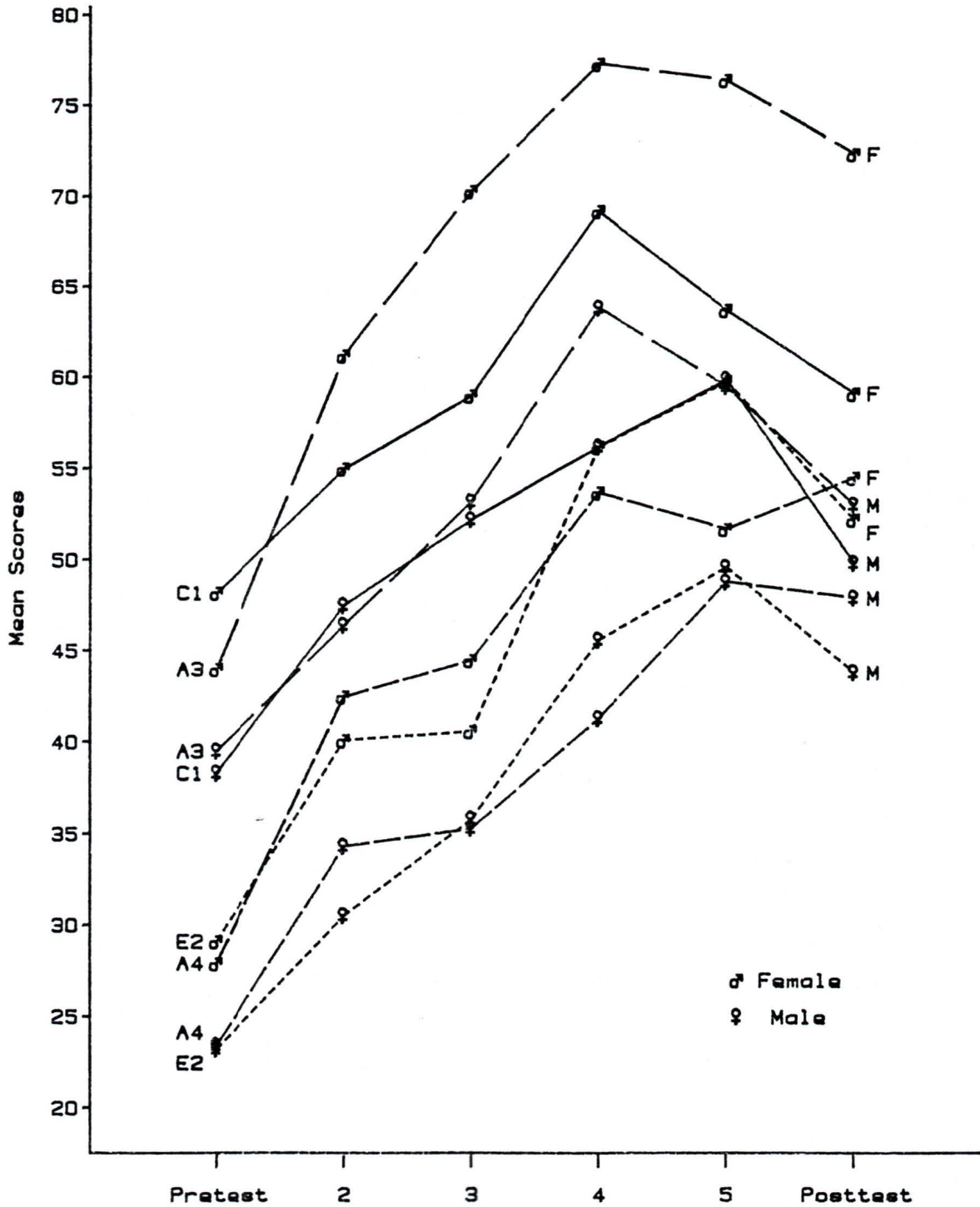
Male	38.3	22.3	49.8	13.6
Female	48.2	14.1	59.1	12.7
Class 2				

Male	23.2	15.0	43.8	17.0
Female	29.1	10.8	52.2	6.1
Class 3				

Male	39.5	13.0	53.0	9.7
Female	44.0	11.5	72.3	15.0
Class 4				

Male	23.4	13.0	47.9	9.9
Female	27.9	17.5	54.5	11.4

Figure 4: Group Mean Scores by Sex on the Math Multiplication Grids (Classes 1, 2, 3, and 4)



Self-Efficacy

The mean scores and standard deviations for the pretest and posttest self-efficacy measure are presented in Table 7 and illustrated across treatments in Figure 5.

A MANOVA using a Repeated Measures Design was conducted to test differences between differential rates of self-efficacy according to feedback given by the tester. The total results of multivariate tests of the effects of sex, group, and time on self-efficacy appear in Appendix 7. For the self-efficacy variable there were neither significant overall differences between males and females nor significant differences between gender by group or time. No interaction between gender by group was found. There was no significant sex by group by time interaction. Significant group differences were found, $F(3,95) = 2.8$, $p < .04$. Overall, the four classes differed in their responses to this measure. A significant difference was also found in measuring the effect of time, $F(4,92) = 15.2$, $p < .001$. The total sample of students differed in their response from the pretest to the posttest in self-efficacy. The Wilk's Lambda criterion showed a significant group by time interaction indicating that some classes changed differentially over each of the tests, $F(12,243) = 4.3$, $p < .001$, (see Figure 5).

Pair wise comparisons of groups using Tukey's Test were done at each time level. Overall differences existed between pretest and posttest scores for the four classes tested. The two ability classes (3 and 4) showed marked increases over the five tests administered. In contrast, Classes 1 (control) and 3 (effort) did not show significant improvement in their self-efficacy scores. On the pretest, Class 4 scored significantly lower than did the other three classes, yet, on the posttest, the two ability classes (3 and 4) scored significantly higher than did Class 2 (effort). Class 4 (ability) also scored significantly higher than did Class 1 (control) (see Figure 3). The differential response pattern of these four groups clearly indicates a treatment effect is taking place.

Scattergrams and Pearson Correlation coefficients were used to investigate the relationships between pretest self-efficacy and posttest self-efficacy scores for each group. Class 1 (control) and Class 2 (effort) both showed significant correlations between the pretest and posttest measures, $r(30) = .52$, $p < .001$, ($r^2 = 27\%$), and $r(19) = .51$, $p < .01$, ($r^2 = 6\%$), respectively. Upon examination of the scattergrams, it can be seen that most scores varied small amounts between pretest and posttest treatments. Both ability Classes 3 and 4 showed a low correlation, $r(28) =$

.29, $p < .06$, ($r^2 = 8\%$), and $r(26) = .22$, $p < .13$, ($r^2 = 4\%$), respectively. It can be seen from the scattergrams for these groups that the low correlations for Classes 3 (ability) and 4 (ability) may be attributed to the fact that those students who scored low in the pretest scored average to high in the posttest, indicating a treatment effect was taking place. Consequently, for Classes 1 (control) and 2 (effort), the student's self-efficacy level did not change significantly over time. This result may be attributed to the type of feedback these two groups were receiving.

Self-Efficacy and Achievement

Scattergrams and correlational analyses were also used to assess the relationships between the two dependent variables. Pearson Product correlations were computed using the pretest for self-efficacy and the pretest for achievement. Classes 1, 3, and 4, showed significant correlations. For Class 1 (control) the correlation was .43, $p < .008$, indicating 18% variance in common. For Class 3 (ability) the correlation was .47, $p < .005$, indicating 22% variance in common, and for Class 4 (ability) the correlation was .61, $p < .001$, indicating 37% variance in common. It appears from these results, that these three classes may have been more capable than Class 2 (effort) of

judging their self-efficacy in relation to this specific task. Class 2 (effort) showed a low, non significant correlation, $r(19) = .01$, $p < .48$, ($r^2 = 1\%$).

The posttest of self-efficacy was also correlated with the posttest of achievement. The correlations for these two measures were found to be significant for all four classes. For Class 1 (control), the correlation was .67 ($p < .001$) with 45% variance in common. For Class 2 (effort), the correlation was .52, $p < .01$, indicating 27% variance in common, and for Class 3 (ability), the correlation was .52, $p < .002$, with 27% variance in common. Those students who scored low on the posttest for achievement changed their scores only moderately on the self-efficacy posttest. Some of the students who scored high on the posttest for achievement did not change their efficacy scores significantly over time. Class 4 (ability) showed a low correlation between posttest self-efficacy scores and posttest achievement scores, $r(26) = .34$, $p < .04$, ($r^2 = 13\%$). Examining the scattergrams for this group, it appears that those who scored low on the posttest achievement measure evaluated their self-efficacy after the test as average to high.

The correlation between the pretest of self-efficacy and the posttest of achievement is significant for only Class 2

(effort), $r(19) = .38$, $p < .05$, ($r^2 = 14\%$). The other three classes (1, 3, and 4) showed very low non significant correlations. For Class 1 (control) the correlation was .27, $p < .06$, with 7% variance in common. For Class 3 (ability) the correlation was .11, $p < .28$, with 1% variance in common, and for Class 4 (ability) the correlation was .31, $p < .06$, with 9% variance in common. It appears that for these three groups their posttest achievement and pretest self-efficacy are not highly related. This score indicates that those students who scored low on the pretest for self-efficacy scored high on the posttest for achievement. For Class 2 (effort) their posttest achievement scores were more closely related to their pretest achievement scores. This result indicates a treatment effect may be taking place in that for Class 2, their posttest achievement scores are not varying greatly from their pretest self-efficacy, which was fairly low.

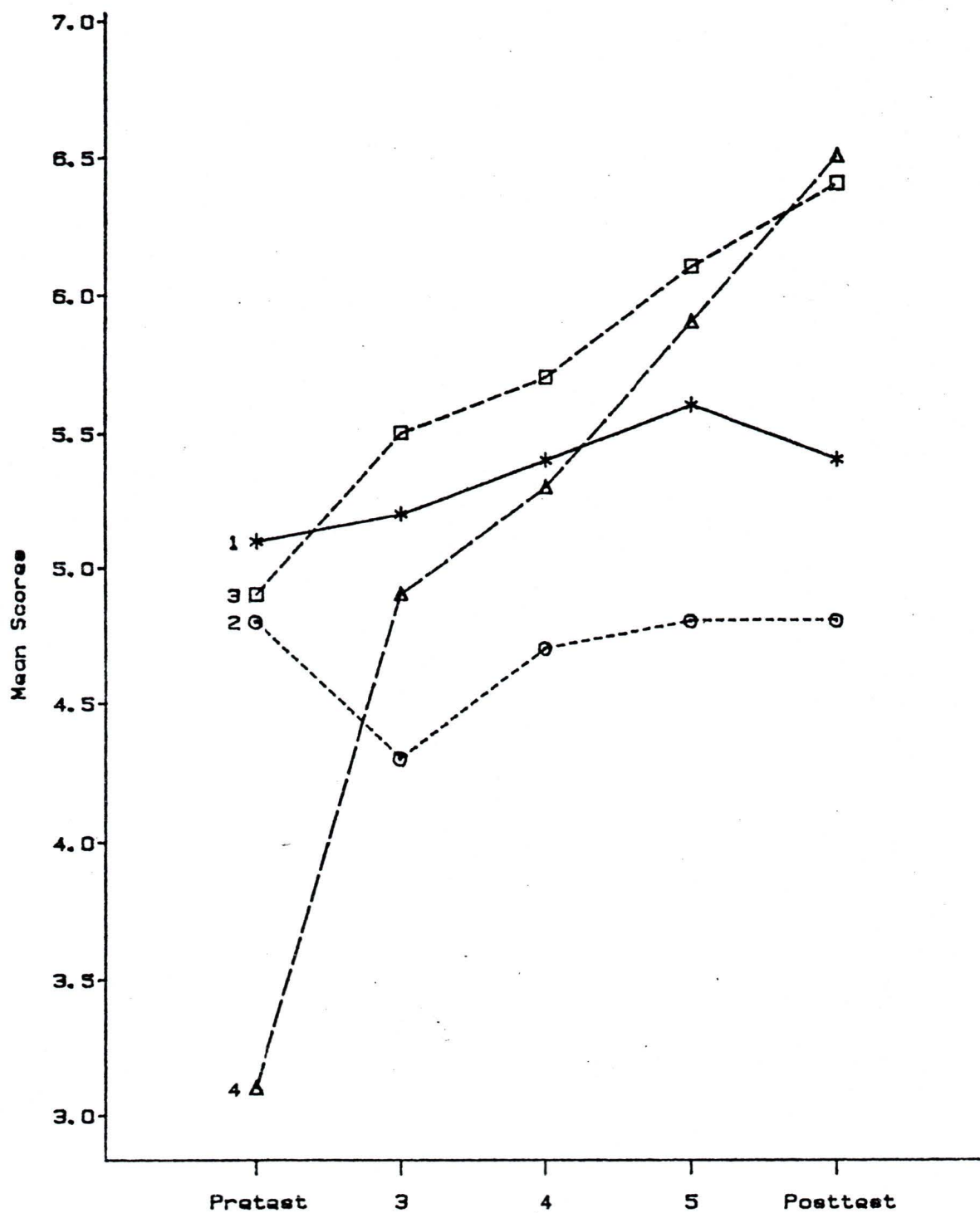
Pretest achievement and posttest self-efficacy scores were also correlated. For Class 1 (control), the correlation was .52 $p < .001$, indicating 27% variance in common. The other three classes had low correlations. For Class 2 (effort) the correlation was .17, $p < .23$, ($r^2 = 2\%$). For Class 3 (ability), the correlation was $-.28$, $p < .07$, ($r^2 = 7\%$), and for Class 4 (ability), the correlation was .28,

$p < .07$, ($r^2 = 7\%$). It seems there may have been some treatment effect influencing these three groups in that their posttest of self-efficacy was not closely related to the pretest achievement scores. Classes 3 and 4 scored low on the pretest for achievement and high on the posttest for self-efficacy. Class 2 (effort) had scores which were randomly associated.

Table 7: Group Mean Pretest and Posttest Scores and Standard Deviations for Self-Efficacy (Classes 1, 2, 3, and 4)

Class	Pretest		Posttest	
	M	SD	M	SD
1	5.1	1.6	5.4	1.5
2	4.8	1.9	4.8	.9
3	4.9	1.3	6.4	1.7
4	3.1	1.6	6.5	1.3

Figure 5: Group Mean Scores for Self-Efficacy (Classes 1, 2, 3, and 4)



Pretest and Posttest Attribution Measures

The pretest attribution group mean scores reflect total attribution scores, with higher scores indicating a greater external locus of control. Means and standard deviations are presented in Table 8. Classes 2 (effort) and 4 (ability) scored marginally but not significantly more external than did Classes 1 (control) and 3 (ability). Using a multivariate analysis of variance (MANOVA), overall results were obtained. Using the Wilk's Lambda criterion, a non significant difference was found between gender, class, and gender by class interaction.

Mean scores and standard deviations for each of the four posttest attributions for all classes are presented in Table 9. Mean attribution scores were graphed for each class and are presented in Figure 6. Using a multivariate analysis of variance (MANOVA), overall results were obtained. Using the Wilk's Lambda criterion, a non significant difference between males and females was found, and a non significant difference was obtained assessing males and females by class. A significant difference, however, was found between the four classes, $F(12,243) = 3.0, p < .001$.

Using Tukey's Test, pair wise comparisons were made. No significant group difference was found between the four classes for attributions of effort or easy questions. For

the ability variable, both of the classes who received ability feedback (classes 3 and 4), scored significantly higher than did Class 2 (effort). On the attribution variable of luck, Class 4 (ability) attributed luck as having a greater impact upon their score than did either Classes 1 (control) or Class 3 (ability).

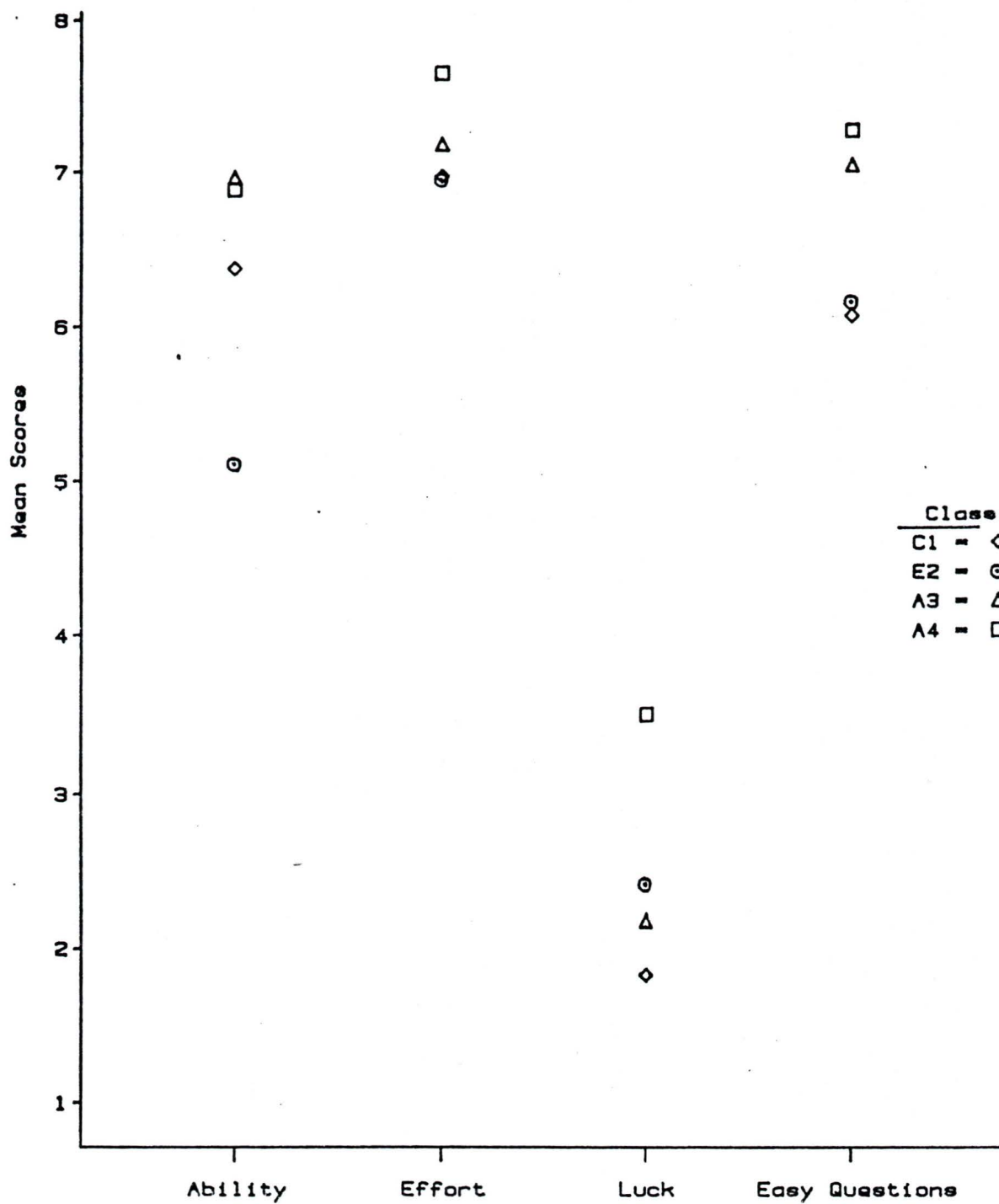
Table 8: Group Mean Pretest Attribution Scores and Standard Deviations (Classes 1, 2, 3, and 4)

Class	Attributions	
	M	SD
1	55.2	7.9
2	60.1	9.5
3	55.9	6.7
4	60.4	9.4

Table 9: Group Mean Posttest Attribution Scores and Standard Deviations (Classes 1, 2, 3, and 4)

Class	Attributions							
	Ability		Effort		Luck		Easy Questions	
	M	SD	M	SD	M	SD	M	SD
1	6.37	1.8	6.97	1.6	1.83	1.0	6.07	1.8
2	5.11	1.4	6.95	1.6	2.42	2.3	6.16	1.5
3	7.18	1.7	7.18	2.0	2.18	1.3	7.04	2.0
4	6.88	1.5	7.65	1.4	3.50	2.2	7.27	1.8

Figure 6: Group Mean Posttest Attribution Scores for Ability, Effort, Luck, and Easy Questions (Classes 1, 2, 3, and 4)



DISCUSSION

The purpose of this study is to give classroom teachers some direction in using attribution feedback effectively in a specific academic situation. Both by using two forms of attribution feedback, ability and effort, and by measuring two dependent variables, self-efficacy and academic achievement, students' response rates can be analyzed to find if, in fact, feedback attributions of ability and effort do differentially affect efficacy level and academic performance.

Using the Canadian Test of Basic Skills as a pretest measure of general mathematical ability, it was found that three of the four classes tested were homogeneous in the areas of Mathematical Concepts and Problem Solving. The fourth group of students, which showed significantly lower achievement scores on the CTBS, was utilized as a second ability feedback group.

Further analysis of the data indicated significant differences between sexes on both pretest measures, the Canadian Test of Basic Skills and the pretest multiplication measure. Assessment of this gender variable revealed that

females performed better than did males on both pretest measures. Research in gender linked differences in mathematics learning supports these findings. For example, The 1985 British Columbia Mathematics Assessment - General Report found that grade four students showed no significant differences between sexes for overall math achievement. Differences, however, were notable in particular domains. Boys performed better in measurement, computers, and calculators, and girls scored slightly higher on the Numbers and Operation, Algebraic Topics, and Problem Solving domains. The same results were obtained in the 1981 Assessment. The 1983 National Assessment of Educational Progress (NAEP), American Mathematical Assessment also found few sex differences existing in achievement for 9 or 13 year olds. The only notable exception in this report was that females at age 9 tended to outperform males on exercises measuring knowledge. The achievement task in the present study involved recall of multiplication number facts. In conjunction with these annual reports it is not surprising, thus, that females performed better than did males both on the achievement tests and on the Canadian Test of Basic Skills.

Upon assessing the scores for achievement on the multiplication facts grid, both males and females remained

parallel over all of the tests given. There was no significant interaction between males and females among groups, and because the males and females did not differ significantly between groups, the variances were pooled, and the scores were analyzed collectively. Overall achievement scores showed no interaction effect, but the classes within the four treatment conditions did respond differentially. Between pretest and posttest measures Class 4, (the class which began with the lowest score and which was given ability feedback) increased their performance markedly. There was no significant difference between this class and the two higher ability classes (1 and 3) on the posttest. Conversely, Class 2, the class receiving effort feedback, also began with a very low pretest score and still showed a significantly lower score than did Class 3 on the posttest.

It is very evident from these results that the treatment effect, namely ability feedback, is much more effective than is effort feedback in increasing performance on the achievement task. It appears from this study that effort feedback has a neutral effect on Class 2's achievement level. In support of this finding, Harari and Covington (1981) stated that ability attributions become increasingly important influences on performance expectancies, whereas effort as a causal factor declines in importance. To take

this concept one step further in relation to this study, effort feedback based on past and future successes may be more detrimental to achievement than previous research has postulated. In answer to Research Question #1, it seems that grade five students' performance on a multiplication facts grid is affected over a five day period by differential attribution feedback. Those classes which were given ability feedback increased their scores more than did two classes of students who received either effort feedback or no feedback. Because of the design in this study, caution must be used when comparing this study, which obtained achievement results due to differential feedback, with previous research. The demand of the academic task in this study was recall and memory, whereas in most other studies an instructional procedural task has been used (Schunk, 1983, 1984). Nonetheless, previous research supports this researcher's findings in that ability feedback helps to increase achievement levels more so than does either effort feedback or no feedback.

Results from the correlation analyses help to strengthen and clarify the treatment effects in this study. The association between pretest and posttest achievement is significant for each class except the effort class. Scores for this class are randomly associated. From these results

it would appear that the feedback of effort being received by this group may have caused inconsistencies in their achievement performance.

A strong differential response pattern is apparent when analyzing the self-efficacy scores for each of the four classes. In accordance with Research Question #2, the self-efficacy of fifth grade students is effected over a five day period by differential attribution feedback regarding performance on multiplication facts grid. Overall, the two classes receiving ability feedback showed marked significant differences over Class 2, which received effort feedback. On the pretest for self-efficacy, Class 4 (the low ability class), scored significantly lower than did the other three classes who were similar to each other in their responses. On the posttest, differences were assessed in the opposite direction for Class 4 (the low ability group). Both ability feedback Classes (3 and 4) scored significantly higher in self-efficacy than did the effort class (Class 2). Notably, Class 4 also scored significantly higher than did the control class on the posttest measure. Because of the strong interaction, a treatment effect here is very evident. Addressing Research Question #3, it would appear from the results of this study that ability feedback has a strong positive effect on self-efficacy, an effect

which is greater than either the no feedback or the effort feedback groups.

These results are partially supportive of previous studies. Schunk (1983), for example, found that children who received only ability feedback judged themselves as more efficacious than did those who received effort feedback. In opposition to this study, however, Schunk (1983) found that the no feedback condition scored the lowest in efficacy rating. Miller, Brickman, & Bolen (1975), in opposition both to this study and to Schunk's (1983) research, reported that ability and effort feedback had the same effect on mathematical achievement; granted, Miller et al (1975) utilized younger children. The results of this study are such that ability feedback had a much greater effect on self-efficacy than both the effort feedback and the no feedback conditions. As well, effort or no feedback were found to have similar effects on the students' self-efficacy judgements. These findings do not support Research Question #4, since feedback attributing success to ability influences the grade five student's level of self-efficacy more than do either feedback attributing success to effort or no attributional feedback.

To explore the possible reasons for contrasting results between this study and previous research, differences in

research design must be taken into account. The effort feedback given in this study was linked both to past successes (eg. "You're working hard") and to future successes (eg. "Keep trying"). By linking effort to both types of successes, there is a possibility that the children would perceive their effort as responsible for future successes. By associating effort to future successes, students' may question their own abilities for doing the task and might wonder whether or not more effort will, in fact, produce better results (Schunk 1984). In a previous study (Schunk, 1982) results showed that using effort attributional feedback for past achievement increased skill development and self-efficacy level to a higher degree than effort attributional feedback for future achievement. Students receiving effort feedback in this sample may have been negating past success feedback for future success feedback. Combining these two types of successes in a feedback situation may have the same effect on individuals as combining effort and ability feedback. Children tend to negate ability feedback when it is followed by effort feedback (Schunk, 1984). In accordance with the concept of inverse compensation, (Kun, 1977; Surber 1980), it is postulated that children infer less effort as outcomes are presented as resulting from higher ability. In other words,

effort attributions decline in importance (Nicholls, 1978, 1979). According to Nicholls (1978), children by the age of nine are in a transition stage whereby they begin to differentiate between the two concepts of effort and ability. In turn, ability feedback should have a stronger effect on third grade children than on younger ones. Furthermore, Harari and Covington (1981), in agreement with Nicholls, postulated that children believe that high effort can enhance ability; with development, however, there is a progressive devaluation of effort in favor of ability. In accordance with Bandura (1981), students may feel that success attained with less effort promotes self-efficacy more than when greater effort is required. In this study, therefore, those students receiving effort feedback may be processing this information on two levels (feedback on future successes negating past successes and/or feedback on effort making them question their capabilities) because they have to work hard to succeed.

Results from the correlation analyses once again help to strengthen and clarify the treatment effects in this study. On the pretest and posttest self-efficacy measures, the control and effort classes both showed high correlations in contrast to Classes 3 and 4, the two ability classes. The ability classes' scores had a low correlation. It is

important to remember that a low score, in this instance, is indicative of change. The two ability feedback groups over the course of testing, thus, changed their self-efficacy scores in a positive way.

Observing the degree of association between posttest self-efficacy and posttest achievement scores, it can be seen that in all groups an increment in achievement performance was directly related to an increment in self-efficacy levels. This degree of association is interpreted differentially among groups. Classes 1, 2, and 3 (control, effort, and high ability) each showed significant correlations. Conversely, Class 4 (low ability) showed a low correlation. Once again this low correlation is indicative of a treatment effect. Their self-efficacy level is higher than their achievement score. Those who scored low on the posttest for achievement scored average to high in the posttest for self-efficacy. This finding supports previous research which states that self-efficacy scores can be increased without necessarily increasing achievement scores (Schunk, 1984, 1986).

An interesting result to observe is the decrement of scores for the last three tests for Classes 1, 2, and 3. One might expect a decrease in self-efficacy scores to correlate with these results. A decrement in self-efficacy

ratings, however, did not occur. The control class and effort class had a levelling off of self-efficacy scores, and the two ability classes' efficacy level continued to increase. This result seems to indicate that ability feedback enhances self-efficacy scores even when there is a decline in achievement. Consistent with previous research this study supports the idea that self-efficacy is not merely a reflection of prior performance (Schunk 1981, 1983, 1985). It appears that a higher self-efficacy was brought about by an interaction between previous achievement scores and ability feedback. These results are also consistent with Weiner's (1979) Attribution Model which includes stability as one of three dimensions. If conditions surrounding the task are thought to remain stable, attributions to ability or task difficulty should result in future expectancies of similar outcome, whereas attributions to more unstable causes (effort or luck) lead to shifts in expectancy (Frieze 1980; Weiner 1977).

In correlating pretest achievement and posttest self-efficacy scores a treatment effect influencing scores of the three groups receiving feedback is apparent. Classes 3 and 4, the two ability classes, have a very low correlation such that students who scored low on the preachievement test rated their self-efficacy level average

to high. Conversely, Class 2, the effort feedback class had randomly associated scores.

In answer to Research Question #5, feedback to a class of grade five students does not have the same effect as individual feedback. Once again the experimental design must be taken into account when comparing this study with other similar research. Previous research studies have had proctors assess children on an individual or small group basis, and the feedback was given to them verbally (Schunk, 1982, 1983; Medway & Venino, 1982). This study did not individualize verbal feedback; rather it directed the feedback to the class collectively.

Attribution theorists postulate that students attribute causes for outcomes by using four variables: a) ability; b) effort; c) luck; and d) ease of task (Weiner, 1979). The pretest and posttest attribution measures in this study examine these four causal ascriptions and the impact they have on the students' judgement of their own successes. Results from the Attribution Pretest indicate no differences between the four classes tested, no sex differences, and no sex by group interaction. Each of the four classes was similar in attributing academic achievement to the four variables, ability, effort, luck, and task ease. Consequently, total attribution scores were also closely

related. Classes 1 and 3 scored slightly lower than did Classes 2 and 4. For this attribution scale, a lower score indicated a more internal locus of control. This finding is congruent with the "learned helplessness" literature (see Seligman, 1973) which postulates that, generally, people who attribute their success and failure to their own behavior are said to have an internal locus of control. Those individuals who attribute their success and failure to luck and task difficulty are said to have an external locus of control (Weiner, 1977). Classes 1 and 3 consisted of higher academic achievers than did Classes 2 and 4, so that the slight difference in mean attribution scores, signifying a more internal locus of control, is not really surprising.

The results on the attribution posttest showed that students did not feel that "ease of the task" had a large bearing on their achievement scores. This type of task (multiplication grids) was chosen because of its intermediate level of difficulty, so this result was not unexpected. Even though the attribution of effort was not statistically different between the four groups, an examination of the group mean scores for this variable shows that children felt that effort had a great impact on their level of achievement. This may be attributed to a time constraint which was placed on the test. When tasks are

performed under time pressure, most students tend to expend more effort. Again, caution must be taken when comparing this study with the results of previous studies. In previous studies, Schunk (1981, 1983) found that students receiving effort feedback judged effort as having a significantly greater impact on their scores than ability and no feedback conditions. Chapin & Dyck (1976) and Schunk (1981, 1983) did not use timed tasks, and, consequently, this variable may not have been rated by the students in the same manner. Attribution studies usually use low achievers or children defined as "learned helpless" who initially do not stress effort as a cause of achievement outcomes (Dweck, 1975; Medway & Venino, 1982). When this is the case, effort feedback should have a greater effect on effort attributions (Schunk, 1984). In the present study, effort feedback did not enhance the effort attribution of Class 2 possibly because of the confounding effect of time pressure on the task. Research Question #6a is supported, but it needs to be qualified, in that all groups (not just the effort group) attributed their success on the multiplication task to the amount of effort expended. Conversely, the students who received ability feedback differed significantly from the control class and the effort class in attributing their successes to ability. In support of Research Question #6b,

this study is in congruence with the idea that students who are given feedback on their ability will assess ability as being a major influence on their performance (Schunk, 1984).

In addressing Research Question #7, this study clarifies the idea that groups of students with high self-efficacy levels do attribute their success on a task to ability. This finding is in accordance with previous research (Schunk, 1984).

In analyzing the attribution of luck, Class 4, the low ability class which received ability feedback, did score luck as having a significant impact on their score. Class 4 differed significantly from Classes 1 and 3 (the two higher ability classes) on this variable. This attribution is closely related to a response one may expect either from children defined as "learned helpless" or, from students with an external locus of control. Studies have shown that "learned helpless" students attribute their successes to external variables such as luck, and their failures are attributed to lack of Ability. In Weiner's (1977) Attribution Model, luck is viewed as an external, unstable, uncontrollable attribute. Those students who attribute luck as a variable having influence upon their success may feel unsure of future outcomes. The students in Class 4 scored their self-efficacy high and felt that their performance was

due to both luck and ability. From these results it may be concluded that the students found it difficult to realize they were genuinely proficient at the task. The emphasis on luck confirms, in one sense, that these students feel less control over performance outcomes.

In summary, from the results of this study, it can be concluded that the feedback attribution of ability enhances academic achievement, heightens self-efficacy, and influences students in making causal ascriptions for success to ability, significantly more than does effort feedback.

Implications for Research

Research comparing differential attributional feedback with groups of students is miniscule in its existence. Studies incorporating larger groups of students may be more appropriate when attribution feedback is being received by classroom groups. Research in self-efficacy and attribution feedback using normal achieving children is also deficient. Research needs to examine the ways in which normal achieving students are affected by differential feedback. Most studies have utilized students who are lacking skills in a particular area. Research could also address the issue of how low achieving students as individuals utilize ability or

effort feedback that is directed at a group level. Social comparative information, in forming self-efficacy, is also apparent and the degree to which it influences an individual, needs to be measured.

The type of task being used, whether it be memory, procedural, comprehension or opinion, could also have differential effects on students' self-efficacy. Since cognitive processing varies according to the demand of the task (Doyle 1983), each type of task and its effect on self-efficacy should be looked at separately.

The notion that the attribution of effort feedback rather than no feedback could be more detrimental to students' self-efficacy as they develop is a profitable idea which needs to be explored farther. Generally, previous studies have utilized children up to about the age of 10. The implications of this type of feedback for older students would be worth investigating.

Tasks which involve time constraints could also be analyzed to explore effects of time pressure on attributions of ability, effort, luck and task ease. An in depth study analyzing differential effort expenditure according to type of task and how this effects self-efficacy would be beneficial. Duration of the feedback is also an important variable which should be considered in future research

because it has implications for differential performance on tasks. These issues need to be examined in order to clarify some of the implications attributional feedback has on a large group of students.

Educational Implications

Classroom teachers need be aware of the differential effects of attribution feedback. All too often feedback is given in a very general sense, and it seems that children do not benefit from generalities. Appropriate feedback can be very rewarding for students by enhancing their self-efficacy and performance levels. Ability and effort feedback must be disassociated and thought of as having differential influences on students' self-efficacy. Not only students lacking in skills, but also normal achieving students need to be given feedback which specifically acknowledges their ability. This study implies that normal achieving students may benefit equally as much as low achieving students from the appropriate type of feedback. Teachers who give attributional feedback based on the difficulty of the task, the students effort and ability expenditures and situational conditions will conceivably both promote their students' learning and enhance their own effectiveness. That feedback is a critical element in the educational process seems apparent from this study.

Conclusion

Classes of students given differential feedback on tasks of intermediate difficulty benefit from the appropriate type of feedback. The attribution of success to ability enhances students self-efficacy levels and helps to increase their performance on a specific task. This study suggests that the attribution of effort, for past and future successes, does not have the same positive effect when promoting self-efficacy as does the attributional feedback of ability. Furthermore, high ability students are just as susceptible to and influenced by ability feedback as are children who are lacking in a particular skill. Teachers who are aware of their students' ability level can deliver feedback which is appropriate for that level, thereby strengthening self-efficacy and enhancing academic performance.

Limitations and Delimitations of The Study

The results of this study are described as exploratory and may be limited in that:

1. The sample was not homogeneous on the pretest measures; and
2. Working with pre-existing groups may have introduced a bias in results.

Analysis of this study leaves many questions unanswered. These include:

1. If a second control group with low achievement ability had been measured, what would be their results;
2. If the four classes involved were homogeneous on the pretest measures, would the results on the posttest be similar;
3. How much did social comparative information influence self-efficacy judgements;
4. Had the study continued over a long period of time would self-efficacy continue to increase for the two classes receiving ability feedback? Would it decrease for the class receiving effort feedback;
5. Would the same results be obtained with older children? To what degree does development affect attributional feedback of effort;

6. Is self-efficacy affected by comparing scores across tests;
7. How are students who are performing at a low level affected by ability feedback which is directed at a group rather than towards an individual; and,
8. How does the demand of the academic task influence the self-efficacy level of the child?

BIBLIOGRAPHY

- Andrews, G. R. & Debus, R. L. (1978). Persistence and the causal perception of failure: Modifying cognitive attributions Journal of Educational Psychology, 70, 154-166.
- Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. Psychological Review, 84, 191-215.
- Bandura, A. (1981). Self-referent thought: A developmental analysis of self-efficacy. In J. H. Flavell & L. Ross (Eds.), Social cognitive development: Frontiers and possible futures, (pp. 200-239) Cambridge, England: Cambridge University Press.
- Bandura, A. (1982). Self-efficacy mechanism in human agency. American Psychologist, 37, 121-147.
- Benson, J. S. & Kennelly, K. J. (1976). Learned helplessness: The result of uncontrollable reinforcements or uncontrollable aversive stimuli? Journal of Personality and Social Psychology, 34, 138-145.
- British Columbia Mathematics Assessment (Oct. 1985). General Report, Vancouver, British Columbia.
- Chapin, M. & Dyck, D. G. (1976). Persistence in children's reading behavior as a function of n length and attribution retraining. Journal of Abnormal Psychology, 85, 511-515.
- Covington, M. V. & Omelich, C. L. (1979). Are causal attributions causal? A path analysis of the cognitive model of achievement motivation. Journal of Personality and Social Psychology, 37, 1487-1504.
- Crandall, V. C., Katkowsky, W., & Crandall, V. J. (1965). Children's beliefs in their control of reinforcement in intellectual academic achievement situations. Child Development, 36, 91-109.

- Diener, C. I. & Dweck, C. S. (1978). An analysis of learned helplessness: Continuous changes in performance, strategy and achievement cognitions following failure. Journal of Personality and Social Psychology, 36, 451-462.
- Doyle, W. (1983). Academic work. Review of Educational Research, 53, 159-199.
- Dweck, C. S. (1975a). The role of expectations and attributions in the alleviation of learned helplessness. Journal of Personality and Social Psychology, 31, 674-685.
- Dweck, C. S. (1975b). Sex differences in the meaning of negative evaluations in achievement situations: Determinants and consequences, (ERIC Document Reproduction Service No. ED 111 495).
- Dweck C. S. & Bush, E. S. (1976). Sex differences in learned helplessness: I. Differential debilitation with peer and adult evaluators. Developmental Psychology, 12, 147-156.
- Dweck, C. S., Goetz, T. E., & Strauss, N. (1980). Sex differences in learned helplessness: IV. An experimental and naturalistic study of failure generalization and its mediators. Journal of Personality and Social Psychology, 38, 441-452.
- Dweck C. S. & Repucci, N. D. (1973). Learned helplessness and reinforcement responsibility in children. Journal of Personality and Social Psychology, 25, 107-116.
- Frieze, I. H., & Weiner, B (1971). Cue utilization and attributional judgements for success and failure. Journal of Personality, 39, 591-605.
- Frieze, I. H. (1980). Beliefs about success and failure in the classroom. In J. H. McMillan (Ed.), The social psychology of school learning (pp. 39-78). New York: Academic Press.
- Frieze, I. H. & Bar-Tal, D. (1980). Developmental trends in cue utilization for attributional judgements. Journal of Applied Developmental Psychology, 1, 83-94.
- Frieze, I. H. & Snyder, H. N. (1980). Children's beliefs about the causes of success and failure in school settings. Journal of Educational Psychology, 7, 186-196.

- Gatchel, R. J., Paulus, P. B., & Maples, C. W. (1975). Learned helplessness and self-reported affect. Journal of Abnormal Psychology, 84, 732-734.
- Glass, D. C. & Singer, J. E. (1972). Urban stress experiments on noise and social stressors. New York: Academic Press.
- Harari, O. & Covington, M. (1979). Reactions to achievement behavior from teacher and student perspective: A developmental analysis. American Educational Research Journal, 18, 15-28.
- Heider, F. (1958). The psychology of interpersonal relations. New York: Wiley.
- Hiroto, D. S. (1974). Locus of control and learned helplessness. Journal of Experimental Psychology, 102, 187-193.
- Horner, M. S. (1968). Sex differences in achievement motivation and performance in competitive and non-competitive situations. Published doctoral dissertation, University of Michigan.
- Jacobsen, B., Lowery, B., & DuCette, J. (1986). Attributions of learning disabled children. Journal of Educational Psychology, 78, 59-64.
- Kelley, H. H. (1967). Attribution theory in social psychology. In D. Levine (Ed.), Nebraska Symposium on Motivation (Vol. 15). Lincoln: University of Nebraska Press.
- Kelley, H. H. & Michela, J. L. (1980). Attribution theory and research. Annual Review of Psychology, 31, 457-501.
- Kun, A. (1977). Development of the magnitude-covariation and compensation schemata in ability and effort attributions of performance. Child Development, 48, 862-873
- Lefcourt, H. M., VonBaeyer, C. L., Ware, E. E., & Cox, D. J. (1979). The Multidimensional - Multiattributitional Causality Scale: The development of a goal specific locus of control scale. Canadian Journal of Behavioral Science, 11, 287-303.

- Levine, R., Reis, H., Sue, E., & Turner, G. (1976). Fear of failure in males: A more salient factor than fear of success in females? Sex Roles, 2, 389-398.
- Loper, A. B. & Reeve, R. E. (1983). Response bias on a locus of control measure by learning disabled children. Journal of Abnormal Child Psychology, 11, 537-554.
- Matherly, T. A. (1986). The distortion of self-perception by learned helplessness. Journal of Psychology, 4, 297-301.
- McMahan, I. D. (1973). Relationships between causal attributions and expectancy of success. Journal of Personality and Social Psychology, 28, 108-114.
- Medway, F. J. & Venino, G. R. (1982). The effects of effort feedback and performance patterns on children's attributions and task persistence. Contemporary Educational Psychology, 7, 26-34.
- Miller, I. W. & Norman, W. H. (1979). Learned helplessness in humans: A review and attribution - theory model. Psychological Bulletin, 86, 93-118.
- Miller, R. L., Brickman, P., & Bolen, D. (1975). Attribution versus persuasion as a means for modifying behavior. Journal of Personality and Social Psychology, 31, 430-441.
- Miller, W. R. & Seligman, M. E. P. (1975). Depression and learned helplessness in man. Journal of Abnormal Psychology, 84, 228-238.
- National Assessment of Educational Progress (April 1983). The third national mathematics assessment: Results, trends and issues. Denver: Education Commission of the States.
- Nicholls J. G. (1975). Causal attributions and other achievement related cognitions: Effects of task outcome, attainment, value and sex. Journal of Personality and Social Psychology, 31, 379-389.
- Nicholls, J. G. (1978). The development of the concepts of effort and ability perception of academic attainment and the understanding that difficult tasks require more ability. Child Development, 49, 800-814.

- Nicholls, J. G. (1979). Development of perception of own attainment and causal attributions for success and failure in reading. Journal of Educational Psychology, 71, 94-99.
- Overmier, J. B. & Seligman, M. E. P. (1967). Effects of inescapable shock upon subsequent escape and avoidance learning. Journal of Comparative and Physiological Psychology, 63, 28-33.
- Roth, S., & Bootzin, R. R. (1974). The Effects of experimentally induced expectancies of external control: An investigation of learned helplessness. Journal of Personality and Social Psychology, 29, 253-264.
- Roth, S. & Kubal, L. (1975). Effects of noncontingent reinforcement on tasks of differing importance: Facilitation and learned helplessness. Journal of Personality and Social Psychology, 32, 680-691.
- Schunk, D. S. (1981). Modelling and attributional effects on children's achievement: A self-efficacy analysis. Journal of Educational Psychology, 73, 93-105.
- Schunk, D. H. (1982). Effects of effort attributional feedback on children's perceived self-efficacy and achievement. Journal of Educational Psychology, 74, 548-556.
- Schunk, D. H. (1983). Ability versus effort attributional feedback: Differential effects on self-efficacy and achievement. Journal of Educational Psychology, 75, 848-856.
- Schunk, D. H. (1984). Self-efficacy perspective on achievement behavior. Educational Psychologist, 19, 48-58.
- Schunk, D. H. (1984). Sequential attributional feedback and children's achievement behaviors. Journal of Educational Psychology.
- Schunk, D. H. (1985). Self-efficacy and Classroom Learning. Psychology in The Schools, 19, 208-223.
- Schunk, D. H., & Hanson, A. R. (1985). Peer models: Influence on children's self-efficacy and achievement. Journal of Educational Psychology, 77, 313-322.

- Schunk, D. H. & Rice, J. M. (1986). Extended attributional feedback: Sequence effects during remedial reading instruction. Journal of Early Adolescence, 6, 55-66.
- Seligman, M. E. P. (1973). Fall into helplessness. Psychology Today, 6, 43-48.
- Seligman, M. E. P. (1974). Depression and learned helplessness. In R. J. Friedman & M. M. Kratz (Eds.), The psychology of depression: Contemporary theory and research. New York: Wiley.
- Seligman, M. E. P. (1975). Helplessness: On depression, development and death. San Francisco: Freeman.
- Stake, J. E. (1976). The effect of information regarding sex group performance norms on goal setting in males and females. Sex Roles, 2, 23-28.
- Surber, C. F. (1980). The development of reversible operations in judgements of ability, effort, and performance. Child Development, 51, 1018-1029.
- Tollefson, N., Traczy, B., Johnson, E. P., Buening, M., Farmer, A., & Barke, C. R. (1982). Attribution patterns of learning disabled adolescents. Learning Disability Quarterly, 5, 14-20.
- Weiner, B. (1974). An attributional interpretation of expectancy-value theory. In B. Weiner (Ed.), Cognitive views of human motivation. New York: Academic Press.
- Weiner, B. (1977). An attributional approach for educational psychology. In L. Shulman (Ed.), Review of research in education (Vol. 4). Itasca, Illinois: Peacock.
- Weiner, B. (1979). A theory of motivation for some classroom experiences. Journal of Educational Psychology, 71, 3-25.
- Weiner, B. (1983). Some methodological pitfalls in attributional research. Journal of Educational Psychology, 75, 530-543.
- Zuckerman, M., Lubin, B., & Robins, S. (1965). Validation of the Multiple Affect Adjective Check List in clinical situations. Journal of Consulting Psychology, 29, 594.

APPENDIX A
LETTER TO PARENTS

September 10, 1986

Dear Parents/Guardians:

I am a teacher on leave of absence from the Sooke School District. I am presently a student at the University of Victoria and in the process of completing my M.A. in Educational Psychology. For completion of my degree I am interested in finding out the types of feedback that students receive which are most effective in helping them to raise their own level of competence, thereby effecting their academic performance in a positive way.

Each day, over a period of five days, the students will complete a math multiplication facts quiz. I will be comparing three classes of students using different feedback techniques. One class will receive feedback for their ability, the second class will receive feedback for their effort, and the third class will not receive any direct feedback. All children will be informed as to their responsibility for this study. Your child's performance on these tests will not have any effect upon his/her progress or standing in the school. The study will be conducted by myself, and all scores will be kept confidential.

I would appreciate your child's participation in this study, and I need your consent for them to be a participant. If you have any questions about the research or the results, please feel free to contact me at 727-6446.

Please sign the form below and have your child return it to the classroom teacher. Your support is much appreciated.

Yours truly,

I _____ give / do not give
 my consent for my child _____ to
 participation in this study.

Parent/Guardian Signature: _____.

APPENDIX B
SELF-EFFICACY PRETEST

Name: _____

Date: _____

Teacher: _____

School: _____

If I was given 100 questions on math multiplication using numbers from 1 to 11, and had 3 minutes to do them, I feel that I would get about _____ right.

Circle the number below that tells how sure you are of the number of questions you will get right.

10 (Highly certain I would get them all right)

9

8

7

6

5 (I would get about half of them right)

4

3

2

1 (Highly certain I would get none right)

APPENDIX C

RECALL OF MULTIPLICATION FACTS GRIDS

APPENDIX D

THE MULTIDIMENSIONAL - MULTIATTRIBUTIONAL
CAUSALITY SCALE AND STUDENTS' ANSWER SHEET

ATTRIBUTION SCALE

Directions: I'm going to read you some statements about school. On the answer sheet in front of you, circle the number under the words that best match the way you feel about the statement.

1. I often feel that when I do well on a test, it is because I was lucky - for example, the questions that I studied were on the test.
2. Some of my good marks may be because those homework assignments and tests were easier to do than others.
3. I feel that my getting good grades in school lets people know whether or not I'm smart.
4. I can do really well in school if I work hard enough.
5. I believe that once a teacher knows that you're a poor student, your work is likely to get lower marks than if a good student handed in the same stuff.
6. Often when I haven't done well on an assignment or test, I think I was just unlucky.
7. If I wasn't doing very well in a subject, I would wonder if I wasn't very smart in that subject.
8. Poor marks tell me that I haven't worked hard enough.
9. The most important part of my getting good grades in a subject is whether or not I'm smart in that subject.
10. Often I don't do well because the teacher doesn't make the subject interesting.

11. Often I don't do well in school because I'm just not lucky that day - for example: I'm not feeling well or the teacher is in a bad mood or I forgot to do my homework the one day the teacher decided to check.
12. When I get a low grade in school, I usually feel that the main reason is that I haven't worked very hard in that subject.
13. Often I think my low marks are because the teacher is really stingy about giving out good grades.
14. For me, the good grades I receive, are always the direct result of my trying hard.
15. If I were to get poor grades in some subjects, I would think it is because I lacked the ability to succeed in those subjects.
16. Whenever I do well on a test or on a homework assignment, it is because I tried really hard.
17. Often I feel that I have to consider myself lucky for any good grades that I get.
18. If I were to fail in a subject, it's probably because I wasn't very smart in that subject.
19. Often my getting a high mark on homework assignments or tests is just a matter of luck.
20. Often I get good marks just because the work wasn't very hard.
21. When I fail to do as well as expected in school, it is

often because I haven't tried hard enough.

22. Some of my lower grades have seemed partially due to tough luck.

23. Some of the times that I have done well at school, it was because the teacher marked really easy.

24. When I get good grades it is because I'm smart in those subjects.

Attribution Answer Sheet Name: _____

Directions: Circle the number under the words that best match the way you feel about the statement.

Example: Sometimes, when I don't do very well in school, it's because I think the teacher doesn't like me.

Example.

Not true for me	Sometimes	Usually	True for me
1	2	3	4

1.	Not true for me	Sometimes	Usually	True for me
	1	2	3	4

2.	Not true for me	Sometimes	Usually	True for me
	1	2	3	4

3.	Not true for me	Sometimes	Usually	True for me
	1	2	3	4

4.	Not true for me	Sometimes	Usually	True for me
	1	2	3	4

5.	Not true for me	Sometimes	Usually	True for me
	1	2	3	4

6.	Not true for me	Sometimes	Usually	True for me
	1	2	3	4

7.	Not true for me	Sometimes	Usually	True for me
	1	2	3	4

8.	Not true for me	Sometimes	Usually	True for me
	1	2	3	4

9.	Not true 1	for me	Sometimes 2	Usually 3	True for me 4
10.	Not true 1	for me	Sometimes 2	Usually 3	True for me 4
11.	Not true 1	for me	Sometimes 2	Usually 3	True for me 4
12.	Not true 1	for me	Sometimes 2	Usually 3	True for me 4
13.	Not true 1	for me	Sometimes 2	Usually 3	True for me 4
14.	Not true 1	for me	Sometimes 2	Usually 3	True for me 4
15.	Not true 1	for me	Sometimes 2	Usually 3	True for me 4
16.	Not true 1	for me	Sometimes 2	Usually 3	True for me 4
17.	Not true 1	for me	Sometimes 2	Usually 3	True for me 4
18.	Not true 1	for me	Sometimes 2	Usually 3	True for me 4
19.	Not true 1	for me	Sometimes 2	Usually 3	True for me 4
20.	Not true 1	for me	Sometimes 2	Usually 3	True for me 4
21.	Not true	for me	Sometimes	Usually	True for me

	1	2	3	4
22.	Not true for me 1	Sometimes 2	Usually 3	True for me 4
23.	Not true for me 1	Sometimes 2	Usually 3	True for me 4
24.	Not true for me 1	Sometimes 2	Usually 3	True for me 4

APPENDIX E
POSTTEST ATTRIBUTION ASSESSMENT SCALE

Name: _____

Date: _____

Teacher: _____

School: _____

Directions: Think about the five grids you have completed. Look below at the scales and their headings and circle one number on each scale which you feel helped you to get the right answers.

Good At It

10	(a lot to do with my score)
9	
8	
7	
6	
5	
4	
3	
2	
1	(nothing to do with my score)

Worked Hard

10
9
8
7
6
5
4
3
2
1

Easy Questions

10
9
8
7
6
5
4
3
2
1

Lucky

10
9
8
7
6
5
4
3
2
1

APPENDIX F

MULTIVARIATE AND UNIVARIATE TESTS OF THE
INTERACTION BETWEEN GROUP MEAN SCORES AND
MULTIPLICATION ACHIEVEMENT TESTS

Multivariate and Univariate Tests of the Interaction Between
Group Mean Scores and Multiplication Achievement Tests

Multivariate Tests¹

Variable	F	df hypothesis	df error	p less than
Sex by Group by Time	1.07	15.00	251.6	.381
Group by Time	3.45	15.00	251.61	.001
Sex by Time	1.62	5.00	91.00	.161
Time	75.45	5.00	91.00	.001

¹Multivariate tests used Wilk's Lambda Criterion

Univariate Tests

Variable	df	MS	F	Sig. of F
Sex	1,95	13228.4	16.6	.001
Group	3,95	11186.6	14.1	.001
Group by Sex	3,95	364.0	.4	.711

APPENDIX G

MULTIVARIATE AND UNIVARIATE TESTS OF THE
INTERACTION BETWEEN GROUP MEAN SCORES AND
SELF-EFFICACY SCORES

Multivariate and Univariate Tests of the Interaction Between
Group Mean Scores and Self-Efficacy Scores

Multivariate Tests¹

Variable	F	df hypothesis	df error	p less than
Sex by Group by Time	.90	12.00	243.70	.546
Group by Time	4.36	12.00	243.70	.001
Sex by Time	.264	4.00	92.00	.900
Time	15.21	4.00	92.00	.001

¹Multivariate tests used Wilk's Lambda Criterion

Univariate Tests

Variable	df	MS	F	Sig. of F
Sex	1,95	1.06385	.125	.001
Group	3,95	24.24	2.865	.041
Sex by Group	3,95	3.166	.3743	.772

PARTIAL COPYRIGHT LICENSE

I hereby grant the right to lend my thesis (the title of which is shown below) to users of the University of Victoria Library, and to make single copies only for such users or in response to a request from the Library of any other university, or similar institution, on its behalf or for one of its users. I further agree that permission for extensive copying of this thesis for scholarly purposes may be granted by me or a member of the University designated by me. It is understood that copying or publication of this thesis for financial gain shall not be allowed without written permission.

Title of Thesis:

**THE EFFECTS OF ATTRIBUTIONAL FEEDBACK REGARDING
MULTIPLICATION
PERFORMANCE ON THE SELF-EFFICACY OF GRADE 5 STUDENTS**

Author

Freda O'Sullivan

November 7, 1986

November 1986
