

THE RELATIONSHIP BETWEEN ACHIEVEMENT DIFFERENTIAL,  
MOTHERS' VALUE OF EDUCATION, STUDENTS' VALUE OF  
EDUCATION, AND STUDENTS' SELF-APPRAISAL OF PERFORMANCE

**CENTRE FOR NEWFOUNDLAND STUDIES**

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The Relationship Between Achievement  
Differential, Mothers' Value of  
Education, Students' Value of Education,  
and Students' Self-Appraisal  
of Performance

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by

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## ABSTRACT

The main purpose of this study was to examine the relationship between achievement differential and mothers' value of education, students' value of education, and students' self-appraisal of performance. The relationship between mothers' value of education and students' self-appraisal of performance was also a major concern in the study.

The present study involved Grade V-VIII boys in one school in the City of St. John's. Information was obtained from mothers and pupils. Mothers' value of education was determined using an instrument devised by Medinnus and also by using an instrument devised by Rundquist and Sletto, further revised by Moss. Information on students' value of education and students' self-appraisal of performance was determined by use of questionnaires devised by the writer and Jones. Achievement differential for all pupils was determined by use of the Canadian Lorge-Thorndike Intelligence Tests, Nonverbal Battery, and by use of results of school exams in English Language, Literature, and Mathematics.

The sample consisted of 39 randomly selected students and their mothers. The students were chosen from a larger group of underachievers and overachievers. Mothers

were selected on the basis that their sons had previously been chosen.

A significant relationship was found between students' self-appraisal of performance and their achievement differential. This was consistent with the literature. One of the additional relationships investigated was that which existed between students' value of education and students' self-appraisal of performance. This relationship was significant for the total sample and for underachievers taken separately.

Some implications of the study were as follows: measurement of students' self-appraisal could be part of the school's testing program, teachers and counsellors could be trained to develop an understanding of self-appraisal theories and how they are related to various aspects of the school situation, and work to increase self-appraisal of performance and value of education might be done independently of the home and still be effective.

Future studies could investigate the degree that improvement of self-appraisal of performance affects test scores. There is also a need to continue efforts to develop valid and reliable instruments with which to assess affective variables such as the ones in the present study.

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## CHAPTER I

### THE PROBLEM

#### Statement of the Problem

It was the purpose of the present study to investigate for a local area the relationship between the achievement differentials of boys and, (1) the educational values of mothers, (2) the educational values of boys, and (3) the self-appraisals of performance of boys in a school with a large percentage of children coming from low economic areas.

#### Importance of the Study

A comprehensive school evaluation program appears to require evaluation of the relationship between academic achievement and variables which have a possible bearing upon achievement. Perhaps the failure of teachers to understand the values and self-appraisals of the deprived has made it difficult to motivate a large number of students from deprived backgrounds.

Counselors working with achievement problems need insights into the various correlates of achievement. They may find that they can do a better job of solving the problems of poor achievement if they consider those factors that influence it. Knowledge of the relationship between

achievement and self-appraisal of performance for certain disadvantaged populations in Newfoundland may lead to specific programs aimed at improving achievement.

Theory and some research by Smith (1969), and Getzels and Jackson (1959), suggest that values are important correlates of achievement.

Other research by Lorenzo (1965), Knudsen (1965), and Campbell (1966), also supports the hypothesis that self-concept is an important correlate of achievement.

Self-appraisal could easily be related to dissatisfaction with school. Getzels and Jackson (1959) state that studies of dissatisfaction have been seen to have two implications. First, at the theoretical level, they seem to be part of a broader area of inquiry which aims at an understanding of the individual's functioning in an institutional setting. Second, at the practical level, the question of why children like or dislike school is felt to be directly related to the immediate problem of school dropouts, grouping procedures, planning for the gifted and slow child, and the like. It is possible that dissatisfaction could easily be related to self-appraisal and values, which in turn could be related to achievement.

Another implication of the present study is the difficulty inherent in doing this kind of research; therefore, development of successful techniques for research in a low economic type of community would be important for future

research and as information for counselling style and technique.

It has been suggested, especially by Stutt (1969) in his work with deprived youth of Montreal, that the counselor must expand his work beyond the school into the home, if he is to have a noticeable impact on achievement in school. According to Stutt, the counselor should be aware of those factors related to achievement so as to avoid inefficient use of time and resources. He must also be aware of the social context in which these factors are important.

It was hoped that the present study would also give some insights into conflicts, particularly in the area of mothers' value of education and the child's value of education, and between mothers' value of education and the child's self-appraisal of performance.

#### HYPOTHESES

The following null hypotheses were investigated in the study:

1. There will be no relationship between mothers' value of education and the achievement differential of their sons.
2. There will be no relationship between boys' value of education and their achievement differential.
3. There will be no relationship between boys' self-appraisal of performance and their achievement differential.

4. There will be no relationship between mothers' value of education and boys' self-appraisal of performance.

#### DEFINITIONS OF TERMS USED

##### Value Placed on Education

This is a term used to describe the subjects' consideration of education as worth sacrificing other things for, useful, important, a desirable good to possess, or something worthwhile to have. It was operationally defined by the score obtained on the Mothers' Value of Education Questionnaire and the Students' Value of Education Questionnaire.

##### Self-Appraisal of Performance

This is one's feeling about one's ability to cope with academic work. It was operationally defined by the score obtained on the Students' Self-Reported School Performance Questionnaire.

There is difficulty in distinguishing in the literature between this term and the term "self-concept", or "school-related self-concept". In the review of the literature, therefore, the term used by the authors is presented, it being understood that operationally it means the same as "self-appraisal of performance".

### Intelligence

Intelligence is a basic ability underlying behavior in a wide variety of situations. In the present study, intelligence was considered to be the ability to learn those skills required for academic progress. It was operationally defined by the score obtained on the Canadian Lorge-Thorndike Intelligence Tests (Nonverbal Battery).

### School Achievement

In the present study, school achievement was defined as teacher assigned grades in Mathematics, English Language, and Literature.

### Grade Average

The total grade average was obtained by first finding the first semester average for each student over the three subject areas of school achievement. Then the same procedure was followed to obtain a second semester average. Total grade average was the average of the first and second semester averages.

### Predicted School Achievement

This is the achievement expected of a child based on intelligence, if other variables were not affecting school achievement. In other words, the achievement expected of a child assuming congruence in percentile rank between intelligence and achievement.

### Achievement Differential

This was the difference obtained when a boy's intelligence quotient percentile was subtracted from his grade average percentile in English Language, Literature, and Mathematics.

### DELIMITATIONS AND LIMITATION

#### Delimitations

1. The study was confined to one school in St. John's and mothers of boys in that school.
2. The study was concerned only with a random sample of Grades V, VI, VII, and VIII boys who had been attending St. Teresa's School, and their mothers.

#### Limitation

1. The small size of the sample may have affected the result. Personal interviews with mothers limited the size of the sample chosen. The results could possibly be more conclusive with a larger sample.

### ORGANIZATION OF THE STUDY

The next chapter presents the research literature concerning the problem studied. Chapter III describes the instruments, the sample, and the method of collecting data. Chapter IV presents the findings and describes their significance. Chapter V presents a summary of the study, some general conclusions, and recommendations. Appendices follow the last chapter.

## CHAPTER II

### THE LITERATURE

This chapter presents the literature from which the hypotheses for the study were derived. An introductory section gives various definitions of values.

#### DEFINITIONS OF VALUES

Vernon (1965) says that value definitions specify relative worth that man attributes to or imposes upon various aspects of his universe.

Miller (1968) says that values, being matters of importance to the self, are always warm, central, ego-involved, and therefore claim the priority of our attention.

Klausmeier (1961) states that there is no sharp dividing line between tastes, attitudes, and values, but that the difference is in the permanence of each. All three are emotionally toned predispositions to react in a consistent way, favorable or unfavorable, toward a person, object, or idea. From the standpoint of stability, tastes are most temporary and values are most stable, with attitudes somewhere between.

In the present study an attempt was made to measure some of these stable, ego-involved feelings which mothers and boys had toward education, and which boys have toward their

ability to do academic work.

#### MOTHERS' VALUE OF EDUCATION AND SCHOOL ACHIEVEMENT

Rankin (1967) found that the scholastic achievement of inner city elementary school children appears to be positively related to the following:

1. The amount of interest taken by parents in their school activities.
2. The extent to which parents encourage their interest in reading.
3. Level of parents' aspirations for their educational attainment.

In a study done by Singh (1972), Seventh Grade students in St. John's named their parents more often than other persons as being those more concerned about how well they did in school. The students also named their parents more than any other persons as being important in their lives.

When considering the total home environment, Ellinger (1961) found that the correlation between school progress and home environment is much higher than the correlation between intelligence and home environment.

According to Perrone (1967) and Greene (1966), it appears that if a child's values are going to change, they will do so in the direction of the parents' values. This change shows the strong influence which parents have on their children in respect to the child's values.

O'Brien (1972) found that 99 percent of the students in her rural Newfoundland sample reported that their parents were concerned about the schoolwork of their children.

Mehl (1973) found that parents' attitudes toward the school were significantly related to indices of student achievement.

While studying the dropout problem in Newfoundland over the ten year period 1954-1964, Kennedy (1966) found that home circumstances and family background played an important role toward influencing children's attitudes and outlook toward education.

Schurr, Towne, and Joiner (1972) stated that a student may still not achieve, even if he knows he can achieve, because achievement is devalued by significant others. They made this statement after having done some research into self-concept as related to ability and achievement.

It becomes clear from the studies mentioned that parental influence seems to be highly related to the school achievement of children.

The importance of the mother's influence was researched by Rosenzweig (1969). The findings of his study agree with conclusions reached by other recent studies that have shown that formal and social learning evolve out of an intricate mother-child interaction beginning with the earliest phase of dependency.

Mothers seemed to be academically significant for 92 percent of boys in Roman Catholic schools in the study done by Singh (1972). Mothers were also named more often than any other persons by the Roman Catholic boys in the study as important in their lives.

Some of the research done by Brookover, Thomas, and Paterson (1964) also tends to favor the mother as the major influence in the lives of most students.

Stehbens (1968) found that mothers of the boys in his study were described as more involved in their sons' lives than were the fathers. The degree of positive parental involvement, especially maternal involvement, was positively related to academic achievement of Ninth Grade boys.

Shelton (1969) found that the differences in achievement between students from one-parent families living with mother, and students from one-parent families living with father were not statistically significant. The trend of the difference, however, favored the "living with mother" group. This study, while giving some insight into the influence of the mother, was far from conclusive in its results as to the exact nature of the mother's influence on school achievement.

Packer and Cage (1972) took a mother's high aspirations for her child's achievement in school as one form of measurement of her value of education. They state that several studies have shown that a mother of this type

influences the child's motivation to achieve and his actual achievement. Hess (1968) showed that low income mothers value achievement highly. Also, mothers in urban areas scored significantly higher than those in small rural communities; they had higher expectations for the amount of schooling their children should receive.

The above studies investigated the relationship of the mother's influence and school achievement; the exact nature of the maternal influence is not clear. It may be true that both formal and social learning evolve out of an intricate mother-child relationship, and that maternal involvement is positively related to academic achievement. However, the exact nature of this influence of the mother, and specifically of mothers who have high or low values of education, cannot be discovered from the literature. Investigating this variable in a low socio-economic area of Newfoundland added two more dimensions to the present study.

#### STUDENTS' VALUE OF EDUCATION AND SCHOOL ACHIEVEMENT

Hummel and Sprintall (1965) found that the under-achiever was less likely to relate his conduct to long range consequences. He was likely to put a premium on the immediate and practical effects to be gained from schoolwork. According to their study, if students do not see any short range value in education, they are most likely to be

underachievers. Thus, it can be seen that values may affect the achievement levels of students.

Cole and Miller (1967), in studying university freshmen, found that the value placed on the concept of academic achievement contributed significantly to the prediction of grade point average.

Knudsen (1967) found that dropouts were lowest in their attitudes toward school and educational expectations, and those who repeated grades were higher in their attitudes. Those who had not repeated grades scored highest on these variables.

Ehrlich (1969) and Snyder and Sibrel (1971) all found that value placed on education became more negative as the child progressed through school. In certain respects this can be taken as an inverse relationship between value placed on education and time spent in school.

Knaupp (1973) says that there are enough studies that have found a low correlation between attitude and achievement to imply that due to certain fundamental characteristics of the school as an institution, it overpowers the influence that attitude might have toward learning. He also says that some investigations have led to the conclusion that there may not be a direct relationship between attitude and achievement.

According to Keane (1969), there is no relationship between student attitude as measured by the Dutton Scale and student achievement. This study was done with

elementary school children.

From the above studies it is not clear just how the value a person places on education is related to his achievement in school. As was reported, some found a positive relationship between value placed on education and school achievement while other studies found the opposite. Some found no relationship. The purpose of the present study was to discover what type of relationship existed in a low-income Newfoundland setting.

#### SELF-APPRAISAL OF PERFORMANCE AND SCHOOL ACHIEVEMENT

Perceptual psychology accepts the idea that the feelings and beliefs one holds about oneself motivate one's conduct; the antecedent for individual responses is the self-concept. La Benne and Greene (1969) studied the self-concept theory of William James, G.M. Mead, and Carl Rogers. They claim that much of the contemporary theorizing about self-concept derives from William James. He considered ego to be the individual's sense of identity. Added to this he felt that self included spiritual, material, and social aspects. For instance, the esteem and regard that a person perceives others have for him forms the social self.

G.M. Mead claimed that the person responds to himself with certain feelings and attitudes as others respond to him. Various selves can be differentiated by the specific

set of responses in different social settings. Home attitudes expressed toward him created a home self; school attitudes expressed by teachers and classroom experiences created a school self, and so forth.

Carl Rogers believes that people behave in terms of the ways in which they see themselves. He feels that as experiences occur in the life of the individual, they are either symbolized, perceived and organized into some relationship to self, ignored because there is no perceived relationship to the self structure, denied symbolization, or given a distorted symbolization because the experience is inconsistent with the structure of self. In other words, it is the individual's self-concept which determines the kind and quality of experience perceived.

From the above theorists it appears that the child's self-concept is **not** unalterably fixed, but is modified by every life experience. This could include experiences in the school situation.

Self-appraisal of performance in school could be considered as part of the total self-concept. It is possible that a person's perception of himself in the school situation influences his total perception of self. If a student's experiences in school are such that he has a low estimation of himself in school, this could cause him to have a low estimation of himself in other areas and possibly in a total sense. Total self-concept has been shown by studies to be

directly related to school achievement. The effects of self-appraisal of performance in school are only beginning to be discovered.

Looking at the total self-concept, Lorenzo (1965) found that low achieving boys showed low self esteem as inferred from items measured in self-drawings.

Campbell (1966) hypothesized that there would be a direct linear relationship between self-concept and school achievement for children in Fourth, Fifth, and Sixth Grades in suburban public schools. His data supported the hypothesis.

In another study Knudsen (1965) found that dropouts, repeaters, and non-repeaters were consistently ordered from lowest to highest respectively in self-perceived status in peer relations, and in their teachers' evaluations of their group.

Guest and Thomson (1972) suggest that a positive self-concept is a prerequisite to further academic learning. In their review of a study by Dinkmeyer (1970), they say it is suggested that few factors are more relevant to the child's academic success and social development than his feelings of personal adequacy and self-acceptance. Dinkmeyer feels that the child's social and emotional needs take precedence over academic needs, and the former must be satisfied if the latter are to be met at all.

Work done by Brookover, Joiner, and Erickson (1965) at Michigan State University is probably the best known and possibly the only large scale investigation into self-concept of ability and its relationship to school achievement. A series of studies by Brookover and others are concerned with following a group of students over a period of years. The studies concentrate on students' academic self-concept and its relationship to sex, social class, and school attended. They found that the mean self-concept score for all girls was significantly higher than for boys. Results of the studies also showed that high achieving students had significantly higher self-concept of ability scores than low achieving students with comparable measured intelligence ranges. They found that a student's self-image was probably a composite of the images reflected by many persons who are important to him. The mother was seen as the major figure in the lives of most students. This research showed that self-concept of ability functions independently of measured intelligence in predicting school achievement.

In the second phase of the study, in which they investigated the same students, Brookover, Joiner, and Erickson (1967) found that self-concept of ability was a significant factor in achievement from Grades Seven through Grade Ten.

The same students were involved in phase three, the final part of the investigation, and they found that the correlation between self-concept of ability and grade point average ranged from .48 to .64 over the six years. Also, higher correlation between perceived evaluations (those evaluations which a student feels that others have toward him) and self-concepts tends to support the theory that perceived evaluations are a necessary and sufficient condition for growth of a positive or high self-concept of ability; however, a positive self-concept of ability is a necessary, but not sufficient, condition for achievement (Brookover et. al., 1967).

Although Brookover's work does not include children as young as those used in the present study, it does overlap and give insights into the effects of self-concept of ability on the performance of older students in Grades Seven and Eights.

Other researchers have discovered much the same findings as Brookover but their studies were on a much smaller scale. Bowen (1969), in his work with 389 Ninth graders, found that scores on the self-estimates of ability were significantly correlated with grade point average.

Singh (1972), in his Newfoundland study, found a correlation of .49 between self-concept of ability and grade point average for his 69 male students. This correlation

was significant beyond the .05 level. His major hypothesis that self-concept of ability is associated with school achievement was substantiated, and it seemed possible that self-concept was a significant factor influencing achievement for the Seventh Grade population of the study. I.Q. scores were not used in the Singh study so he stated that more stringent tests of his hypothesis were not possible.

Schneider (1970) found the same relationship between feelings of ability and Ninth Grade boys' achievement in English and Mathematics.

Schurr, et al., (1972) established that self-concept of academic ability was a necessary but not sufficient condition for improved academic performance.

O'Brien (1972), in her study of Eighth Grade students in rural Newfoundland schools, found that self-concept of ability was significantly related to achievement when measured intelligence is controlled. Significant differences in the mean self-concept of ability scores of overachievers and underachievers were found at all intelligence levels.

Krupczak (1973) observed a statistically significant positive correlation between student self-concept and achievement. He also found that self-concept of academic ability predicted grade point average best, reading scores next, and arithmetic scores third. In the study, student-reported self-concept of academic ability was a greater

predictor of grade point average than I.Q. scores. Subjects for the above study were 570 Grade Six students.

Mehl's study (1973) found that students' confidence level of academic ability was significantly related to indices of achievement.

It appears from all of the literature reviewed that self-concept is closely related to school achievement. More specifically, self-concept of academic ability has been found by many researchers to be related to school achievement.

Many of the studies quoted so far concerned themselves with students older than those used in the present study. Since this area of research is new, no literature was available on the age groups used in this study. However, much exploration is being done at the present time and possibly some of it concerns age groups such as those used in the present study. Also, the local studies to date in this area were concerned with students in rural schools, and with urban students whose I.Q. was not taken into consideration.

#### MOTHERS' VALUE OF EDUCATION AND STUDENTS'

#### SELF-APPRAISAL OF PERFORMANCE

Very little literature can be found concerning the relationship between mothers' value of education and students' self-appraisal of performance.

As was mentioned earlier, Brookover (1965) found that a student's self-image was probably a composite of the images reflected by many persons who are important to him. The mother was seen as the major figure in the lives of most students.

Wechsler (1971), in studying Grade Four and Five students, found some important influences which mothers have on their children's self-concepts. She contended that involving the parents of underachieving children in counselling may provide an effective method of helping the children who have proven to be very resistant to therapeutic approaches.

Mehl (1973) found that parents' attitude toward school was significantly related to student confidence levels of academic ability.

Only a small amount of literature is available concerning the relationship between parents' value of education and students' self-appraisal of performance. An even smaller amount is available on the relationship between mothers' value of education and students' self-appraisal of performance. The little that is available shows that parents' values, and particularly mothers, are closely related to students' self-appraisals of performance.

#### SUMMARY

A fair amount of literature is available concerning the relationship between parents' value of education, in

particular mothers', and the school achievement of students. None of the literature received from local sources specifically considered mothers' value of education.

Some literature is available on the relationship between students' value of education and school achievement. However, the literature is contradictory in its findings.

Some research is available on the relationship between self-appraisal of performance and achievement. In general, the evidence points to a positive correlation between the two variables. Putting these variables under investigation in a local setting was the purpose of the present study.

Little research was found concerning the relationship between mothers' value of education and students' self-appraisal of performance. This study tried to substantiate the small amounts of research available as well as place it in a Newfoundland setting.

## CHAPTER III

### PROCEDURES

The present chapter deals with the procedures followed in carrying out the study. The separate sections will describe the general procedures, the determination of overachievers and underachievers, sampling, instrumentation, and data processing.

#### GENERAL PROCEDURES

All procedures for the study were carried out in the Spring of 1971. The Canadian Lorge-Thorndike Intelligence Tests (Nonverbal Battery) were administered first. The administration was done class by class to all students from Grades V-VIII. After an intelligence quotient was established for each child, his percentile rank in his own class was computed. Using the achievement differential, explained in the next section of this chapter, students were classified as over- or underachievers.

Next, the mothers of those students selected as the sample were visited. The purpose of these visits was to administer the Mothers' Value of Education Questionnaire and to obtain permission to administer the two student questionnaires to their sons, namely the Students' Value

of Education Questionnaire and the Students' Self-Reported School Performance Questionnaire. It was stressed during the introduction that there were no personal questions to be answered. Once inside the home, a more detailed standardized explanation was given covering the following points:

1. It was explained that this was a study on education.
2. The researcher stated that their cooperation would be appreciated.
3. Next the purpose of the study was described. It was said that the study was trying to determine the type of connection which existed between how children did in school and how mothers felt about education, how students felt about education, and how students felt about their abilities in school.
4. It was stressed that such a study was being done only to help children.
5. Next, the lady was asked if she would like to see the questions.
6. The code number system was explained.

Following the explanation, a code number was placed on the questionnaire. The lady was then asked to place a check (✓) on one of the five spaces after each statement or question to indicate how she felt about the item. A sample question was then read to each lady. In all cases the investigator offered to read every item of the questionnaire for each mother. Each accepted this method of having questions read to her.

It was originally planned to interview 40 mothers. However, two refused to participate and a replacement could

only be found for one. Another replacement could not be found because there was no other student available in the proper grade level at the school who was in the same category of achievement. Since no student could be found, no mother was available. Therefore, the total size of the sample amounted to 39 mothers and their sons.

The student questionnaires were administered during the regular teaching day on June 14, 1971. Each grade level was researched separately. Approximately twenty minutes was required by each group to answer all the questions. The questionnaires were completed in a room used solely for that purpose. Careful supervision was exercised over the students to ensure that all parts of each questionnaire were completed; however, care was taken to insure that the students would not feel as though they were being watched as to how they were answering the individual items. This was accomplished by not stopping and watching students work.

#### DETERMINING OVERACHIEVERS AND UNDERACHIEVERS

This section describes how a student was classified as either an overachiever or an underachiever for purposes of selecting a sample for the study.

First, each student's achievement differential was determined. In order to do this local I.Q. percentiles were used. After each student's I.Q. score was computed, his percentile rank in his own class was determined (see Appendix I). The achievement differential was then obtained

by subtracting the students I.Q. percentile from grade average percentile (see Appendix I). If a positive number resulted, the student could be classified as an overachiever. If a negative number resulted, the student could be classified as an underachiever. This assumed a perfect correlation between intelligence and achievement test scores.

Secondly, a mean and a standard deviation were calculated for the achievement differentials of the total population from which the sample was drawn. The mean was  $-.05$ , which was taken to be  $0$ . The standard deviation was  $25.57$ , which was taken to be  $26$ .

Third, the criterion for classification as an underachiever or an overachiever was set as follows: (1) an underachiever was one whose achievement differential was more than one-half standard deviation below the mean and (2), an overachiever was one whose achievement differential was more than one-half standard deviation above the mean. Therefore, a student was considered an overachiever if his achievement differential was greater than  $+13$ . He was considered an underachiever if it was below  $-13$ .

To sum up, three steps were followed in determining underachievers and overachievers. First, each student's achievement differential was calculated. Next, a mean and a standard deviation were determined for the achievement differentials of the total population. Finally, an underachiever was taken to be one whose achievement differential was more than one-half standard deviation below the mean.

An overachiever was one whose achievement differential was more than one-half standard deviation above the mean.

#### DRAWING THE SAMPLE

This section describes how the sample was selected.

The pupil population was chosen from all Grade V-VIII pupils who met the two conditions below.

A. Each student had done the Canadian Lorge-Thorndike Intelligence Tests, Nonverbal Battery.

B. Each student had been present for regular examinations so that an average for at least one semester could be obtained over the three subject areas of English Language, Literature, and Mathematics.

Using a table of random numbers from Glass and Stanley (1970), five overachievers and five underachievers were selected from each grade level. These were selected by an assistant so that the investigator would not know if a particular child was an overachiever or an underachiever. This approach was followed so as to avoid possible bias during the interview with mothers. Such bias might have occurred if the investigator had known the classification of the child whose mother was being interviewed. Two alternate students were chosen for each category (underachiever or overachiever) for each grade level.

Tables 3.1 and 3.2 give statistics concerning the number of students in each grade, number doing intelligence tests, number taking school exams, number available for sampling, and number of overachievers, underachievers, and normal achievers for each class.

TABLE 3.1

Number of Students in Each Grade, Number Doing  
Intelligence Tests, Number Taking School Exams,  
and Number Available for Sampling

GRADE	TOTAL NO. STUDENTS	TOTAL NO. DOING I.Q. TEST	TOTAL NO. TAKING EXAMS	TOTAL NO. AVAILABLE FOR SAMPLING
5	58	45	58	25
6	33	31	33	13
7	71	52	71	30
8	51	38	51	21
TOTAL	213	166	213	89

TABLE 3.2

Number of Overachievers, Underachievers, and  
Normal Achievers for Each Class

GRADE	OVERACHIEVERS	UNDERACHIEVERS	NORMAL ACHIEVERS	TOTAL
5	14	11	20	45
6	7	6	18	31
7	15	15	22	52
8	11	10	17	38
TOTAL	47	42	77	166

Table 3.3 gives the mean and standard deviation of I.Q. scores, achievement percentiles, and achievement differentials of the sample.

TABLE 3.3

Mean and Standard Deviation of I.Q. Scores,  
Achievement Percentiles, and Achievement  
Differentials of Sample

	MEAN	STANDARD DEVIATION
I.Q.	84.10	13.80
ACHIEVEMENT PERCENTILES	42.80	26.10
ACHIEVEMENT DIFFERENTIALS	-2.05	34.50

#### INSTRUMENTS

This section deals with the questionnaires and the intelligence test used in the study.

The questionnaires were as follows: Mothers' Value of Education Questionnaire (MVE), given as in Appendix A; Students' Value of Education Questionnaire (SVE), given as in Appendix B; and Students Self-Reported School Performance Questionnaire (SRSP), given as in Appendix C.

The Mothers' Value of Education Questionnaire, Section I

This questionnaire was made up of two sections. The first, consisting of nine items, had as its purpose the

measurement of attitudes toward the value of education or of being educated. Thirteen items were taken from a 40 item scale developed by Medinnus (1962). These 13 items were eventually cut to nine and revised in keeping with suggestions made by judges.

The nature of the items in Section I of the MVE questionnaire centered around mothers' attitudes toward aspects of schooling and education in general. Items dealt with topics such as how profitable mothers felt education to be and whether they thought most people would learn more by working than by going to school. Other items questioned whether they felt educated people were better citizens or whether they thought the educational system was doing a good job.

#### Reliability

It was hoped that by good item writing and clarity of questions reliability could be established. Reasonable care was taken in the construction of all items in Section I of the questionnaire. The reliability of this section was not actually measured.

#### Validity

The type of validity of primary concern in Section I of the MVE questionnaire was content validity. The writer hoped to determine if the questions had a logical and theoretical relationship to the behavior which he was trying to measure. This type of validity was established on the

basis of judges' ratings. Judges were selected from the Faculty of Education at Memorial University of Newfoundland.

Questions were modified until they received high ratings by all judges. Ratings given by the judges were an indication of the degree to which they felt that the content of the questionnaire was pertinent to the subject of mothers' value of education and therefore valid.

As support for the face validity of the questionnaire, the mean ratings for each question are presented. It can be seen by referring to Table 3.4 that the mean ratings are close to, or the same as, the highest rating possible for each question, indicating some degree of face validity for the instrument.

The range of ratings is also presented in Table 3.4. When this range is low, it indicates that all judges were consistent in their ratings. If the mean ratings were high and the range was low, this would tend to further support the writer's claim that the instrument had a sufficient degree of validity to warrant its use in this particular study.

TABLE 3.4

The Mean and Range of Judges' Ratings on Individual  
 Items in the Mothers' Value of Education  
Questionnaire

QUESTION	MEAN RATING	RANGE
1	4.33	1
2	4.33	1
3	4.66	1
4	4.00	0
5	4.00	0
6	4.66	1
7	4.33	1
8	4.66	1
9	4.33	1

Highest possible mean rating . . . . . 5

Widest possible range . . . . . 5

Explanation of Rating:

5 . . . . . Excellent

4 . . . . . Very Good

3 . . . . . Good

2 . . . . . Fair

1 . . . . . Poor

In summary, an exact reliability coefficient is not available for Section I of the MVE questionnaire. However, it is felt that all the necessary precautions were taken in item construction to ensure a reasonable degree of reliability. This was considered to be sufficient for the present study where conclusions were to be drawn concerning groups, in which case a lower level of reliability would be acceptable. Evidence was presented for content validity and face validity of this section of the questionnaire based on judges' ratings.

#### The Mothers' Value of Education Questionnaire, Section II

Section II was Moss' (1973) adaptation of an instrument designed by Rundquist and Sletto (1936). The original questionnaire is given as in Appendix D. Moss' adaptation is given as in Appendix E. It was designed to measure attitudes toward the value of education or of being educated. The original was a Likert type scale containing 22 items.

The nature of the items in Section II of the MVE questionnaire centered around how valuable education was in meeting the problems and making the decisions of everyday life. Various items investigated the mothers' feelings about such areas of concern as working as opposed to going to school. Mothers were asked to say which situation they considered to be more valuable. It also questioned whether

education would enable people to enjoy life better, use their leisure time to better advantage, help people think for themselves, and whether university education was doing more harm than good for most people. Questions related to how much one should sacrifice to secure an education were also asked.

### Reliability

Previous studies by Rundquist and Sletto (1936), and by Moss (1973) of earlier versions of Section II of the MVE questionnaire showed empirical evidence of reliability. The present adaptation of this scale employed sound principles of item writing; however, experimental evidence is not available demonstrating the reliability of this version.

### Validity

Shaw and Wright (1967) reported good content validity for Section II of the MVE questionnaire. However, they stated that the content domain was somewhat restricted by failure to include items dealing with college education. Moss' adaptation partly corrected this difficulty. Although Shaw and Wright stated that none of the items were so seriously dated as to require alteration or elimination, Moss, through preliminary testing using 11 graduate students in Educational Administration at Memorial University of Newfoundland, eliminated 11 of the original 22 items. He also added two items dealing with post-secondary education, resulting in a final scale of 13 items. Moss then submitted

this 13 item scale to a panel of five members in the Faculty of Education at Memorial University of Newfoundland in the Departments of Educational Administration, Curriculum and Instruction, and Educational Foundations. Faculty members were requested to point out any statements which they felt did not reflect a value, positive or negative, toward education. They were also asked to suggest aspects of education not covered by the scale for which parents might or might not value education. Because of the panel's reaction, further modifications were deemed unnecessary.

The investigator for the present study then submitted these 13 items to a panel of three judges for ratings as to their suitability. As a result of this rating, one item was dropped. This was item #4 as given in Appendix E.

For both Section I and Section II directions to mothers were given orally by the investigator. These directions may be found as part of the questionnaire in Appendix A. Questions from the mothers were permitted during the directions. No statements were answered by parents until the investigator had satisfied himself that they understood the procedures to be followed. It was presumed that they understood the procedures if they appeared relaxed, had no questions as to the procedures, and were willing to start answering the items. No mother was required to give her name on the questionnaire; a code number system was used so that her responses could be compared to her son's responses, which were also on a coded questionnaire.

It was originally planned to make tape recordings of ten of these interviews with mothers. This proved to be a very difficult task, since frequently many small children were present at the time of the interview. It was felt that it might damage rapport if mothers were asked to keep their children quiet, or if the investigator constantly had to ask the children to remain quiet himself during the interview. Because of these circumstances, only three ladies were taped and only two of the tapes were of good enough quality to be valuable to the research. The other tape was spoiled due to mechanical difficulties with the tape recorder.

These tapes were used to determine if the investigator had any influence upon the type of responses given during the interview. Each tape was evaluated by three judges. These judges were graduate students from the Department of Educational Psychology, Guidance and Counselling at Memorial University of Newfoundland. They listened to the tapes and made comments on each. This sample of interviews was found by the judges to be free of any attempts to bias the responses of the people being interviewed. It should be noted that while the judges felt that some leading might have occurred, their conclusion was that it did not influence the responses. The ratings of each tape can be found in Appendix F.

In both Sections I and II of the MVE questionnaire, the responses to the statements indicating positive attitudes toward education were scored either +13 or +1. Responses

indicating negative attitudes were scored -3 or -1. An undecided response was scored 0. The total score for each mother was found by adding the values given to all responses on both sections. The highest possible score was +63 and the lowest possible score -63 for the 21 items. Heavier weights such as +3 or -3 were given in order to accentuate extreme differences because of the expectancy that mothers would tend to score positive responses.

#### Students' Self-Reported School Performance Questionnaire

Content validity was also of primary concern in this questionnaire. This type of validity was established using judges' ratings as was done in the first section of the MVE questionnaire.

The mean ratings for each question are presented in Table 3.5. This table shows that the ratings are close to, or the same as, the highest possible rating for each question. This indicates some degree of face validity for the instrument. The range is also presented in Table 3.5. Being low, it indicates that all judges were consistent in their ratings. Since the mean ratings are high and the range is low the instrument demonstrates sufficient validity for use in the study.

TABLE 3.5

The Mean and Range of Judges' Ratings on  
Individual Items on the Self-Reported  
School Performance Questionnaire

QUESTION	MEAN RATING	RANGE
1	4.66	1
2	4.66	1
3	4.66	1
4	5.00	0
5	5.00	0
6	4.66	1
7	4.66	1
8	4.33	1
9	4.66	1
10	4.33	1
11	4.33	1
12	4.66	1
13	5.00	0
14	4.66	1
15	4.66	1
16	4.66	1
17	4.66	1
18	4.66	1
19	5.00	0
20	4.66	1

Highest possible mean rating . . . . . 5

Widest possible range . . . . . 5

Explanation of Ratings:

5 . . . . . Excellent  
4 . . . . . Very Good  
3 . . . . . Good  
2 . . . . . Fair  
1 . . . . . Poor

As in the MVE questionnaire, standard procedures for item writing were used in developing the questionnaire; however, no empirical evidence of reliability was available.

The Self-Reported School Performance Questionnaire was prepared by Virginia Jones (1972) and the investigator.

The questionnaire had as its purpose the measurement of how a student viewed himself with regard to academic work, ability, and progress. The student was questioned on his ability to do good work in school, the speed at which he could do the work, his desire to quit school, his ability to get good marks if he tried harder, and other areas of concern. His abilities in Language, Literature, and Mathematics were given special attention since these were the subjects used to determine the level of school achievement in the present study.

In scoring the questionnaire, one point was given to a student if he answered a question in a manner which denoted a positive self-appraisal. The question was scored zero if he answered in a manner which denoted a negative self-appraisal. A final score was arrived at by means of addition. The highest possible score was 20.

#### Students' Value of Education Questionnaire

The type of validity of primary concern in this questionnaire was also that of content validity. Validity was established using judges' ratings, as was the SRSP questionnaire.

The mean ratings for each question are presented in Table 3.6. It can be seen by referring to the table that the ratings are close to, or the same as, the highest rating possible for each question. This would indicate validity for the instrument.

The range is also presented in Table 3.6. All judges were consistent in their ratings. Since the mean ratings are high and the range is low, it was concluded that the instrument probably had sufficient validity for use in the present study.

TABLE 3.6

The Mean and Range of Judges' Ratings on Individual  
 Items in the Students' Value of Education  
Questionnaire

QUESTION	MEAN RATING	RANGE
1	4.66	1
2	4.00	0
3	4.66	1
4	4.66	1
5	4.66	1
6	4.66	1
7	4.66	1
8	4.66	1
9	5.00	0
10	4.33	1
11	4.33	1
12	5.00	0
13	4.00	0
14	5.00	0
15	5.00	0
16	4.33	1
17	4.00	0
18	5.00	0
19	4.00	0
20	4.00	0

Highest possible mean rating . . . . . 5

Widest possible range . . . . . 5

Explanation of Ratings:

5 . . . . . Excellent  
 4 . . . . . Very Good  
 3 . . . . . Good  
 2 . . . . . Fair  
 1 . . . . . Poor

As in the MVE questionnaire, standard procedures for item writing were used in developing the questionnaire; however, no empirical evidence of reliability was available.

The Students' Value of Education Questionnaire was prepared by the investigator. It consisted of 20 items and had as its purpose the measurement of the students' consideration or value of education. It aimed to find out if the students considered education as worth sacrificing other things for and if it was useful and important. Various questions touched on areas such as their desire to pass grades, their desire to go to school even after they finished Grade Eleven, and whether they studied even when it meant missing some type of activity which they considered fun. By these questions it was hoped to obtain a measurement of the value students placed on education. No pre-test was done on this instrument. One point was given to a student if he answered a question in a manner which denoted a positive attitude toward education. The question was scored zero if he answered in a manner which denoted a negative attitude. A final score was arrived at by means of addition. The highest possible score was 20.

The Canadian Lorge-Thorndike Intelligence Tests, Nonverbal Battery, Form I

This test was used to get an estimate of intelligence for the study. The Nonverbal Battery was used because there was some doubt in the mind of the investigator that

the Verbal Battery would be valid for use in the present study. Many of the students in the school came from poor economic home situations. Therefore, it was possible that many of them were not verbally proficient. To measure their intelligence verbally seemed to the investigator to be unwise if a good indication of their true intelligence was desired. It was felt that many of the students to be tested might have more intelligence than they would be able to express verbally. The above reasoning is supported by Anastasi (1968) when she says that nonreading (nonverbal) tests are designed to assess the abstract reasoning abilities in children with reading disabilities or other educational handicaps. Further support for use of the Nonverbal Battery may be drawn from the following statement by Anastasi (1968) about the American Lorge-Thorndike which is very similar to the Canadian version.

The nonverbal and verbal batteries do nevertheless have much in common. A typical correlation between the two batteries, found in a group of 1,590 fourth graders, was .74. A factor analysis of the eight tests revealed a general factor that accounts for the largest proportion of the variance in each test. A smaller group factor was identified through four of the five tests in the verbal battery, and another group factor through the two number tests (cutting across verbal and nonverbal batteries). The Lorge-Thorndike verbal and nonverbal batteries thus appear to be more nearly comparable than is generally true of verbal and nonverbal tests [p.224].

The Nonverbal Battery consists of three subtests requiring nine minutes each to administer. Levels A, B, C, and D of the 1967 edition were used. Comments by reviewers in Buros Mental Measurements Yearbook (1960) on the American Lorge-Thorndike were helpful in selecting the Canadian version for use in the study.

One reviewer made the following comments about the American tests:

On the whole the Lorge-Thorndike series is among the sounder instruments available, from the point of view of psychological insights, shown in selecting and developing the materials and from the point of view of statistical analysis of the standardization data [pp. 479-484].

Another writes:

The Lorge-Thorndike tests should be accorded a place among the best of our group intelligence tests. They are well designed, easily administered and scored and, what is especially noteworthy, the uses recommended for them are reasonable and defensible [pp. 481-482].

Both of the above statements are supported by another reviewer who says:

It should be made clear that in this reviewer's opinion, this is an excellent series of tests, well designed and constructed, admirably printed and equipped with highly satisfactory norms. It can also be said that the tests provide reliable measures of verbal reasoning and nonverbal reasoning [pp. 482-484].

### Reliability of Canadian Lorge-Thorndike

Odd-even reliability is the only type discussed in the manual for this test (Wright, 1967). The following coefficients were given for the four levels of the Nonverbal Battery used in this study:

Level A = .93

Level B = .93

Level C = .92

Level D = .91

### Validity of the Canadian Lorge-Thorndike

Validity information from the manual is quoted as follows:

One way of judging the validity of a test is to determine the degree to which it seems to be doing the job for which it is designed. Thus one can examine the items of the Lorge-Thorndike Intelligence Tests to see if they require a pupil to make responses which one would call 'intelligent.' The items for the Lorge-Thorndike Intelligence Tests were selected so that for the most part they deal with symbolic relationships. In answering most of the items a pupil is required to discover a principle and then apply it. The tests, then, have been designed to measure reasoning ability [p. 29].

Another form of validity mentioned is its correlation with other, older tests which are designed to measure the same thing. Data for Canadian pupils is not yet available; however, experience with similar forms of the Lorge-Thorndike Tests in the United States indicate that the tests

correlate quite highly with other well known measures of intelligence. The Nonverbal Battery correlates in the high 60's and low 70's with the Stanford-Binet and with the WISC Verbal Scale. Correlations of similar magnitude are reported between the Lorge-Thorndike Nonverbal Battery and the Verbal Reasoning and Numerical Abilities Sections of the Differential Aptitude Tests (Wright, 1967).

In view of the above comments from various reviewers on the American version of the Lorge-Thorndike Intelligence Tests, and after considering the limited, yet sound, reliability and validity data on the Canadian version, the investigator considers them to be one of the better group intelligence tests and suitable for use in the present study.

#### DATA PROCESSING

##### Hypothesis I:

There will be no relationship between mothers' value of education and the achievement differential of their sons.

In order to test this hypothesis the Fisher Exact Probability was used. This is an exact test of significance for a 2x2 table developed by R.A. Fisher (see Ferguson, 1966). After the MVE questionnaire was scored, the median was computed for the total group. Mothers below the median were considered

to have a lower value of education than mothers who scored above the median. They were then placed in Table 4.2 as the total number of mothers with a low value of education and total number of mothers with a high value of education. They were also classified as mothers of underachievers or overachievers.

By means of the Fisher Exact Probability, one may calculate exact probabilities and avoid the use of the continuous chi-square distribution to obtain approximate probabilities. Usually it is not necessary to calculate the probabilities associated with all possible arrangements of the 2x2 table. It is only necessary to calculate the probabilities associated with the observed table and those that represent more extreme departures from expectation in the same direction. The formula for this test is given in Appendix G.

Hypothesis II:

There will be no relationship between boys' value of education and their achievement differential.

The Fisher Exact Probability was also used to test this hypothesis. After the SVE questionnaire was scored, a median was computed for the total group. Students below the median were considered to have a lower value of education than students above the median. They were then placed in Table 4.4 as the total number of students with a low value

of education and total number of students with a high value of education. They were also classified in this table as underachievers or overachievers.

Calculations on the 2x2 table were carried out as described in the analysis of data for Hypothesis I.

#### Hypothesis III:

There will be no relationship between boys' self-appraisal of performance and their achievement differential.

Again the Fisher Exact Probability was used to test this hypothesis. When the SRSP questionnaire was scored, students below the median were considered to have a lower self-appraisal of performance than students above the median. They were then placed in Table 4.7 as the total number of students with a low self-appraisal of performance and the total number of students with a high self-appraisal of performance. They were also classified in this table as underachievers or overachievers

Calculations on the 2x2 table were carried out as described in the analysis for the data concerning Hypothesis I.

#### Hypothesis IV:

There will be no relationship between mothers' value of education and boys' self-appraisal of performance.

The Fisher Exact Probability was used to test Hypothesis IV. The 2x2 table shown in Table 4.9 was set up by classifying students as having a low or high

self-appraisal of performance and placing them in categories as having mothers with low or high values of education.

Calculations on the 2x2 table were carried out as described in the analysis for the data concerning Hypothesis I.

#### SUMMARY

This chapter dealt with the procedures used in carrying out the present study. At first a general overview of all procedures was given, followed by separate sections dealing with determining over- and underachievers, sampling, instruments, and data processing.

## CHAPTER IV

### ANALYSIS OF DATA

The purpose of this chapter is to present the analysis of data collected in the study.

#### HYPOTHESIS I

This hypothesis stated that there would be no relationship between mothers' value of education and the achievement differentials of their children based on English Language, Literature, and Mathematics.

Table 4.1 gives some statistics concerning the scores on the MVE questionnaire.

TABLE 4.1

Mean, Standard Deviation, and Median for Mothers'  
Value of Education Questionnaire

	N	MEAN	STANDARD DEVIATION	MEDIAN
MOTHERS OF UNDERACHIEVERS	20	30.55	14.6	32.0
MOTHERS OF OVERACHIEVERS	19	30.63	12.5	30.0
TOTAL NO. OF MOTHERS	39	30.60	13.5	31.0

There was less variability about the mean for the overachieving group. However, since the overachievers had a lower median score, they did not have a value of education which was consistently higher than the under-achieving group.

A test of significance was run on the relationship between mothers' value of education and the achievement differentials of their sons. Table 4.2 gives the 2x2 table.

TABLE 4.2

Relationship Between Mothers' Value of Education  
and the Achievement Differentials of Their Sons

	<u>MOTHERS' VALUE OF EDUCATION</u>		TOTAL
	LOW	HIGH	
UNDERACHIEVING SONS	10	10	20
OVERACHIEVING SONS	8	11	19
TOTAL	18	21	39

FISHER'S EXACT PROBABILITY = .43

The exact probability associated with Table 4.2 was .43. The present study failed to reject the null hypothesis.

#### HYPOTHESIS II

This hypothesis stated that there would be no relationship between students' value of education and their achievement differentials based on English Language, Literature, and Mathematics.

Table 4.3 gives some statistics which resulted from scoring the SVE questionnaire.

TABLE 4.3

Mean, Standard Deviation, and Median for  
Students' Value of Education Questionnaire

	N	MEAN	STANDARD DEVIATION	MEDIAN
UNDERACHIEVERS	20	16.9	2.6	17.5
OVERACHIEVERS	19	17.1	3.2	18.0
TOTAL SAMPLE	39	17.0	3.0	18.0

Although the underachievers had a slightly lower mean as compared to that of overachievers, there was less variability of scores about their mean. This finding, plus the fact that there was also a smaller difference between their mean and median scores, shows that they were a more consistent group in their responses.

When we consider that the total possible score for this questionnaire was 20, it can be seen by referring to Table 4.3 that both groups generally had very high ratings.

Table 4.4 shows the relationship between SVE and their achievement differentials.

TABLE 4.4

Relationship Between Students' Value of  
Education and Their Achievement Differentials

	VALUE OF EDUCATION		TOTAL
	LOW	HIGH	
NO. OF UNDERACHIEVERS	11	9	20
NO. OF OVERACHIEVERS	7	12	19
TOTAL	18	21	39

FISHER'S EXACT PROBABILITY = .21

The exact probability for Table 4.4 was .21. The present study failed to reject the null hypothesis.

### HYPOTHESIS III

This hypothesis stated that there would be no relationship between students' self-appraisal of performance and their achievement differentials based on English Language, Literature, and Mathematics.

Table 4.5 presents the results of calculations done on the responses to the items on the SRSP questionnaire.

TABLE 4.5

Mean, Standard Deviation, and Median for  
Students' Self-Reported School  
Performance Questionnaire

	N	MEAN	STANDARD DEVIATION	MEDIAN
UNDERACHIEVERS	20	12.9	4.6	14.5
OVERACHIEVERS	19	15.2	4.5	16.0
TOTAL SAMPLE	39	14.0	4.6	15.0

The overachieving group scored higher on the questionnaire as can be seen from the higher mean and median.

Table 4.6 shows the relationship between students' responses on the SRSP questionnaire and their achievement differentials.

TABLE 4.6

Relationship Between Students' Self-Appraisal  
of Performance and Their Achievement Differentials

	<u>SELF-APPRAISAL OF PERFORMANCE</u>		TOTAL
	LOW	HIGH	
NO. OF UNDERACHIEVERS	13	7	20
NO. OF OVERACHIEVERS	6	13	19
TOTAL	19	20	39

FISHER'S EXACT PROBABILITY = .04

The exact probability of .04 was sufficient to reject the hypothesis of independence. A significant relationship was found between students' self-appraisal of performance and their achievement differentials.

TABLE 4.7

Proportion of Underachievers, Overachievers, and Total Sample Responding to Individual Items on the Students' Self-Reported School Performance Questionnaire in a Manner Denoting a High Self-Appraisal

QUESTION NUMBER	PROPORTION OF UNDERACHIEVERS	PROPORTION OF OVERACHIEVERS	PROPORTION OF TOTAL SAMPLE
1	.45	.89	.67
2	.50	.68	.59
3	.90	.95	.92
4	1.00	.95	.97
5	.90	.89	.90
6	.40	.58	.48
7	.55	.68	.62
8	.60	.74	.67
9	.75	.63	.69
10	.55	.79	.67
11	.75	.74	.74
12	.55	.79	.67
13	.30	.68	.48
14	.50	.79	.64
15	.65	.53	.59
16	.75	.74	.74
17	.75	.63	.69
18	.60	.79	.69
19	.65	.84	.74
20	.80	.84	.82
	N = 20	N = 19	N = 39

In the study, .68 of overachievers had high self-appraisals of performance. However, only .35 of underachievers had high self-appraisals of performance.

The median proportion of underachievers who answered in a manner denoting a positive self-appraisal was .625, for overachievers it was .765, and for the total sample .680.

#### HYPOTHESIS IV

This hypothesis stated that there would be no relationship between mothers' value of education and students' self-appraisal of performance.

Table 4.8 shows the relationship between MVE and SAP (self-appraisal of performance).

TABLE 4.8

Relationship Between Mothers' Value of Education and  
Students' Self-Appraisal of Performance

MOTHERS' VALUE OF EDUCATION	STUDENTS' SELF-APPRAISAL OF PERFORMANCE		TOTAL
	LOW	HIGH	
LOW	10	8	18
HIGH	9	12	21
TOTAL	19	20	39

FISHER'S EXACT PROBABILITY = .32

The exact probability for Table 4.8 being .32, therefore, the present study failed to reject the null hypothesis.

The relationship between mothers' value of education and self-appraisal of school performance of underachievers and overachievers as two distinct groups was also investigated. Table 4.9 shows the relationship between MVE and SAP for underachievers and their mothers.

TABLE 4.9

Relationship Between Mothers' Value of Education  
and the Self-Appraisals of Performance  
of Underachievers

MOTHERS' VALUE OF EDUCATION	UNDERACHIEVERS' SELF-APPRAISAL OF PERFORMANCE		TOTAL
	LOW	HIGH	
LOW	7	3	10
HIGH	6	4	10
TOTAL	13	7	20

FISHER'S EXACT PROBABILITY = .50

The exact probability associated with Table 4.9 was .50. Therefore, it was concluded that there was no significant relationship between MVE and SAP for underachievers and their mothers.

Table 4.10 shows the relationship between MVE and SAP for overachievers and their mothers.

TABLE 4.10

Relationship Between Mothers' Value of Education  
and the Self-Appraisals of Performance  
of Overachievers

MOTHERS' VALUE OF EDUCATION	OVERACHIEVERS' SELF- APPRAISAL OF PERFORMANCE		TOTAL
	LOW	HIGH	
LOW	3	5	8
HIGH	3	8	11
TOTAL	6	13	19

FISHER'S EXACT PROBABILITY = .83

The exact probability for Table 4.10 was .83. Therefore, there was no significant relationship between MVE and SAP for overachievers and their mothers.

#### ADDITIONAL VARIABLES INVESTIGATED

This section presents the findings concerning areas which were considered important by the investigator, yet, were not included in the hypotheses for the study.

Mothers' Value of Education and Students' Value of Education

Table 4.11 gives the data concerning the relationship between MVE and SVE.

TABLE 4.11

Relationship Between Mothers' Value of Education  
and Students' Value of Education

STUDENTS' VALUE OF EDUCATION	MOTHERS' VALUE OF EDUCATION		TOTAL
	LOW	HIGH	
LOW	10	8	18
HIGH	8	13	21
TOTAL	18	21	39

FISHER'S EXACT PROBABILITY = .21

No significant relationship between MVE and SVE was found. The exact probability associated with Table 4.11 was .21.

Students' Value of Education and Students' Self-Appraisal of Performance

The relationship between SVE and SAP was investigated. Table 4.12 gives the data.

TABLE 4.12

Relationship Between Students' Value of Education and Students' Self-Appraisal of Performance

STUDENTS' SELF-APPRAISAL OF PERFORMANCE	STUDENTS' VALUE OF EDUCATION		TOTAL
	LOW	HIGH	
LOW	12	7	19
HIGH	6	14	20
TOTAL	18	21	39

FISHER'S EXACT PROBABILITY = .04

There was a significant relationship between SVE and SAP. The probability associated with Table 4.12 was .04.

Of all those students with a high value of education, .67 also possessed high self-appraisals of performance. However, only .33 of those students who had low values of education also possessed high self-appraisals of performance.

The relationship between SVE and SAP was also investigated for underachievers and overachievers taken separately. Table 4.13 shows the relationship for underachievers.

TABLE 4.13

Relationship Between Students' Value of Education  
and Students' Self-Appraisal of Performance  
for Underachievers

STUDENTS' SELF- APPRAISAL OF PERFORMANCE	UNDERACHIEVERS' VALUE OF EDUCATION		TOTAL
	LOW	HIGH	
LOW	10	3	13
HIGH	1	6	7
TOTAL	11	9	20

FISHER'S EXACT PROBABILITY = .01

The exact probability for Table 4.13 was .01. A significant relationship did exist between SVE and SAP for underachievers. Of all those students who had a high value of education, .67 also had a high self-appraisal of performance. However, only .09 of those who had a low value of education also had a high self-appraisal of performance.

The relationship between SVE and SAP for over-achievers is shown in Table 4.14.

TABLE 4.14

Relationship Between Students' Value of Education  
and Students' Self-Appraisal of Performance  
for Overachievers

STUDENTS' SELF- APPRAISAL OF PERFORMANCE	OVERACHIEVERS' VALUE OF EDUCATION		TOTAL
	LOW	HIGH	
LOW	2	4	6
HIGH	5	8	13
TOTAL	7	12	19

FISHER'S EXACT PROBABILITY = .78

The exact probability associated with Table 4.14 was .78. The relationship between SVE and SAP for overachievers was not significant.

#### SUMMARY

The study failed to reject Hypotheses I and II, showing that no significant relationship was found between mothers' value of education and achievement differential or between students' value of education and achievement differential. Hypothesis III was rejected. This hypothesis stated that there would be no relationship between students' self-appraisal of performance and their achievement differential. The study also failed to reject Hypothesis IV for the total sample and also for underachievers and overachievers taken separately. This hypothesis stated that there would be no relationship between mothers' value of education and students' self-appraisal of performance. Some additional variables were investigated using the data collected during the study. No significant relationship was found between mothers' value of education and students' value of education. The relationship between students' value of education and students' self-appraisal of performance was significant for the total sample and for underachievers, but not for overachievers.

## CHAPTER V

### DISCUSSION, CONCLUSIONS, AND RECOMMENDATIONS

#### Discussion

Briefly, the hypotheses of the present study dealt with:

1. The relationship between mothers' value of education and the achievement differentials of their sons,
2. The relationship between students' value of education and their achievement differentials,
3. The relationship between students' self-appraisal of performance and their achievement differentials, and
4. The relationship between mothers' value of education and students' self-appraisal of performance.

The following additional variables were also investigated to determine the relationship between them:

1. The relationship between mothers' value of education and students' value of education for the total sample and for underachievers and overachievers taken separately, and
2. The relationship between students' value of education and students' self-appraisal of performance for the total sample and for underachievers and overachievers taken separately.

This chapter will deal with these areas of concern separately, discussing each in terms of present meaning and possible future consequences. Whenever possible, implications for future research and planning will be discussed.

Mothers' value of education and achievement differentials of their sons. Those studies cited in the review of the literature, Chapter II, showed the relationship of parental value of education to school achievement. Maternal values were especially noted. Although the literature pointed out in several instances that both formal and social learning evolved out of an intricate mother - child relationship, support for this was not found in the present study. The study was concerned specifically with the formal aspects of mothers' value of education and school achievement. While studying these variables, it was actually found that mothers of overachievers had a lower median score on the MVE questionnaire than mothers of underachievers. Possibly, for the type of environment in which the present study was carried out, a mother's value of education was not related to how her son did in school.

It is also possible that the investigator influenced mothers in ways not discernible during the interview or from listening to tapes of some interviews. It is possible that mothers answered the way they did regardless of what

the investigator did to try and not influence them. This influence could have occurred due to the personality of the investigator or due to the fact of his physical presence. Perhaps the instrument used to measure mothers' value of education did not really measure that quality.

Students' value of education and their achievement differentials. The review of the literature showed that the studies to date did not reach any consistent conclusions as to the relationship between students' value of education and their achievement. The results of the present study were more in line with the findings of Knaupp (1973) and Keane (1969) which showed no significant relationship.

From Table 4.3, page 52, it can be seen that mean scores for underachievers and overachievers were very high on the SVE questionnaire. Three possibilities are apparent for this trend in responses. First, it is possible that a large number of students in both groups stated that they valued education when they really did value it. Second, it is possible that many students stated that they valued education when they did not value it. If the second case is true, two motives might have caused the students to respond in that manner. First, it is possible that they checked answers denoting a high value of education to merely amuse themselves and to want to jokingly mislead the investigator. However, no such attitude was apparent to the investigator during the testing. Second, it is

possible that they checked those responses denoting a high value of education because they felt that this was the socially desirable response. It is also possible that the questionnaire was so constructed as to elicit socially desirable responses unknowingly. The investigator saw no evidence of either motive for responding in a manner denoting a positive attitude toward education if they genuinely did not have a positive attitude. If they were not named on the answer sheet this would partially eliminate a need to respond in a socially desirable manner, since they could not be identified by the readers afterwards. However, they could have responded in a positive manner to seem good to themselves.

Perhaps the instrument used to measure students' value of education did not really measure that quality.

Students' self-appraisal of performance and their achievement differential. The findings concerning the relationship between students' self-appraisal of performance and school achievement were consistent with the literature reviewed, especially that of Brookover (1965, 1967), Bowen (1969), and Singh (1972). In the present study, the findings were true for students from a low socio-economic area of St. John's.

Table 4.7, page 56, showed that all underachievers and .95 of overachievers answered question number four in a positive manner. They stated by responding in this way that they would get good marks if they tried. If what

these students felt is true, many of the students in the school were not working up to their full potential. It is possibly unrealistic to suggest that such a high percentage could get good marks, yet, some attention should be paid to the fact that a large number of students felt they could do much better.

It is possible that different students have different conceptions of what "good marks" mean. Perhaps some students felt that good marks for them would be marks that are higher than their present ones, yet, not necessarily high marks when compared with some scores obtained by other students.

Mothers' value of education and students' self-appraisals of performance. From the review of the literature, especially that of Brookover et al., (1965), it appeared that mothers' values of education were closely related to the self-concept of ability of their children. No support for these findings was apparent from the present study.

Even less of a relationship appeared to exist between these two variables when mothers of underachievers and mothers of overachievers were taken separately. One possible explanation for this could be that mothers were not considered important figures by their sons when the mothers' value of education was concerned.

Another possible explanation for the findings of the present study not agreeing with findings of earlier

studies could be instrumentation. Perhaps instruments used in the present study were not as well constructed as those used in earlier studies.

Mothers' value of education and students' value of education. No significant relationship was found between the two variables in the present study. It is possible that direct contact with the student would be preferable to working with the mother and hoping that the son would increase his value of education through contact with her.

Students' value of education and students' self-appraisal of performance. A significant relationship existed between these two variables. The source of the relationship was the underachieving group. By studying students' values of education and applying programs to increase their values, it may be possible to raise their self-appraisals of performance. Since self-appraisal of performance was shown earlier to be related to achievement differential, by using a program such as was suggested above, it might be possible to increase achievement.

The relationship between students' value of education and students' self-appraisal of performance was also significant for underachievers. Therefore, it might be possible, particularly for underachievers, to increase their value of education and thereby increase their self-appraisal of performance and their achievement.

It appeared from this section of the study that some students can overachieve and yet have no significant relationship between their value of education and their self-appraisal of performance. However, the underachievers had a significant relationship between the same two variables.

### Conclusions

Judging by the cooperation from mothers during the present study, it is concluded that this type of research is quite feasible in the area described. Mothers were cooperative when they listened to the explanation of the study and the reasons for it. Researchers should keep in mind that in dealing with people such as were involved in the personal interviews, care must be taken so as not to make the person feel self-conscious due to possible lack of education or poor home circumstances.

In conclusion, the following recommendations are made for educators concerned with the type of students and mothers involved in the present study, and for future researchers who might study further the relationship between values and school achievement.

### Recommendations for Educators

1. Measurement of students' self-appraisal could be considered for inclusion as part of the school's testing program.
2. Teachers and counselors could be trained to develop an understanding of self-appraisal theories and how they are

related to various aspects of the school situation.

3. It is possible that work to increase self-appraisal of performance and value of education might be done independently of the home and still be effective.

4. Measurement of students' value of education could be considered for inclusion as part of the school's testing program.

#### Recommendations for Future Research

1. Future studies could investigate the degree that improvement of self-appraisal of performance affects test scores.

2. Future studies could attempt to determine why, for overachievers, there is no significant relationship between students' value of education and students' self-appraisal of performance.

3. A similar study could be done using girls as the student sample.

4. There is a need to continue efforts to develop valid and reliable instruments with which to assess affective variables such as the ones in the present study.

5. Future studies could investigate the reasons for large numbers of students stating that they can do much better work in school, yet failing to do so.

6. Similar studies could be carried out in non-disadvantaged areas and the results compared with the present study.

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APPENDIX A

MOTHERS' VALUE OF EDUCATION QUESTIONNAIRE

DIRECTIONS: Please read each item carefully, and check quickly the response which best expresses your own feelings about the statement. Let your own feelings determine your answer. DO NOT SPEND MUCH TIME ON ANY ONE ITEM.

If you are in doubt, check the response which comes closest to your own feeling about the statement. For example, if you think that the statement is entirely wrong, check the phrase "strongly disagree."

EXAMPLE:

A high school education makes a man a better citizen.

STRONGLY  
AGREE

AGREE

UNDECIDED

DISAGREE

STRONGLY  
DISAGREE

If you think that there is some truth in the statement, but you do not completely agree with it, check the phrase "agree."

EXAMPLE:

Everyone should go to university.

STRONGLY  
AGREE

AGREE

UNDECIDED

DISAGREE

STRONGLY  
DISAGREE

PLEASE WORK RAPIDLY. Be sure to answer every item.

Some of the statements may appear to be the same as others. Please answer them according to your feelings.

S E C T I O N I

1. Going to school is a profitable experience.

<u>STRONGLY</u> AGREE	<u>AGREE</u>	<u>UNDECIDED</u>	<u>DISAGREE</u>	<u>STRONGLY</u> DISAGREE
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2. Generally speaking, educated people are better citizens.

<u>STRONGLY</u> AGREE	<u>AGREE</u>	<u>UNDECIDED</u>	<u>DISAGREE</u>	<u>STRONGLY</u> DISAGREE
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3. It seems to me that public money which is put into education is well worth it.

<u>STRONGLY</u> AGREE	<u>AGREE</u>	<u>UNDECIDED</u>	<u>DISAGREE</u>	<u>STRONGLY</u> DISAGREE
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4. On the whole, educational systems are doing a good job today.

<u>STRONGLY</u> AGREE	<u>AGREE</u>	<u>UNDECIDED</u>	<u>DISAGREE</u>	<u>STRONGLY</u> DISAGREE
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5. Schools are the backbone of Canadian Democracy.

<u>STRONGLY</u> AGREE	<u>AGREE</u>	<u>UNDECIDED</u>	<u>DISAGREE</u>	<u>STRONGLY</u> DISAGREE
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6. The main reason that I can see for going to school is that the law requires it.

<u>STRONGLY</u> AGREE	<u>AGREE</u>	<u>UNDECIDED</u>	<u>DISAGREE</u>	<u>STRONGLY</u> DISAGREE
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7. Most people will learn more by working for four years than by going to school for four years.

<u>STRONGLY</u> AGREE	<u>AGREE</u>	<u>UNDECIDED</u>	<u>DISAGREE</u>	<u>STRONGLY</u> DISAGREE
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8. The best way to get a good job is to get a good education.

<u>STRONGLY</u> AGREE	<u>AGREE</u>	<u>UNDECIDED</u>	<u>DISAGREE</u>	<u>STRONGLY</u> DISAGREE
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9. Many children would be better off if they discontinued their education after grade eight.

<u>STRONGLY</u> AGREE	<u>AGREE</u>	<u>UNDECIDED</u>	<u>DISAGREE</u>	<u>STRONGLY</u> DISAGREE
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S E C T I O N   I I

10. A young person will benefit more by working for four years than by going to high school.

<u>STRONGLY</u> AGREE	<u>AGREE</u>	<u>UNDECIDED</u>	<u>DISAGREE</u>	<u>STRONGLY</u> DISAGREE
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11. Education enables people to enjoy life better.

<u>STRONGLY</u> AGREE	<u>AGREE</u>	<u>UNDECIDED</u>	<u>DISAGREE</u>	<u>STRONGLY</u> DISAGREE
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12. Education helps people to use their leisure time to better advantage.

<u>STRONGLY</u> AGREE	<u>AGREE</u>	<u>UNDECIDED</u>	<u>DISAGREE</u>	<u>STRONGLY</u> DISAGREE
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13. An educated person is better able to think for himself.

<u>STRONGLY</u> AGREE	<u>AGREE</u>	<u>UNDECIDED</u>	<u>DISAGREE</u>	<u>STRONGLY</u> DISAGREE
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14. Education is of little help in meeting the problems of real life.

<u>STRONGLY</u> AGREE	<u>AGREE</u>	<u>UNDECIDED</u>	<u>DISAGREE</u>	<u>STRONGLY</u> DISAGREE
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S E C T I O N II (CONTINUED)

15. Educated people are better equipped to adjust to our changing society.

<u>STRONGLY</u> AGREE	<u>AGREE</u>	<u>UNDECIDED</u>	<u>DISAGREE</u>	<u>STRONGLY</u> DISAGREE
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16. One solution to the world's poverty problem is education.

<u>STRONGLY</u> AGREE	<u>AGREE</u>	<u>UNDECIDED</u>	<u>DISAGREE</u>	<u>STRONGLY</u> DISAGREE
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17. Parents should not be expected to make personal sacrifices in order to put their children through college.

<u>STRONGLY</u> AGREE	<u>AGREE</u>	<u>UNDECIDED</u>	<u>DISAGREE</u>	<u>STRONGLY</u> DISAGREE
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18. Education is valuable to everyone.

<u>STRONGLY</u> AGREE	<u>AGREE</u>	<u>UNDECIDED</u>	<u>DISAGREE</u>	<u>STRONGLY</u> DISAGREE
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19. It is better for a person to go to college or to trade school than to go immediately to work.

<u>STRONGLY</u> AGREE	<u>AGREE</u>	<u>UNDECIDED</u>	<u>DISAGREE</u>	<u>STRONGLY</u> DISAGREE
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S E C T I O N II (CONTINUED)

20. University education is doing more harm than good to most people.

STRONGLY  
AGREE

AGREE

UNDECIDED

DISAGREE

STRONGLY  
DISAGREE

21. Public money spent for education could be more wisely spent for other purposes.

STRONGLY  
AGREE

AGREE

UNDECIDED

DISAGREE

STRONGLY  
DISAGREE

APPENDIX B

STUDENTS' VALUE OF EDUCATION QUESTIONNAIRE

DIRECTIONS: Place a ✓ mark after YES or NO, whichever one you wish to mark.

1. Do you think you should work hard in school? YES . . .  
NO . . .
2. Would you feel badly if you failed in school? YES . . .  
NO . . .
3. Would you like to pass Grade 8? YES . . . NO . . .
4. Would you like to pass Grade 11? YES . . . NO . . .
5. Would you like help with your schoolwork so that you  
could do it really well? YES . . . NO . . .
6. Would you like to go to school even after you finish  
Grade 11? YES . . . NO . . .
7. Do you think school is a waste of time? YES . . . NO . . .
8. Do you think all education is a waste of time? YES . . .  
NO . . .
9. Do you want to get a good education? YES . . . NO . . .
10. Do you go to school only because you are forced to  
go? YES . . . NO . . .
11. Does education make people too smart for their own  
good? YES . . . NO . . .
12. I think time spent studying is a waste of time.  
YES . . . NO . . .
13. Education does more harm than good. YES . . . NO . . .
14. It is better to get a job when you are sixteen than  
to keep going to school. YES . . . NO . . .

15. Education is good. YES . . . NO . . .
16. Do you think education will make your life interesting? YES . . . NO . . .
17. Will a good education help you to get a good job? YES . . . NO . . .
18. Do you still study even when it makes you miss out on some fun? YES . . . NO . . .
19. I feel I would be happier if I could study well. YES . . . NO . . .
20. Today, people get more education than they need. YES . . . NO . . .

APPENDIX C

STUDENTS' SELF-REPORTED SCHOOL PERFORMANCE QUESTIONNAIRE

DIRECTIONS: Place a ✓ mark after YES or NO, whichever way you wish to answer a question.

1. I do good work in school. YES . . . NO . . .
2. I am slow at schoolwork. YES . . . NO . . .
3. I want to quit school right now. YES . . . NO . . .
4. I will get good marks if I try hard. YES . . . NO . . .
5. I think I will get low marks no matter how hard I try. YES . . . NO . . .
6. School is a lot of fun. YES . . . NO . . .
7. I waste a lot of time in school. YES . . . NO . . .
8. I hate working at Math. YES . . . NO . . .
9. School is no fun at all. YES . . . NO . . .
10. I hate working at English Language. YES . . . NO . . .
11. I hate working at Literature. YES . . . NO . . .
12. I do poorly in Math. YES . . . NO . . .
13. I find schoolwork hard. YES . . . NO . . .
14. I feel I do English poorly. YES . . . NO . . .
15. I feel I do Literature poorly. YES . . . NO . . .
16. In Math, I do as well as most pupils. YES . . . NO . . .
17. In Literature, I do as well as most pupils. YES . . .  
NO . . .

- 18. In English Language, I do as well as most pupils.  
YES . . . NO . . .
- 19. I am backward in schoolwork. YES . . . NO . . .
- 20. I think I will pass Grade 8. YES . . . NO . . .



16. A man is foolish to keep going to school if he can get a job.
17. Savings spent on education are wisely invested.
18. An educated man can advance more rapidly in business and industry.
19. Parents should not be compelled to send their children to school.

APPENDIX E

MOSS' ADAPTATION OF THE ORIGINAL RUNDQUIST  
AND SLETTO QUESTIONNAIRE

1. A young person will benefit more by working for four years than by going to high school.

STRONGLY  
AGREE

AGREE

UNDECIDED

DISAGREE

STRONGLY  
DISAGREE

2. Education enables people to enjoy life better.
3. Education helps people to use their leisure time to better advantage.
4. A good education is no comfort to a person who has just lost a job.
5. An educated person is better able to think for himself.
6. Education is of little help in meeting the problems of real life.
7. Educated people are better equipped to adjust to our changing society.
8. One solution to the world's poverty problems is education.
9. Parents should not be expected to make personal sacrifices in order to put their children through college.
10. Education is valuable to everyone.
11. It is better for a person to go to college or to trade school than to go immediately to work.
12. University education is doing more harm than good to most people.
13. Public money spent for education could be more wisely spent for other purposes.

## APPENDIX F

### JUDGES' EVALUATIONS OF TAPED INTERVIEWS

INTERVIEW No. 050

JUDGE No. 1

Numbers seven and 17 were very difficult to explain to the parent. Your interpretation of these did not appear to influence the response.

However, in a couple of instances I noticed that you asked for a response naming only one or two of the possible responses, rather than all five possible responses. In one other I noticed your response to a question asked by the parent was, "Do you agree a little?" However, I don't think that this influenced the parent's final responses because she went on to explain what she was trying to say.

JUDGE No. 2

I did not notice any way in which you influenced the respondent. Some of the questioning was difficult because of the lack of understanding of the questions. All in all, I feel that the procedure was unbiased as far as could be possible. There was a bit of leading but not enough to influence the responses.

JUDGE No. 3

In general I do not think your remarks influenced the choices. I wonder though, if in some instances, you interpreted a little too much, e.g. numbers 7, 17, and 20. Occasionally, when you were helping her interpret (see number 20), you may have led a little.

INTERVIEW No. 041

JUDGE No. 1

Your remarks did not influence the responses given.

JUDGE No. 2

There was no sign of influencing the respondents replies. Again, there was a sign of leading, but in my opinion this was not stressed enough to influence the parent.

JUDGE No. 3

I do not feel that your remarks influenced the lady's responses. Number 17 was a bit doubtful, but your remark during number 20 seemed to make up for that.

## APPENDIX G

### FISHER'S EXACT TEST OF SIGNIFICANCE FOR A 2x2 TABLE

The probability of any arrangement of cell frequencies, given the marginal restrictions is obtained by:

$$p = \frac{(A + B) ! (C + D) ! (A + C) ! (B + D) !}{N! A! B! C! D!}$$

The numerator is the product of the factorials of the marginal totals. The denominator is N! times the product of the factorials of the cell frequencies.

EXAMPLE:

0	3	3
5	3	8
5	6	

$$p = \frac{(0 + 3) ! (5 + 3) ! (0 + 5) ! (3 + 3) !}{11! 0! 3! 5! 3!}$$

This test enables the calculation of exact probabilities and avoids the use of continuous chi-square distribution to obtain approximate probabilities. It may be used appropriately where the expected cell frequencies are small.

## APPENDIX H

### FORMULA FOR STANDARD DEVIATION

$$s = \frac{N\sum x^2 - (\sum x)^2}{N(N-1)}$$

N = number of scores

$\sum$  = sum

$x^2$  = the square of each score

x = score

APPENDIX I

FORMULA FOR DETERMINING PERCENTILE RANK

$$\text{Percentile Rank} = \frac{\frac{1}{2} f + \text{cum } f}{N} \times 100$$

f = frequency

cum f = cumulative frequency

N = number of cases







