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Academic achievement and its relation to  
family background and locus of control

Mohammad Khayyer  
University of Wollongong

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**Academic Achievement and its Relation to Family  
Background and Locus of Control**

A thesis submitted in fulfilment of the requirements for the  
award of the degree

**Doctor of Philosophy**

from

**University of Wollongong**

by

**Mohammad Khayyer, B.A., M.A.**

Graduate School of Education  
1994

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## **Acknowledgments**

The investigator wishes to acknowledge, with deep appreciation, the valuable advice and encouragement of the supervisors of the study, Associate Professor P. de Lacey (principal supervisor) and Professor K. Gannicott (co-supervisor), for their technical and professional advice, personal assistance and commitment to the study.

Thanks are also due to Professor S. Nowicki and to the Australian Council for Educational Research (ACER) for their permission to the investigator for using their instruments in this study. I am also grateful to the ACER for their agreement to reproduce relevant passages of the TORCH and PATHMATHS tests as Appendix B of this thesis.

Also, thanks are due to Dr. T. R. Burke, Assistant Director-General, Department of School Education, South Coast Region, for permission to conduct the field work in Departmental Schools.

The investigator wishes to express appreciation to the Shiraz University for a full scholarship for this study, and also to the Graduate School of Education, University of Wollongong for their financial support, in order to present a part of this study at the AAER Conference in 1994.

The assistance of the principals, teachers, and students of the schools in the Illawarra region, who were involved in this study, is also greatly appreciated.

# **Academic Achievement and its Relation to Family Background and Locus of Control**

## **Abstract**

The relationship between academic achievement and locus of control is considered with some key demographic and familial factors that can affect both academic achievement and locus of control. The size of the effects of each of these factors on both academic achievement and locus of control was investigated. The effect of academic-achievement feedback on the locus of control was also considered.

Six primary public schools, in the Illawarra region, New South Wales, were selected by stratified random sampling. In each school, one class in each year (3, 4, 5 and 6) was selected to provide subjects, consisting of 502 students, 235 boys and 267 girls. Four kinds of instruments were administered to the subjects of the study: a demographic and family background questionnaire, a locus-of-control questionnaire (Nowicki-Strickland), a reading-comprehension test (TORCH) and a mathematics test (PATMATHS). In order to investigate the effects of academic-achievement feedback on locus-of-control attitude, two of the six schools, were selected randomly. In one of these schools the general results of students' academic achievement were used as group achievement feedback, while in the second school the group feedback was not administered. Group-achievement feedback appeared to influence locus-of-control attitude subsequently.

The results of the study showed that the girls' academic achievement was significantly higher than the boys' academic achievement. No significant difference was found between the locus-of-control means of boys and girls. The academic achievement significantly increased with SES from low to high levels. Also, the internal locus-of-control attitude increased with SES from low to high levels. The academic achievement of the English-speaking students was significantly higher than the academic achievement of the non-English-speaking students. Also, the non-English-speaking students had a more external locus-of-control attitude than English-speaking students. Also, the results showed that the locus of control of students receiving encouraging feedback for both tasks (reading comprehension and mathematics) shifted towards internality, while the locus of control of other groups who received encouraging-discouraging or discouraging-discouraging feedback, did not change significantly.

Locus of control, socioeconomic status, grade, sex, and language background had significant direct effects in determining academic achievement, while grade, socioeconomic status and language background had significant direct effects in determining locus of control. Neither mother's work patterns nor family size had significant effects on academic achievement or locus of control.

Although the results showed that locus of control is the best predictor of academic achievement, it cannot be concluded that locus of control is the cause of academic achievement.

Some implications are indicated for educational policy.

# **Chapter 1**

## **Introduction**

### **1. Statement of the problem**

Students' educational and psychological development has been the subject of many studies for a long period of time, because these areas of development are important areas of educational development for students themselves, the students' families and educational authorities. In other words, both academic and personality development of the students has been a concern especially of educated individuals in society, notably educational researchers and educational authorities.

Both of these areas, academic achievement and personality, are dependent on many variables, such as demographic and environmental factors. Demographic factors are related to variables such as grade or age and sex, and environmental factors are related to variables such as family backgrounds and school environments. Therefore, studying these variables and their effects on both academic achievement and personality of the students can help educators to consider some antecedents to academic achievement and personality and possible modifications to their teaching strategies where they might be appropriate.

## **2. Justification and educational implications of the study**

Studying the antecedents of academic achievement has been focused upon by many researchers throughout the world for a long time. Some points are raised regarding this line of research.

First, some of these studies have concentrated only on the demographic and familial backgrounds of the students, while some have concentrated only on personality variables such as locus of control. However, studying these two important matters (familial backgrounds and personality factors) simultaneously, and comparing these two aspects in predicting and analyzing academic achievement, has received less attention from psychologists and educators. Therefore, it is necessary to study these two aspects simultaneously and compare the two related groups of variables with each other in predicting and analyzing academic achievement more effectively.

Secondly, these kinds of studies have a great potential value to educators, because, practically, though educators can rarely change the familial background of the students, it might be possible to modify students' personalities through educational practices in order to affect motivational development positively. In this regard, it can be said that even students' personalities are more flexible to change than their abilities through educational practices (Stipek & Weisz, 1981). However, to support this argument, Magnusson and Perry (1989) in their empirical research concluded that improving the quality of teaching for students who have little control over their behaviour will not improve their academic performance, unless first the attitude of uncontrollability can be changed toward controllability.

Thirdly, another issue that is directly related to the above point is how the attitude of uncontrollability can be changed. By comparison with other areas referred to above,



there has been limited empirical work in this area of study. One of the methods that has been suggested is 'attributional retraining' which is a therapeutic technique for reinstating psychological control (Magnusson & Perry, 1989); but this method is more appropriately used by educational or psychological specialists rather than classroom teachers or counsellors. However, another method that is examined in this study is 'reporting achievement feedback'. There have been a few enquires on this method, and they have been mainly carried out in an experimental or artificial classroom, rather than in real classroom situations. Furthermore, it seems that this method is not only more suitable for teachers to use, but also it is a valuable method for children's educational and psychological development.

Fourthly, the findings of these kinds of research can help educational administrators at different levels to consider the needs of students in the administrations' educational planning. Also, these findings can be used as a source of information for curriculum developers, to meet the needs of students in curriculum planning. Furthermore, they can help the teachers and counsellors to reach a better understanding of their students, and help the teachers determine how to treat the students to attain educational objectives. Again, the results of locus-of-control research help teachers to understand that students can not only regulate their behaviours, but also reinforce themselves (self-reinforcement) and motivate themselves (self-motivation). However, for students to reach such self-reinforcement and self-motivation, the role of teachers and counsellors is very important. In other words, although students need teacher guidance, they should not always be dependent on teacher reinforcement and motivation for their learning (Thornburg, 1984). In this regard, the students should be helped by their teachers to see the consequences emerging from their behaviour (Thornburg, 1984).

Finally, although much research has been undertaken regarding academic achievement and its relation to familial backgrounds in Australia, these studies pay little attention to personality factors, especially locus of control. The locus-of-control attitude is highly related to the cultural background of the individuals. In this regard, it is assumed that individuals who have a similar cultural background and experience a similar socialization pattern may form a similar locus-of-control attitude. As a result, therefore, differences in the locus-of-control attitude may be consequences of different socialization experiences. However, in Australia, as a multicultural society with a variety of socialization patterns, by comparison with other developed or underdeveloped societies, this construct (locus of control) might usefully be considered more than hitherto by psychologists and educators.

In summary, in studying academic achievement, it is necessary to focus on both the family background of the students and the students' personality constructs. Locus of control is one of the personality constructs that has attracted many researchers, because this construct, particularly among school children, is an important element in determining future behaviour (in the case of the present study, academic achievement). Also, modification of locus of control is more possible than the family background of the students. Additionally, another important question in this study is 'how can the locus of control attitude be modified by achievement feedback'?

Again, these kinds of studies are highly related to the cultural background of the students, and Australia, as a multicultural society, has a unique culture. Therefore, such studies may have a significant value for educational administrators at different levels as they consider the needs of students in the course of their educational planning.

### **3. Objectives of the study**

The objectives of this study can be classified in five categories.

First, one of the objectives is to study the effects of some demographic, familial and in terms of locus-of-control variables on the academic achievement of school children. In other words, at this stage academic achievement on the basis of the variables indicated above will be compared.

The second objective is to study the effects of demographic, familial and academic achievement variables on the locus-of-control attitude of the students. In this regard, the locus-of- control attitude, on the basis of the variables indicated above, will be considered.

The third objective of the study is to attempt to predict both the academic achievement and the locus of control of the students on the basis of their demographic and familial backgrounds. In this regard, first, on the basis of demographic, familial background and locus-of-control variables, the contribution of each of these variables in predicting academic achievement will be determined. Secondly, the contribution of demographic, familial background and academic achievement will be determined in predicting the locus-of-control variable.

The fourth objective is to determine the effects of the demographic, familial background and locus-of-control variables on academic achievement. Also in this regard, first, the contribution of each of the above variables in predicting academic achievement will be determined. In addition, in this stage of the inquiries the direct and indirect effects of each variable (demographic and familial background) on both locus of control and academic achievement will be measured.

Finally, the fifth objective of this research is to study the effects of academic achievement feedback on locus of control. In other words, it is planned to study the locus of control shifts in various conditions, in terms of academic achievement-feedback effects.

#### **4. Key words**

The key words in this study can be considered in four categories. First is the *demographic* category, in which two variables - sex and grade (age) - are included. The second is the *familial background* category, in which four variables - family size, language background, socioeconomic status (in terms of father's occupation), and mother's work - are included. Thirdly, there is the *personality* category in which the locus-of-control attitude is included; and, finally, the *academic-achievement* category in which the performance on two standardized tests, reading and mathematics tests, are considered.

Each of these variables will be operationally defined in Chapter 4.

#### **5. A brief review of research relating to the study**

The following brief review serves as an introduction to the context of the present inquiry, and will be elaborated in Chapter 3.

A significant relationship has been reported between locus of control and academic achievement, in the direction that students who tend towards internal locus of control have higher grades and achievement-test scores than 'external' students, by many researchers (Johnson & Kanoy, 1980; Kennelly & Mount, 1985; Stipek & Weisz,

1981; Maqsd, 1983). In contrast to the above findings, Hansford and Hattie (1982) in their review using meta-analysis, suggested that the relationship between self-regard (including locus of control) and academic achievement is neither precise nor clear. Also, Wylie (1979) stated that the correlations between achievement indices and overall self-measures tend to be quite small, and there is no evidence to support the proposition that the variables achievement and self regard are strongly associated.

However, Hansford and Hattie (1982) have suggested that certain gaps were observed in relation to self-measures in the literature. They pointed out that a few studies were concerned with very young children and the effect of home environment as an intermediate variable between self-measures and achievement. This question, however, is not central to the present enquiry, but is recommended for future research.

Many studies have been concerned with mediating variables, such as sex, grade, socioeconomic status, family size and language background, and their relationships to both locus of control and academic achievement.

Outcomes of various studies regarding sex differences in relation to locus of control have indicated contradictory results. For example, some studies have not found any significant differences between males and females regarding their locus of control (Bar-Tal & Darom, 1979). Also, among bright elementary school children, no relationships were found for sex with either self-concept or locus of control (Johnson & Kanoy, 1980). Regarding academic achievement and sex differences, also, a few studies have shown that there is no significant difference between the achievement of male and female students (Ainley, Foreman & Sheret, 1991). In relation to mathematics academic achievement, no significant difference has been shown between

boys and girls in both elementary and high school levels (Hilton & Berglund, 1974; Chipman & Thomas, 1985).

On the other hand, on the basis of other findings, sex differences regarding both locus of control and academic achievement have been reported. For instance, it has been shown that males and females presented different patterns of causal attribution for similar achievement outcomes (Callaghan & Manstead, 1983). Nowicki and Strickland (1973) stated that in early grades female achievement, in contrast to male achievement, could not be predicted from the Nowicki-Strickland locus-of-control scale; but, in Fifth and Seventh Grade it has been shown that a significant relationship existed between locus of control and academic achievement. Also, Stipek and Weisz (1981) in their review stated that there is a stronger association between internal locus of control and achievement for boys than girls, particularly when the Children's Nowicki-Strickland Internal-External (CNS-IE) scale is used. In addition, it seems differences in locus of control in males and females varied in relation to different measures of academic achievement. In this regard, Kennelly and Mount (1985) have reported externality of locus of control was negatively and significantly related to both grade-point average and the Iowa Test of Basic Skills, while this relationship for girls was significant only for grade-point average.

As stated before, some researchers found sex differences regarding academic achievement. For example, Chipman and Thomas (1985) reported that the overall scores on all subjects showed female students received higher grades than male students at high-school level. This finding was supported by further studies (Khayyer, 1986; Marsh, 1989). Some other researchers found the reverse direction of the above finding: a lower achievement rate was reported for girls by comparison with boys (Sampson, 1965; Adams, 1985). However, it seems sex differences in

academic achievement in previous studies mainly depended on the students' grade level, the type of test and the time at which the study was carried out.

One variable that might affect locus of control and academic achievement is the grade level or age of the respondents. The trend of changes of locus of control showed that responses of the students tend to become more internal with increasing age (Nowicki & Strickland, 1973). However, Rotter (1975) reported that the association between locus of control and achievement is lower for college students than for high-school students. In this regard, it is suggested that researchers would be advised to consider the age or grade levels of the students in their interpretation of the results of locus-of-control measures, particularly when they study the relationship of the latter with academic achievement.

Socioeconomic status of the family is another variable that correlates with locus of control and academic achievement. It has been found that students of low-socioeconomic status were more external than those of high-socioeconomic status (Ludwigsen & Rollins, 1971; Nowicki & Strickland, 1973). On the other hand, in some studies no significant relationship was found between socioeconomic status and locus of control (Maqsud, 1983; Gore & Rotter, 1963). However, different results from different studies in different societies are to be expected, because of, first, variations in the definition of socioeconomic status; secondly, the use of different indicators for identifying socioeconomic status; and finally, variations of standard of living in different societies.

Also, it has been shown that the socioeconomic status of the family has significant effects on average academic achievement of the children (Fraser, 1980; Banks & Finlayson, 1973; Ainley, Foreman & Sheret, 1991). The correlation between

socioeconomic status and academic achievement in various studies varies between .35 and .50 (Fotheringham & Creal, 1980).

It seems necessary to pay more attention to the effects of socioeconomic status on both locus of control and academic achievement, because the contribution of this variable to locus of control and academic achievement is not clearly determined, particularly at elementary-school level.

In relation to family size and its relationship to locus of control and academic achievement, various studies have indicated contradictory results. Some studies have indicated that increased externality was associated with larger family size (Zajonc, 1976; Rama & Natarajan, 1981). On the other hand, some studies have not found significant differences between small and large families on locus-of-control score (Kohn & Schooler, 1969; Parnicky, Williams & Silva, 1987).

Also, in regard to family size and its relationship with academic achievement, it has been mentioned that the typical correlation between the number of children in the family and academic achievement was  $-.25$  (Iverson & Walberg, 1982). On the other hand, the results of some studies have not shown significant relationship between family size and academic achievement or block design performance (Roodin, Broughton & Vaught, 1974; Steelman & Doby, 1983).

However, it is necessary to determine the relationship of the family size, by comparison with other variables already mentioned, on both locus of control and academic achievement.

Another variable that might affect both locus of control and academic achievement is the language background of the family. Among a number of studies of the internal-



external locus-of-control dimensions, few studies have been concerned with cross-cultural differences in recent years. In a multicultural society like Australia, it is helpful to compare locus-of-control beliefs among students who come from different cultures with different language backgrounds.

In contrast to the locus-of-control literature, there exists a considerable amount of literature that deals with non-English- speaking backgrounds or ethnic minority groups in relation to academic achievement. The majority of these studies indicated that these groups obtain comparatively lower performance or achievement scores than other groupings in society (Farmer, Vispoel & Maehr, 1991; Ainley, Foreman & Sheret, 1991; Williams, 1987; Rumberger, 1983).

As mentioned before, another aim of this study is to examine the effects of feedback practices, regarding achievement behaviour and its influence on locus of control. Little work has been carried out on feedback effects of academic achievement on locus of control, particularly in a natural classroom environment. The result of one study showed that the feedback can affect causal-explanation patterns of success and failure of the students (Oren, 1983), and another study showed that expressive instruction improved the performance of external locus-of- control students who received contingent feedback, but that improvement did not occur for those who received noncontingent feedback. In other words, the students who received contingent feedback experienced more control over their performance than those who did not receive contingent feedback (Magnusson & Perry, 1989). Academic-achievement feedback and its effects on locus of control is a potentially valuable issue for educators, because it may be possible to affect academic achievement through this method.

In this brief review, some of the variables which can be associated with locus of control and academic achievement were summarized. In spite of many studies that have been carried out in these areas, it seems the findings to date are not generally definitive. In addition, as shown before, these results are inconsistent with each other much of the time. As a result, it seems that these kinds of studies should be refined more than before.

## **6. A brief account of the sources of the data, the methods and procedures**

Subjects of this study were selected randomly in Years 3 through 6 from six primary public schools in the Illawarra region of New South Wales. In order to attain the objectives of this study two standardized achievement tests (TORCH & PATMATHS), a locus-of-control questionnaire and a brief familial-background questionnaire were administered to the subjects. Also, in order to measure the effects of academic-achievement feedback on locus of control, two schools (out of six schools) were selected randomly. After three weeks in one of these schools, and after administering the achievement tests and the locus-of-control questionnaire, the general results of the achievement tests were reported to the classes. Then, after the academic-achievement feedback, the same locus-of-control scale was administered again to the students in each class. In the second school, also after three weeks, the locus-of-control scale was administered again without reporting the general results of achievement tests to the children.

In this study sex, grade, socioeconomic status, family size, mother's work and language background were always independent variables. Two other variables, academic achievement and locus of control, served as either independent or dependent variables at different stages of the analysis.

The contents that will be presented in the subsequent chapters are as follow:

In Chapter 2, the theoretical background of the study, with an emphasis on social-learning theory, will be discussed. Then, briefly, social-learning theory will be compared with attributional theory.

In Chapter 3, the review of literature will be presented. In this chapter, literature on locus of control, academic achievement and their relationships will be discussed first. Then, the literature providing a basis for studying the relationships between the independent variables of this study on one hand, and locus of control and academic achievement on the other hand, will be discussed.

In Chapter 4, variables of the study will be operationally defined first. Then, population, sampling, instruments, methods and procedures for the experiments will be discussed. Finally, designs and statistical procedures of the study will be presented.

The results of the study will be presented in Chapters 5, 6, and 7. In Chapter 5, the statistical characteristics of the sample will first be described. Then, the results of the academic achievement tests in relation to each of the independent variables of the study will be discussed. In Chapter 6, the results regarding the locus-of-control scores, in relation to each independent variable, will be presented. In Chapter 7, the results regarding predictions of both academic-achievement and locus-of-control measures from the independent variables will be discussed; then, the results of a path analysis between independent and dependent variables will be presented. At the end of this chapter, the results regarding academic-achievement feedback and its effects on locus of control will be presented.

Finally, in the last chapter, Chapter 8, the discussion and conclusion of the study will be presented.

In Chapter 6, the possibility of academic achievement acting as an independent variable influencing locus of control is also explored.

## **Chapter 2**

### **Theoretical Background**

#### **1. Introduction**

Traditional studies of self begin with the work of William James (1892). He described the nature of self and mentioned the difference between self as object (the Me) and self as subject (the I). Shaver (1975) in his book defined the Me as "the sum total of all that a person can call his own" (p. 74). The Me is composed of three components: the constituents of the Me, the emotion to which these constituents respond, and finally the behaviours that are the consequence of these emotions. The constituents category can be divided into three parts: the material self, the spiritual self, and the social self. The material self is a single category which is related to the individual's body such as his house and his other properties. Also the spiritual self is a single category which is related to all of the individual's psychological faculties and disposition, such as sensation and different aspects of abilities, skills and personality. Finally, the social self is a multiple category that includes all of the individual's social selves, and it is proposed that a separate social self exists for every individual (Shaver, 1975).

Therefore, it can be said, while there is a single material self and a single spiritual self, there are multiple social selves, and these multiple social selves mean that the individual can act several different roles for different purposes (Shaver, 1975). Consequently, this multiplicity of social selves makes for more complexity than the other kinds of selves, in carrying out empirical studies.

The second component of Me is the emotions to which the constituents respond (Shaver, 1975). For example, if our achievements are increasing, we feel satisfaction; or on the other hand, if our achievements are decreasing, we feel dissatisfaction. James (1892) classified these emotions into two broad categories: self-complacency (pride) and self-dissatisfaction (despair).

The final element of the Me is composed of the two sets of behaviours that are produced by emotions. The first set of behaviours serves to maintain the present state of the self. These behaviours are called self-preservation, including reflex actions, and self-defence behaviours. The second set of behaviours serve to provide behaviours for the future instead of merely to maintain the present. This set of behaviours is called self-seeking; it is composed of both physical activities and social experience (Shaver, 1975).

This categorization of the Me into material, spiritual and social selves is reflected in psychological theories such as Maslow's hierarchy of individual needs, the motivational theories, and recently the self-perception theories (Shaver, 1975). Of course the social Me is the most important element for self-perception theories such as social-learning theory and attribution theory. Shaver (1975) mentioned that:

If the Me is the sum total of the content of the self, then the I can be considered the ongoing of consciousness. It is the pure ego, the thinker, the knower, or, as James calls it, the organized stream of consciousness. Since the I is a process rather than a collection of empirical entities (like the Me), it is exceedingly difficult to describe in concrete terms. (p. 76)

It can be concluded that the I is a dynamic process of consciousness and of participating in purposeful behaviour. In other words the I is the awareness of self (Shaver, 1975).

## **2. Social-Learning Theory**

Social-learning theory is one of the theories that is based on the social aspects of the Me. This theory, which was primarily founded by Rotter, emphasizes the role of reinforcement, reward or gratification as an important event in acquisition and performance of skills and knowledge. According to Rotter (1966) there are individual variations in the perception of reinforcement. In other words, an event may be perceived by some individuals as a reinforcement, while others may regard it differently. However, because of this variation in the perception of the individuals, creation of various reactions by them to an event is inevitable. One of the determinants of the reactions of an individual is whether or not he or she perceives the reinforcement to be contingent on his or her own behaviour (Rotter, 1966). Social-learning theory tries to develop a framework for human behaviour in relatively complex social situations. However, in some ways, this theory may be considered as an attempt to integrate two different kinds of learning theories: reinforcement or 'S-R' theories and cognitive or 'field' theories (Rotter, Chance & Phares, 1972; Bandura, 1977).

### **2.1 Some Important Principles of Social-Learning Theory**

First, in the study of human personality, the unit of investigation is the interaction of the individual with his or her meaningful environment. According to this theory a large amount of human social behaviour is based on learned or modifiable behaviour.

Thus social-learning theory concentrates on learned behaviour (Rotter, Chance & Phares, 1972).

Secondly, personality constructs are independent of other constructs in any other field such as physiology, biology or neurology. Of course descriptions of constructs in one field should be consistent with the same constructs in any other field of study, but hierarchy of dependency does not exist among them. In other words, behavioural or more specifically personality constructs may also be described by physical constructs in other fields of study, but personality is active in space and time (Rotter, Chance & Phares, 1972). Also, personality constructs appear to be described usefully in organisms with a higher level of stage of development (Rotter, Chance & Phares, 1972).

Thirdly, the experiences of an individual affect each other. In other words, an individual's interaction with his or her environment influences his or her previous experiences, although personality has unity. Here, the term 'unity' has at least two meanings. First, unity is defined in terms of a core personality. In other words, it means each person possesses a core unity which mainly determines his or her behaviour. That is, all an individual's behaviours come from this central core. The next meaning of unity refers to stability and interdependence. As an individual gains more experience, his or her personality becomes more stable (Rotter, Chance & Phares, 1972). Therefore, previous experiences will be a major basis for selection of new experiences and interpretation of reality. Also, this selectivity process will increase the generality of behaviour. Of course, in spite of this stability and generality, it should be mentioned that new experience, even after a well established development of behaviour, can affect stability and generality. Also the effects of situational factors in determining behaviour should not be completely ignored (Rotter, Chance & Phares, 1972).



Fourthly, social-learning theory tries to neglect the term 'cause', because too often the term 'cause' implies singularity. However, exponents of this theory believe that a description of behaviours in terms of relevant past and present conditions is a more useful approach for explaining behaviour. For this purpose, this theory attempts to specify antecedent conditions for prediction. In other words, for predictive purposes, looking for the variables that are relevant at any cross section of time is a more appropriate approach than the single-cause approach for explanation of behaviours (Rotter, Chance & Phares, 1972).

Fifthly, from the social-learning theory approach, behaviour has a directional aspect or is goal-directed. The directional aspect of behaviour is related to the effect of reinforcing conditions. According to this theory the person attempts to maximize his or her positive reinforcement in any situation (Rotter, Chance & Phares, 1972). However, social learning theory attempts to provide a general theoretical background for the concept of reinforcement and its effects on behaviour in social situation. Rotter (1966) pointed out that:

In social learning theory, a reinforcement acts to strengthen an expectancy that a particular behaviour or event will be followed by that reinforcement in the future. Once an expectancy for such a behaviour-reinforcement sequence is built up the failure of the reinforcement to occur will reduce or extinguish the expectancy. (p. 2)

Moreover, in this theory, when we concentrate on the environmental conditions that determine the direction of behaviour, we pay attention to goal or reinforcement. However, when we concentrate on determining the direction, we pay attention to

needs. Both goals and needs come from the same sources - the interaction of the individual with his or her environment (Rotter, Chance & Phares, 1972).

The following points should be considered about the nature of needs: (a) The needs of an individual, according to social-learning theory, are learned or acquired. Of course early needs or goals, and perhaps some later ones, may be produced by the association of learned behaviour with reflex or unlearned behaviour.

(b) Social-learning theory postulates that early-learned goals in human beings are the result of satisfactions and frustrations that are mostly controlled by other people, especially the family.

(c) Behaviours, needs, and goals of an individual are not independent of each other. In other words, they are active within functionally related systems and the relations among them are determined by previous experiences (Rotter, Chance & Phares, 1972).

Finally, the manifestation of a behaviour in an individual is determined by both the importance of goals or reinforcement and by the individual's expectancy that these goals will occur in future. These expectations are directed by previous experience and they can be quantified. This principle tries to answer the question of how an individual in a specific situation behaves in terms of potential reinforcers (Rotter, Chance & Phares, 1972). In other words, development of a concept regarding anticipation of reinforcement that is directed to specific goals is important according to this theory. Thus, a concept is needed other than the simple value of reinforcement for dealing with human behaviour (Rotter, Chance & Phares, 1972).

In succeeding pages, basic concepts of social-learning theory in predicting behaviour will be explained.

## **2.2 Basic Concepts in Social-Learning Theory**

According to social learning theory, four basic concepts are used for the prediction of behaviour. These basic concepts are behaviour potential, expectancy, reinforcement value and psychological situation (Rotter, Chance & Phares, 1972).

### **2.2.1 Behaviour potential**

Rotter, Chance and Phares (1972) defined behavioural potential as:

The potentiality of any behaviour's occurring in any given situation or situations as calculated in relation to any single reinforcement or set of reinforcement. (p. 12)

The concept of behaviour in social-learning theory is broadly used. In other words, it includes both observable and unobservable or implicit behaviour. Although studying the implicit behaviour as cognitive activity is complicated and difficult, this behaviour is an important aspect of social-learning theory (Rotter, Chance & Phares, 1972).

Behaviour potential means that in any specific situation it is assumed that the behaviour that actually occurs is the behaviour that has the highest potential. Therefore, it can be said that in a specific situation the probability of occurrence of a specific behaviour (potentiality of occurrence) is greater than other behaviours (behaviours with less potentiality) (Rotter, Chance & Phares, 1972). Of course, behaviour potential is a relative concept (Rotter, Chance & Phares, 1972). It should be pointed out that in social-learning theory the principles governing behaviours are the same for both cognitive activities and observable behaviours (Rotter, Chance & Phares, 1972).

### 2.2.2 Expectancy

Rotter, Chance and Phares (1972) defined expectancy as:

The probability held by the individual that a particular reinforcement will occur as a function of a specific behaviour on his part in a specific situation or situations. Expectancy is systematically independent of the value or importance of reinforcement. (p. 12)

Although the expectancy concept may refer to either an objective or a subjective concept, in social-learning theory expectancy refers to a subjective probability. An objective concept of expectancy refers to a probability that is basically determined by objectively describable past events. However, in social-learning theory subjective probability does not mean inaccessibility to objective measurement. In regard to the subjectivity concept of expectancy, it can be mentioned that usually people's statements about probability of occurrence of an event differ systematically from their experience with the event that occurred in the past (Rotter, Chance & Phares, 1972). Many factors can influence this probability estimation. Some of these factors are: the nature or classification of a situation, pattern and sequence of consideration, uniqueness of events, and generalization and perception of causality (Rotter, Chance & Phares, 1972). For example, Rotter (1966) mentioned that in situations which are perceived as being related or similar to a particular situation, the individuals generalize their expectancies. This generalization for a group of events provides one of the important groups of variables in describing personality.

### **2.2.3 Reinforcement value**

Rotter, Chance and Phares (1972) noted that:

The reinforcement value of any one of a group of potential external reinforcements may be ideally defined as the degree of the person's preference for that reinforcement to occur if the possibilities of occurrence of all alternatives were equal. (p. 13)

In other words, reinforcement value refers to a relative preference, and it indicates preference for something over something else. Usually within a specific culture such preference is consistent and reliable and it is independent of expectancy (Rotter, Chance & Phares, 1972).

Rotter (1966) stated that during a child's development he or she acquires increasing numbers of experiences, and as a result he or she differentiates between events which are causally associated with preceding events and those which are not so associated. Therefore, when the child perceives that the reinforcement is not contingent on his behaviour, the occurrence of that behaviour will not increase an expectancy by comparison with when it is perceived as contingent (Rotter, 1966). Also, regarding the effect of contingency in the conditioning situation, Rescorla and Wagner stated that if the unconditioned stimulus (US) occurs frequently in the absence of the conditioned stimulus (CS), no conditioning or learning happens. Thus, in order for the conditioning to occur, a CS and a US should be presented contingently (Lieberman, 1990). Of course, it seems the individual's history of reinforcement influences the degree to which he or she attributes reinforcement to his or her action (Rotter, 1966).

#### 2.2.4 The psychological situation

An individual is continuously interacting with various aspects of both his internal and external environment, and during his interaction he acts selectively to both internal and external stimulation simultaneously. Also, his interaction with his environment is too often consistent with his past experience. Because of the mutual interaction of an individual with his environment, and also because of their mutual effects on each other, in this theory the term 'psychological situation' is preferred rather than stimulus (Rotter, Chance & Phares, 1972).

It should be mentioned that social-learning theory emphasizes the psychological situation, because when the situation is changed, consequently the behaviour will be changed. But there is still a generality in behaviour. However, in spite of this generality this theory also considers situational specificity (Rotter, Chance & Phares, 1972). For example, we can say person A is generally more aggressive than person B, but in spite of this personality characteristic, in some situations person B may behave more aggressively than person A. Therefore, we cannot predict the individual's behaviour only on the basis of his internal characteristics, because of the complexities of human behaviour. (Rotter, Chance & Phares, 1972).

Regarding these four basic concepts and their relations, Rotter, Chance and Phares (1972) stated these variables in the following formula.

$$(1) \quad BP_{x, s1, Ra} = f ( Ex, Ra, S1 \ \& \ RV_{a, s1} ) \quad (p. 14)$$

In the above formula (1) it is mentioned that the potentiality of occurrence of behaviour x, in situation 1, in regard to reinforcement a, is a function of expectancy

for reinforcement that follows behaviour x in situation 1 and the reinforcement value in situation 1 (Rotter, Chance & Phares, 1972).

Rotter, Chance and Phares (1972) also argued that the above formula is limited because this formula deals only with the potentiality of a specific behaviour in relation to a single reinforcement. Therefore, the next formula, that deals with a broader concept of behaviour, is suggested.

$$(2) \quad BP_{(x-n), S(1-n), R(a-n)} = f [ E_{(x-n), S(1-n), R(1-n)} \& RV_{(a-n), S(1-n)} ]$$

(p.14)

In formula (2), it is mentioned that the probability of occurrence of related behaviours (behaviours potentiality) x to n, in determined situations 1 to n in relation to potential reinforcements a to n, is a function of expectancies for these reinforcements that follow these behaviours in these situations and the reinforcement values in these situations (Rotter, Chance and Phares, 1972).

### 2.3 Internal-External Locus of Control

As mentioned before, in social-learning theory, the role of reinforcement and reinforcement value is very important. In this regard, any event that can change the potentiality of occurrence of a specific behaviour is called reinforcement and, on the basis of this definition, prediction of behaviour can be made.

However, one of the determinants in prediction of behaviour is whether or not the individual perceives that the reinforcement that follows his behaviour is contingent upon his own behaviour or is controlled by other forces outside of himself; in other words, whether or not an individual perceives a causal relationship between his action

(behaviour) and the reinforcement (Rotter, 1966). Of course, perception of causal relationship is a relative concept, or it can vary in degree (Rotter, 1966). An individual may perceive that the reinforcement that follows his behaviour is not related completely to his behaviour; or he perceives it as a result of luck, fate, or chance; or he perceives his behaviour is under the control of other powerful sources. If the individual interpreted his behaviour in this way, his belief is called external control by social-learning theory (Rotter, 1966). In contrast, if the individual perceives that there is a relation between reinforcement and his behaviour or perceives that the reinforcement is contingent upon his action, the individual is considered to manifest internal control (Rotter, 1966).

Also, Stipek and Weisz (1981) stated that "locus of control is defined as generalized expectancy for internal or external control of reinforcement" (p. 102).

In other words, Rotter proposed a unidirectional view of locus of control; while Wong and Sproule (1984) suggested that internality and externality in locus of control are not as mutually exclusive as Rotter claimed. Wong and Sproule (1984) pointed out that:

Locus of control is concerned with the assignment of responsibility.

One perceives internal control when one assumes full responsibility for what has happened, even though it was externally caused. One perceives external control if the responsibility for an outcome rests entirely elsewhere, regardless of whether it is the direct consequence of one's own behaviour. One perceives dual control when the responsibility for an outcome is shared by the individual as well as external sources. (p. 312)



In a somewhat similar vein, Levenson has developed a multidimensional view of locus of control on the basis of Rotter's unidimensional locus-of-control scale. In this multidimensional view, external locus of control is divided into two dimensions; powerful others and chance. The chance dimension of powerful others is related to the belief that other powerful sources control one's behaviour, and the dimension of chance is concerned with a belief about the unordered and random nature of the world, in contrast to the belief in order and predictability of the world (Levenson, 1981). In the dimension of powerful others, there is a potential for controlling reinforcement in contrast to the chance dimension; in other words, this view of externality might be very similar to the internality of Rotter's view (Levenson, 1981). Therefore, from Levenson's point of view, locus of control has three dimensions of expectancy: Internality, Powerful Others and Chance (Levenson, 1981).

However, in social-learning theory it is hypothesized that the locus-of-control (internal- or external-belief) variable makes a significant contribution to understanding the process of learning in different situations. Also, it is argued that there are consistent individual differences in the perception of control of reinforcement among individuals in the same situation (Rotter, 1966).

## **2.4 Locus of Control and Academic Achievement**

It is suggested that children who are high on the need for achievement believe in their own abilities or skills in the determination of their efforts (Crandall, Crandall & Katkovsky 1965). In a similar vein, social-learning theorists propose that students' behaviour in achievement situations is determined by their locus of control (Stipek & Weisz, 1981). In other words, if the student perceives that his or her academic achievement is contingent on his or her behaviour (internal locus of control), according to social learning theory, then his or her success is likely to increase in the

future. In contrast, if the student believes that there is no contingency between his or her academic achievement and his or her behaviour (external locus of control) then his or her academic achievement is unlikely to increase in future (Rotter, 1966).

Furthermore, Rotter (1966) stated that an individual's expectation about the relationship between locus of control and academic achievement is not the only predictor of the academic achievement. In this regard, the value of the expected reinforcement should also be considered. For example, if a high grade is not important for a student, he will not study hard enough to get a high grade, although he may believe that a good mark is contingent on his study (Rotter, 1966).

Also, Rotter, Chance and Phares (1972) mentioned that, as a general expectancy developed from past experience in similar situations, situational variables also affect perceptions of the contingency of reinforcement. In this relation Rotter (1975) argued that when an individual is situated in a novel or ambiguous situation, the relative importance of expectancy will increase in this situation. In extensive situations, on the other hand, the relative expectancy of the individual will decrease. Therefore, the generalized expectancy for students who have had numerous experiences in academic situations, like college students, is less predictive for academic achievement than for students who have less experience (Stipek & Weisz, 1981).

Also, it should be noted that general measures of locus of control show moderate association with various behaviours, while specific measures of generalized expectancy should have high correlations with specific behaviour that is related to that domain of expectancy and should not have any significant correlations with behaviour in other domains (Stipek & Weisz, 1981).

However, social-learning theory not only deals with the perception of students and its relation to academic achievement, but also to other theories, such as attribution theory, which are concerned with this variable (academic achievement). Consequently, in the following pages, Weiner's model of achievement-related behaviour, which is based on attribution theory, will be discussed.

### **3. Attributional Model of Achievement-related behaviour**

Attributional theory is a class of various theories that deals with clarifying causal perception. In other words, 'attribution' is a term that is related to the perception of an individual about the causes of his own or another individual's behaviour. One of the models of achievement-related behaviour is Weiner's model, which deals with causal perception of success and failure. In relation to academic performance, Diener and Dweck (1978) stated that 'failure-oriented' students are inclined to use attributions, while 'mastery-oriented' students do not tend to use attributions. However, Weiner (1979) believes that both 'failure-oriented' and 'mastery-oriented' students tend to make attributions about their achievement. In other words, Weiner (1972) pointed out that the individual's beliefs regarding causes of success and failure have an important role in understanding achievement-related behaviour. According to the attributional model of achievement-related behaviour, it is suggested that beliefs about the causes of success and failure mediate between an individual's perception of an achievement task and the final performance (Weiner, 1972).

However, Weiner (1979) proposed that the causes that are perceived as most responsible for success and failure in an achievement situation are ability, effort, task difficulty and luck. These causal factors are categorized in three dimensions. In the first dimension, causal elements are divided in terms of their internality and externality (Weiner et al., 1971). In other words, the causal factors, ability, effort, task difficulty

and luck, can be regarded as either internal or external to the individual. Ability and effort are regarded as internal sources of causality, because these factors originate within the individual; and task difficulty and chance are regarded as external sources of causality, because they originate outside the individual (Bar-Tal, 1978). This dimension is called locus of causality by Weiner (Weiner, 1979).

In the second dimension these causal elements are regarded in terms of their stability over time (Weiner et al., 1971). In other words, this dimension considers the causal factors on a stable (invariant) or unstable (variant) continuum (Weiner, 1979). Therefore, ability and task difficulty are regarded as stable, because they do not change over time; while effort and chance are regarded as unstable, because they can vary over time (Bar-Tal, 1978).

The third dimension was added to the achievement domain by Rosenbaum (1972) and is called intentionality. This dimension is called locus of controllability by Weiner (Weiner, 1979). In this relation, causes such as effort or teacher's attitude can be classified as intentional, whereas ability, task difficulty and chance can be categorized as unintentional (Weiner, 1979).

Therefore, according to Weiner's model, causes of achievement-related behaviour theoretically can be located within one of eight categories (2 levels of locus X 2 levels of stability X 2 levels of controllability). For example, ability as an internal cause is stable and uncontrollable, task difficulty as an external cause is also stable and uncontrollable, and luck is unstable and uncontrollable (Weiner, 1979).

Of course it should be noted that most researchers have concentrated their empirical studies on the use of the first two dimensions that were mentioned before, locus of causality and stability, and the four causes that were originally pointed out by Weiner

(Bar-Tal, 1978). However, it has been found that these two dimensions have important roles in understanding affective reactions in regard to the success or failure and also in the changes in perceived probability of success in the future (Bar-Tal, 1978). Also, Weiner (1979) stated that each of the three dimensions of causality has both a primary psychological function and a number of secondary effects.

In relation to these effects, it can be pointed out the locus of causality has influenced the affective reaction of pride and shame. In a success situation, when students attribute their achievement to internal causes, i.e. either ability or effort, they feel more pride (self-satisfaction) than when they attribute to the external causes, good luck or ease of the task (Bar-Tal, 1978). In contrast, in a failure situation, when students attribute their failure to the internal causes lack of ability or lack of effort, they feel more shame (self-dissatisfaction) than when they attribute failure to external causes such as the difficulty of the task or bad luck. In other words, when failure is attributed to the difficulty of the task or to bad luck (external factors), its consequence is little shame and no responsibility is taken for that failure (Bar-Tal, 1978).

In regard to the stability dimension, it should be noted that this dimension is related to expectancy for future success or failure. In supporting the above statement, previous researchers in the attributional studies have indicated that causal attributions regarding past performance have an important impact for determination of goal expectancies (Weiner, 1979). For example, if students attribute their success to their high ability or the ease of the task (stable factors), their expectancy for future success will be increased, whereas if they attribute their success to unstable factors (good luck or effort [usually not too often]), their expectancy for future success will be decreased. In other words, the expectancy of the students after success and failure on a task can change and such expectancy shifts are dependent on perceived stability of the cause of the prior outcome (Weiner, 1979). It can be said that if an individual attains success

(or failure) and he perceives the causes of that outcome as stable, then future success (or failure) can be anticipated with more certainty. If on the other hand he perceives the causes are unstable or subject to change, the probability of the repetition of prior outcome will be decreased (Weiner, 1979). Therefore, it can be said that the result of unexpected outcomes is unstable attribution, particularly luck (Weiner, 1979).

In relation to the controllability or intentionality dimension, Rosenbaum (1972) stated that intentionality is required to differentiate, for instance, mood from effort. Although both of them are internal and unstable causes, intuitively they are different. However, the intent dimension describes this difference. In this regard, mood is classified as unintentional whereas effort is classified as intentional. Hence, failure that is attributed to lack of effort does not mean that there was an intent to fail (Weiner, 1979). Intent usually refers to a desire or want. Therefore, effort differs from mood, because effort is perceived as a controllable factor (Weiner, 1979). As mentioned before, this dimension was added to the other dimensions later; therefore the empirical research on this dimension is less than the other dimensions.

#### **4. Comparison of Locus-of-Control Concept with Attributional Model of Achievement-Related Behaviour**

It should be mentioned that the attributional model of achievement-related behaviour is based on an expectancy-value theory of motivation and on the concept of locus of control in social-learning theory (Bar-Tal, 1978). According to expectancy-value theory, the determinants of aroused motivation are both the expectancy that the behaviour will lead to goal attainment and the value of the goal. In other words, if an individual perceives high probability for attainment to a goal and also the goal is highly attractive, then he tends to attain that goal with high intensity (Bar-Tal, 1978). Also, as mentioned before, Rotter (1966) developed the concept of locus of control as

a generalized expectancy regarding the degree to which an individual's behaviour is controlled in order to secure reinforcement.

In contrast to Rotter (1966) who emphasizes the generalized expectancy model, Weiner's model is concentrated on situational determinants regarding perception of personal causality. In other words, in Weiner's model, an individual's perception regarding the causes of success or failure is essentially determined by situational variables. Hence, attributional theorists try to find relationships between various situational characteristics and causal attributions that are made in these situations (Stipek & Weisz, 1981).

Among the three dimensions of the attributional model, locus of causality somehow is much more similar to external-internal locus of control in social-learning theory than the stability or controllability dimensions. In this regard, it seems that Rotter (1966) proposed to equate internal causality with internal control, and external causality with external control. However, in this regard, Wong and Sproule (1984) stated that these two concepts (locus of control and locus of causality) differ in some aspects. Also, Weiner (1979) agreed with this difference, and stated that locus of causality and locus of control are two separate causal dimensions. Regarding the difference between these two concepts Wong and Weiner (1981) stated that:

The locus dimension is concerned with the source of causality; that is, either the cause resides in you, in some other people, or in the situation. The control dimension is concerned with the extent of one's control or mastery over various causal factors. (p. 655)

Stipek and Weisz (1981) stated that the attributional model has several advantages by comparison with the social-learning model of children's perception of control,

because in the attributional model children's perceptions are usually measured in specific situations (in this case achievement versus non-achievement). In the social-learning model, however, usually the distinction between domains is not considered as it is in the attributional model (Stipek & Weisz, 1981).

Also the distinction between contingency and control that is emphasized in the attributional model is important specifically for predicting achievement behaviour (Stipek & Weisz, 1981). For example, a child who perceives that his or her failure is related to his or her lack of ability behaves differently in an achievement situation from a child who attributed his or her failure to lack of effort. However, in the social-learning model both of these attributions are categorized as internal locus of control. Another distinction between contingency and control is stated by Bandura (1977). He pointed out that students may perceive that a specific behaviour will result in a certain outcome (contingency), but if they have serious doubts about their necessary potential for performing that activity, such perception cannot influence their behaviour (control).

Furthermore, most outcomes are caused by several factors, and the attributional model of achievement-related behaviour is provided as a method of measuring the contribution of each factor and the degree to which the factors contribute to in a particular outcome; while locus-of-control measures usually consist of forced-choice items and cannot differentiate the degree to which each of the factors contributed to a particular outcome (Stipek & Weisz, 1981).

In spite of the advantages of the attributional model of achievement-related behaviour (some of which are mentioned above) over the social-learning model, it has also some disadvantages.



Although both the social-learning and attributional models emphasize subjective meaning regarding categorization of a perceived cause, the classification of some causes is varied, especially in the attributional model, both among individuals and in various situations. For example, the individual may perceive luck as a stable characteristic in some cases (I am a lucky man) and an unstable characteristic in other cases (I was lucky today) (Stipek & Weisz, 1981). Also, Riemer (1975) pointed out that task difficulty is classified as a stable factor, while on the basis of some experimental manipulation, it has been suggested that individuals may perceive this factor as an unstable.

Also, the categorization of causes by Weiner's taxonomy should be considered cautiously, particularly when young children are involved. In this relation, ability is usually categorized as an internal, stable, and uncontrollable cause by a majority of adults. On the other hand, a young child whose ability for performing a task changes daily, may perceive it as less stable. In other words, an adult person who fails in a task and attributes his or her failure to lack of ability, generally has a low expectation for future performance on the task, while a child may continue with high expectation for future success, because he or she believes that his or her ability may change (Stipek & Weisz, 1981).

Moreover, attribution to luck and its influence on task behaviour of the children has not been examined (Stipek & Weisz, 1981). In other words, understanding of luck may be not well developed among children, and therefore prediction of a behaviour cannot be predicted from luck attribution (Stipek & Weisz, 1981).

In addition, although there is a large number of studies on the relationships between students' causal attributions and their academic achievement, the results of these studies were primarily based on highly controlled experiments, rather than on a real

classroom. In these kinds of experiments, children are usually asked to solve hypothetical tasks and then make attributions. Therefore, the validity of these experiments in a natural educational environment remains in question until these findings are tested in a real classroom (Stipek & Weisz, 1981).

Furthermore, attributional studies have concentrated on specific situational determinants of attribution. In other words, research in this field of study has little attention to 'generalized attribution' (Stipek & Weisz, 1981).

In conclusion, although the attributional model of achievement-related behaviour is based on social-learning theory and has paid more attention to various aspects of human cognition, further empirical research, particularly in real classroom situations, is needed for supporting its hypotheses.

In the present study, however, young children are involved and, as mentioned before, the dimensions of their cognitions are not as stable or developed as those of adult subjects. Hence, in selecting the instrument for measuring locus of control and also in analysing the findings, more attention will be paid to social-learning theory.

## **5. Changes in Expectancy (Expectancy Shifts)**

Expectancy shifts are discussed in both social-learning theory and attribution theory. From the social-learning point of view, it has been mentioned that since behaviour is influenced by both expectancy and reinforcement values, therefore any changes in these two variables can cause changes in behaviour. As a matter of fact, changes in the reinforcement value in the case of an adult subject are very difficult, although theoretically they are not impossible but difficult in practice. Therefore, in order to

change behaviour, it is easier to change expectancies (Rotter, Chance & Phares, 1972).

However, in social-learning theory it is postulated that two variables can affect the size of expectancy changes. The first one is described in terms of 'surprise value of an occurrence' and the second one is described in terms of 'the number of previous experiences' (Rotter, Chance & Phares, 1972).

'Surprise value of an occurrence' is described by both positive and negative reinforcement and usually unexpected occurrence influences expectancy shifts more than expected occurrence. For example, for a student who usually has low scores and then receives a high score, his or her expectancy regarding his or her intellectual ability may change considerably (Rotter, Chance & Phares, 1972). Of course, in this case, the event of receiving a high score must cause recategorization of the situation by the student. If this recategorization has not happened, the student may perceive its occurrence as random only in this specific situation (Rotter, Chance & Phares, 1972).

Much evidence has indicated that individual differences in perception of situations are related to their previous experiences. In other words, the amount of increment of expectancy after a reinforcement is based on the formula " $1-E$ " (Rotter, Chance & Phares, 1972, p. 28). In this formula, '1' indicates the actual occurrence (or it can be said to be an expectancy of 1.0) and 'E' indicates the previously held expectancy (it is expressed as some decimal value). Therefore, the increment in expectancy is the result of the difference between the actual occurrence and the previously held expectancy. In contrast, in the failure of a reinforcement case when decrement occurs, '0' can be put instead of '1' in the formula (Rotter, Chance & Phares, 1972).

The second variable that affects the amount of expectancy change is the number of previous expectancies that the individual has experienced in the situation (Rotter, Chance & Phares, 1972). In this regard, Rotter, Chance, and Phares (1972) stated that:

The degree to which we base our expectancies on our most recent experience is a function of how much earlier experience we have had that is not consistent with the most recent experience. With a lot of experience in a given situation, a recent, inconsistent experience will have little effect on our expectancies (unless cues present suggest that the situation itself has changed). Formally stated, this principle is, the increment of a specific expectancy (  $E'$ ), following the occurrence of any given reinforcement, diminishes as the subject has more experience in that specific situation. (p. 29)

These two principles are combined into the following formula (Rotter, Chance, & Phares, 1972):

$$E' = f ( O - E ) \text{ (p. 29)}$$

In this formula 'N' stands for frequency of previous experiences in a specific situation; 'O', represents the occurrence of the reinforcement, represented as a decimal (in case of a specific reinforcement it can be either 1 or zero); and  $E'$  stands for the expectancy that the subject had before regarding the occurrence of the reinforcement (Rotter, Chance & Phares, 1972).

Weiner (1986) stated that in a skill-related task, the expectancy will be increased after success and will be decreased after failure. These kinds of changes are called typical

expectancy shifts. In contrast, in a chance task the shift of expectancy is called atypical expectancy shift (Weiner, 1986). However, it is less frequent to have atypical shifts at skill-related tasks and typical shifts at chance-related tasks. These kinds of shifts at skill-related and chance-related tasks are summarized in the following table by Weiner (1986).

**Table: 1**  
**Task Characteristic**

	Skill	Chance
More common observation	Typical Shift	Atypical Shift
Less common observation	Atypical Shift	Typical Shift

(p. 83)

However, the size of the expectancy shift after a success or failure is proposed to be influenced by how the event is perceived. Stated otherwise, if the outcome is perceived internally greater then more typical shifts will be produced than when the outcome is perceived externally (Weiner, 1986). Therefore, social-learning theory has explained the predominant typical shifts in skill task characteristic (internal control) and atypical shifts in chance task characteristic (external control). Of course, some individuals may perceive a reverse direction from the usual pattern that is discussed above. In other words, they may perceive skill tasks as determined by chance or chance tasks as affected by personal factors (Weiner, 1986). Also, Phares (1957)

stated that atypical shifts or decrements in the expectancy of success after a success and increment after a failure is more common in the chance condition than in the skill condition.

On the other hand, attributional theorists believe that the stability of a cause, rather than its locus, determines expectancy changes. In this regard, Weiner (1986) stated that if conditions, or presence or absence of causes, are perceived to be the same, then the past experiences will be expected to be repeated. In these conditions a success probably produces a belief that there will be future success, and a failure produces a belief that there will be future failure. On the other hand, if individuals perceive that the causal conditions may change, then the present result may be expected to change in future. Therefore, the individuals' successes would produce small increments, whereas the individuals' failures do not necessarily produce the belief that there will be future failures (Weiner, 1986). The previous principles that are explained for social-learning theory can be applied to attribution theory. In other words, success and failure at skill tasks are usually attributed to ability and effort. As mentioned before, ability is a stable factor, and students, who attributed their successes to their hard work (effort), as a consequence tended to work hard again for future success (Weiner, 1986). Also, if the causes of prior success are attributed to relatively stable factors in skill-related tasks, future success will be anticipated with more confidence, and therefore, aspiration level will be increased (Weiner, 1986). Sometimes, however, outcomes of skill tasks may be attributed to unstable factors. For example, if failure is attributed to low effort, then the individual may intend to work harder in the future. In these situations (attribution to unstable factors), atypical or minimal shifts in expectancy will occur (Weiner, 1986).

Regarding chance tasks, Weiner (1986) stated that these tasks tend to be attributed to unstable factors. For example, the student probably tends to rationalize, "I had a good

(or bad) chance last time, but that situation may not happen again". In this case, therefore, expectancy should not rise and it may drop after a success, or increase after a failure (Weiner, 1986). However, sometimes in a chance task, an individual may perceive that he or she is a lucky or unlucky, as a trait characteristic, person. Therefore, the cause of the outcome is attributed to a stable factor and a typical shift is applied in this case (Weiner, 1986).

In summary, it seems that the final results regarding typical and atypical shifts in task-related situations, from the social-learning-theory and attribution-theory point of view, are very similar.

## **6. Locus of Control and Achievement Motivation**

Achievement behaviour of individuals with a high need for achievement, and achievement behaviour of individuals with a low need for achievement, are different. This difference is the consequence of different perceptions that these individuals have about the causes of success and failure. In other words, those students who have a high need for achievement tend to attribute their success to internal causes; whereas students who have a low need for achievement try to attribute their success to external causes. It seems that, the former group experience more pride and reward for their successes, whereas the later group experience less pride for their success (Bar-Tal, 1978). In this relation Weiner (1977) pointed out that internal attributions for success, not failure, are assumed to be related to high achievement needs, whereas, in the failure case, achievement needs of the students and also their achievement behaviours would be a function of the stability of their situation. For example, students who attribute their failure to unstable factors (lack of chance or effort) are more likely to approach achievement tasks than students who attribute their failure to stable factors (lack of ability or difficulty of task) (Stipek & Weisz, 1981).

In this way, students with high achievement motivation have more resistance when they are confronted with failure than students with low achievement motivation, because the former group attribute their failure to unstable factors, while the latter attribute their failure to stable factors (Bar-Tal, 1978). In a similar manner, students who are high in achievement motivation believe that their outcomes on the tasks are mostly determined by their efforts; therefore, they continue their attempts with great intensity. On the other hand, students who are low in achievement motivation tend to neglect the importance of effort in their performance to achieve their goals (Bar-Tal, 1978).

However, it should be noted that it may be argued that achievement behaviour can be predicted, not only on the basis of achievement motivation theory (Atkinson, 1964), but also by the conceptualization of self perception as a variable that is intervening between need for achievement and achievement behaviour (Bar-Tal, 1978). As an advantage it may be assumed that the conceptualization of causal perceptions make possible to modify the causal perceptions of success and failure among students (Bar-Tal, 1978).

However, Rotter (1966) mentioned that it seems students who are at the internal end of the scale attempt more overt striving for achievement by comparison with those students who feel that they have little control over their environment. He mentioned that there are two limitations that affect the potential strength of the above relationship, particularly when college students or adults are involved.

The first limitation is that, among college students and adults, especially with males, there are more people who have an external view, because they use this externality as a defence mechanism against failure but they were originally highly competitive. In



other words, these people still continue their striving behaviour in clearly structured competitive situations but by expressing external views they assumed a stance defensively against failure (Rotter, 1966).

The second limitation is that internal-external locus-of-control is obviously not generalized across the board, and in academic achievement situations that are highly structured, there might be more specificity determining response by comparison with other kinds of situations. Therefore, it is expected to find a higher relationship among children who have less experience in competitive academic situations by comparison with college students or adults who have more experiences in this kind of situation (Rotter, 1966).

However, in spite of the above limitations, it is clearly shown that internals have stronger motivation in achievement situations (Rotter, 1966).

## **7. Antecedents of Locus of Control and Achievement Behaviour**

There are many variables that may affect locus of control and achievement behaviour. Among them sex, age, socioeconomic status of the family, family size, and language background are selected for the purpose of this study. The reasons for this selection are stated below.

### **7.1 Sex**

Many studies have suggested that the sex of participants may serve to qualify the association between locus of control and achievement behaviour (Lefcourt, 1976; Phares, 1976; Stipek & Weisz, 1981; Bar-Tal, 1978). For example, Lefcourt (1976) pointed out that there may be stronger relations between locus of control and

achievement for males than for females. Also, Bar-Tal (1978) pointed out that there is a tendency for females to show more external attitudes and also in their attribution patterns they tend to use more luck attributions than males. Also, females generally assess their ability less than males, particularly in success situations (Bar-Tal, 1978).

However, Weiner (1986) has more recently called females an 'At-Risk' group. He pointed out that females in success situations tend to attribute their successes to unstable causes and in failure situations to stable causes, whereas for males this pattern is reversed.

There are several explanations for attributional patterns of women that may inhibit their achievement. First, these attributional patterns may be the consequence of lower expectations that other people make for women about their successes and failures, and then women internalize these attributional patterns and form maladaptive patterns (Bar-Tal, 1978). Secondly, the sex differences in attributions may be the result of the differential evaluative interactions between teachers and students and also peers who are involved in the school. In this regard, not only females but also blacks and minorities and individuals with certain causal attribution may perform below their abilities in a classroom, because of their maladaptive attributions (Bar-Tal, 1978). Finally, Stipek and Weisz (1981) have suggested that the differences between attributional patterns of boys and girls may be related to social desirability. By social desirability, is meant that in some societies the social expectancies regarding the sexes are different. Therefore, many people, including family members, behave differently towards boys and girls. Thus girls represent behaviours that are accepted by the individuals in the society, because they attempt to satisfy the members of the society. In other words, the girls behave according to social desirability.

## **7.2 Age (Grade)**

Another variable that affects the relationship between locus of control and achievement behaviour is age or grade level of students (Lefcourt, 1976; Phares, 1976; Stipek & Weisz, 1981; Bar-Tal, 1978). Because promotions from one grade to the next are now almost universally based on age, grade and age are accepted as interchangeable criteria for the purposes of this study. Phares (1976) stated that as a child grows the internal control will increase, because the young child is relatively helpless and has little control over his or her behaviour. In other words, his or her behaviour is mostly controlled by adults, but as he or she grows older his or her self-perception is increasingly internalized (Phares, 1976).

However, Phares (1976) pointed out that the relationship between locus of control and academic achievement is stronger among children than among adults. Regarding this relationship, Stipek and Weisz (1981) could not find consistent age differences in their review. Findley and Cooper (1983) found some support for Phares's conclusion and stated that the inconsistency might be related to the curvilinear relation that exists between locus of control and academic achievement. In other words, this correlation is stronger among adolescents than among children or adults.

## **7.3 Family Background**

Human beings do not live in a vacuum. A person lives in a social environment and inevitably interacts with this environment, and each individual affects his or her cognitive and affective structures. Many variables are located in this category. Among them socioeconomic status, family size, and language background are prominent, and are selected for study in this research.

From the socioeconomic-status point of view, Katz (1967) suggested that the cognitive system of the children that is a basis for achievement motivation may be learned differently by different socioeconomic and racial groups. He mentioned that, for example, blacks' cognitive structure is not developed in a way to support the efficacy of effort. In other words, it can be said blacks do not tend to use effort attributions, or they do not perceive the relations between effort and outcome which other people usually perceive in task situations.

The results of most empirical research has shown relative consistency in their findings. For example, Battle and Rotter (1963) in a sample of blacks and whites in sixth and eighth grade, found that the lower-class blacks were significantly more external than middle-class blacks or upper- or lower-class whites.

However, there are some explanations for these kinds of findings. First, the individuals and ethnic groups who come from classes that have little opportunities to have significant power, social mobility or material advantages feel they have no control over their behaviour, and as a result they manifest a higher external score on locus-of-control scales (Phares,1976). Secondly, this finding among children of lower-socioeconomic status may be the results of direct teaching. In this way, when these groups make internal attitudes on the basis of their limited experiences, their elders, parents, teachers and peers might laugh at them and then advise them not to express such beliefs about internal control (Phares, 1976). Also, in a similar vein, they learn that they are restricted in society in a variety of opportunities such as jobs, promotions, health, housing and education (Phares, 1976). Therefore, through such experiences they learn that they have no power to control their environments.

From a family-size point of view, most previous studies indicated a negative correlation between family size and internality. In other words, a larger family size is

associated with a lower internal score on locus-of-control scales. The same explanations that are mentioned for other familial factors are applicable to family size, because family size is also related to the culture of poverty and there is a relationship between family size and socioeconomic status.

However, more discussion about these factors (family background) and their effects on locus of control and achievement behaviour and some previous empirical research regarding the variables of this study will be examined and discussed in the next chapter.

## **Chapter 3**

### **Literature Review**

The concepts of locus of control and academic achievement have attracted much research in the fields of education and psychology. In this review, first locus of control and academic achievement, and then the relation between these two variables, will be discussed, and finally some demographic and familial factors that can affect these two constructs will be explained according to previous researches. Of course because of the nature and diversity of this study, some researches will be mentioned under more than one category.

#### **1. Locus of Control**

Initially, the notion of 'locus of control', as mentioned in the previous chapter, was introduced by Phares (1957) and Rotter (1966) in the social-learning theory. In this theory, reinforcement has been recognized as a determinant of behaviour. The perception of the individual about the sources of this reinforcement is an important element in determining future behaviour. In other words, the perception of the individual about reinforcement (reward or punishment), in Rotter's terms, creates a dichotomous characteristic; that is, within any behaviour the two poles cannot co-exist (Rotter, 1966). This dichotomous variable is internal versus external locus of control. Rotter (1966) mentioned that:

When a reinforcement is perceived by the subject as following some action of his own but not being entirely contingent upon his action, then, in our culture, it is typically perceived as the result of luck, chance, fate, as under the control of powerful others, or as unpredictable because of the great complexity of the forces surrounding him. When the event is interpreted in this way by an individual, we have labeled this a belief in external control. If the person perceives that the event is contingent upon his own behaviour or his own relatively permanent characteristics, we have termed this a belief in internal control. (p. 1)

Therefore, the general expectancies, that are mentioned in the previous chapter, are operationally defined in terms of locus of control (Lewis-Beck, 1978). An internal locus of control indicates that the individual perceives himself or herself as responsible for his or her behaviour, whereas external individuals perceive that other individuals or other sources are responsible for their behaviour (Johnson & Kanoy, 1980). In other words, the first individual (internal) believes he or she has control over his or her own behaviour, while the second one (external) thinks he or she has little or no control over his or her own behaviour. It can be said that internals perceive a causal relationship between their actions and reinforcements, whereas externals cannot recognize this relationship and try to attribute these consequences to luck, fate or other sources that are external to themselves (Kennelly & Mount, 1985).

However, when causal relationships are perceived as self-attributed, greater persistence of that behaviour will occur and consequently a self-reinforcing style will be followed (Bugental, Collins, Collings, & Chaney, 1978; Barling & Fincham,

1978). As a result, individuals who have internal, by comparison to external, locus of control are more active at a cognitive level, and more able to get and use information, and more capable of performing well and using their skills more effectively in appropriate situations (Phares, 1976; Wolf, 1972; Marsh, 1992).

However, the perception of causal relationship not only varies in degree from individual to individual, but it may also vary even in the same individual in different situations and at different times (Feather, 1991). Further research showed that the concept of internal-external locus of control may be considered in terms of temporary (state) or enduring (trait) qualities (Perry & Penner, 1990). In temporary situations the transient environmental events can affect individual perception, while the individual has a stable cognitive schema that can affect his or her perception (Perry & Penner, 1990). Therefore, an internal-locus individual may be periodically confronted by a situation that may normally cause loss of control over his/her behaviour, such as failing on a test or rejection from his peer group (Perry & Penner, 1990). However, loss of control caused either by temporary environmental factors or by pre-existing cognitive schemata can affect individual performance, but its long-term effect on the perception of the individual is different. It should be mentioned that some researchers believe that the role of social-learning theory constructs emphasize principally motivational rather than cognitive aspects (Barling, 1982). While others believe that self-perception is neither purely cognitive nor purely motivational, it contains some elements of both (Shaver, 1975), and some researchers mentioned that it is not clear yet whether self-perception is cognitive or motivational (Callaghan & Manstead, 1983).



In addition to social-learning theory, other theories deal with self-perception and the concept of control, such as attribution theory and intrinsic motivation. Although some principles of these theories are different from each other, the aims and some basic concepts of them are very close to each other. For example, in attribution theory, locus of causality can be either internal or external, but, in contrast to social-learning theory, attribution theorists argue that some internal causes are under the control of the individual, like effort, and some of them uncontrollable, like ability (Shaver, 1975).

Because of the similarities between different self-perception theories, some empirical researches that are based on social-learning theory and attribution theory will be reviewed in the following pages.

## **2. Academic Achievement**

Academic achievement has been the subject of various kinds of studies in the area of education and psychology from early childhood education to higher education. Educators and psychologists have studied academic achievement in relation to different aspects of other psycho-educational factors such as social milieu, type of curriculum, teachers' qualifications and experience, parents' and peers' expectations, interest in school, academic self-assessment, self-perception, motivation, children's rearing, home background, and individuals' personality. From these kinds of empirical researches, educators and psychologists have developed a number of theoretical frameworks in order to understand and predict students' academic achievement.

Researchers have used different techniques for measuring academic achievement. In a meta-analysis study, Hansford and Hattie (1982) identified sixty-one performance or achievement tests during their analysis. These kinds of measures can be divided into 'teacher or student rating', 'home-made test' and 'published test'. However, the analysis of the studies that used these performance or achievement tests suggested that the researchers did differentiate between different kinds of abilities (Hansford & Hattie, 1982). In most of the studies the authors are more interested in measuring a general or a heterogeneous ability rather than a specific or homogeneous ability. Although the use of particular measures in various studies is dependent on the aims of study, sometimes it is apparent that using different kinds among these measures has yielded similar results. For example, it has been reported that evaluations of academic performance either by students' own ratings or by teachers' ratings have been in good agreement (Feather, 1991). In another study measuring school achievement, in regard to reading ability, it has been reported that all the estimated relationships have been in the same direction, whether reading tests or teacher ratings were used as criteria for measuring academic achievement (Skaalvik, 1983). Also in a meta-analysis, the results of five different tests of verbal ability (reading, vocabulary, verbal, language and English comprehension) showed no statistically significant differences (Hansford & Hattie, 1982).

In spite of these reports regarding the similarities between different kinds of academic achievement measures, it seems their relationships to other measures are different. For example, when achievement tests were related to various self-measures, a correlation range between 0.09 for spelling to 0.39 for work study has been found (Hansford & Hattie, 1982). Also, it has been found that, among different techniques used for measuring academic achievement, the grade-point average has the highest correlation with measures of overall self-regard ( $r = 0.34$ ) (Hansford & Hattie, 1982). Generally,

it has been shown that 'home-made' tests including teacher ratings and grade-point averages, have produced a higher mean correlation than 'published' or 'published and well normed' achievement tests (Hansford & Hattie, 1982). It can be concluded that the choice of types of achievement measures used can be influenced by the strength of the relation between academic achievement and other self-measures.

In another approach to the problem, researchers have studied academic achievement at different levels of education, from early childhood to higher education. But the majority of these studies has concentrated on academic achievement at secondary-school level and beyond, especially in developed countries; and academic achievement was regarded as a dependent variable, while other socio-educational or psycho-educational factors were regarded as independent variables. The direction of the influence was from the socio-educational or psycho-educational factors towards academic achievement. In some studies, completing high school or continuing study beyond Year 10 was regarded as the independent variable (Ainley, Foreman & Sheret, 1991). But, it should be mentioned that there is a difference between academic achievement and completing or remaining at high school beyond Year 10.

However, there is no balance between the number of researches that have been done at high-school and elementary-school levels, especially in Australia. In fact, the majority of the previous researches was concentrated at high-school level. Of course this imbalance is because of the nature of Australian education. In Australia studying up to Year 10 is compulsory. However, this matter should not affect, or give cause to neglect, achievement at elementary-school level, because the foundation of formal education is in elementary school in most societies. The importance of this level of education in developing different aspects of cognition and personality of the individual

is not negotiable, particularly for the educational scientist. Therefore, this kind of study should be more concentrated at this level, because early school leaving or school failure at a higher level of education may be the result of deficiency at this level.

### **3. Locus of Control and Academic Achievement**

The main aim of this review is to study what has been discovered about the relationship between self-perception, mainly in terms of locus of control, and academic achievement. The majority of educators and psychologists believe that achievement and ability are strongly related to overall self-regard. However, studies concerning a relationship between personality or motivational variables and academic achievement have emerged in educational and psychological researches over the last two decades. The value of this kind of research is apparent for educators because students' personality or motivation is sufficiently flexible to change more than their ability; therefore academic achievement may be modified or enhanced indirectly through educational practices in order to affect the motivational development of the student (Stipek & Weisz, 1981).

Various researches have shown that there is a positive relationship between locus of control and academic achievement, in the direction that elementary and high-school students who have internal locus of control have higher grades and achievement-test scores than external students (Johnson & Kanoy, 1980; Kennelly & Mount, 1985; Stipek & Weisz, 1981; Maqsud, 1983). The above result was found by various research designs.

For example, Johnson and Kanoy (1980) compared academically bright forth-grade students or achievers with underachievers on the basis of IQ and achievement scores. Students' Grade-Point Average (GPA) was based on final grades for arithmetic, reading and language in the third grade. The IQ scores and GPAs were used to form a regression-line equation for predicting an expected GPA for each student, that was based only on the students' IQ score. Then a discrepancy score - actual GPA minus predicted GPA - was determined for each student. For ensuring that actual achievers and underachievers would be compared, potential students were chosen from the extreme range of discrepancy scores. Students who were in the top 50 percent of discrepancy scores were defined as achievers, and students who were in the bottom 20 percent as underachievers. The final sample of this study consisted of 20 achievers and 9 underachievers. Each student responded to two questionnaires: the Intellectual Achievement Responsibility (IAR) for measuring internal-external locus of control and The Piers-Harris Children's Self Concept Scale (P-HCSCS) as a measure of self concept.

The results showed that there were not any main effects on the self-concept total score or the four sub-scales of the self-concept scores: behaviour, physical appearance and attributes, anxiety, and happiness. But for the self-concept sub-scale of intellectual and school status, there was a significant difference ( $p < .05$ ) that showed achievers had a higher self-concept than underachievers on intellectual and school status. Also the results indicated that achievers had higher internal locus-of-control scores than underachievers for both the IAR total and the IAR negative scores ( $p < .05$ ). The IRA positive score did not show any difference between achievers and underachievers. In relation to the last findings, the authors concluded that perhaps both achievers and underachievers are willing to accept responsibility for the outcome of positive

achievement, while, by contrast, only achievers are more willing to accept responsibility for negative achievement (Johnson & Kanoy, 1980).

This study may be criticized for two reasons. First, the sample size of this study is very limited, and overall 29 students cannot be considered as a representative sample in order to make a generalized conclusion. Secondly, this study did not consider about 30 percent of the individuals who were nearly the average students on the basis of their grade point average. Possibly, if the researchers had included this group in the study, the above results would have changed.

In another study in Kano City, Nigeria, carried out by Maqsd (1983), the relationships of locus of control with self-esteem were investigated, as well as academic achievement, and prediction of performance, among Nigerian secondary-school pupils. The sample of this study consisted of 80 boys from a secondary school who were selected randomly from among 243 students. The mean age of the sample was 16.73 years. Five measures were used in this study in order to find the relationships between variables. First, locus of control was measured by the Rotter I-E Scale. Secondly, a brief Socioeconomic Background Questionnaire (SBQ) constructed by the researcher was used for measuring the educational and occupational background of the students' parents. Thirdly, in order to measure the non-verbal intelligence of the students, the Raven's Standard Progressive Matrices (RSPM) was used. Fourthly, the Cohen and Cohen adapted version of the Brookover Scale of self-concept of Academic Ability (BSAB) was administered in order to measure students' self-esteem. Fifthly, two objective tests, one for English and the other for mathematics, were used for assessing the students' academic achievement. These academic-achievement tests were constructed by the subject teachers in

accordance with the prescribed syllabuses of the two subjects, English and mathematics. Finally, in order to measure a prediction of academic-achievement performance by the students, one week after administering the achievement tests the subjects were informed of their scores on the two tests, and then they were asked to estimate the marks which they would achieve after a month.

In order to test the hypotheses of this study, the researcher collected the data in three phases. In first phase, the I-E Scale, the SBQ, the BSAB, the RSPM questionnaire, and the first achievement tests in English and mathematics were administered. In the second phase, one week after the first phase, the subjects were given their scores on the first English and mathematics achievement tests and then they were asked to predict their scores on similar English and mathematics achievement tests that they would be administered after a month. In the third phase, one month after the second phase, the second English and mathematics tests were administered to the subjects (Maqsud, 1983).

For measuring the effects of socioeconomic status, locus of control, non-verbal intelligence, and self-esteem on academic achievement, the subjects were divided into two groups: high and low, on the basis of split at the median point, for each of the four variables (Maqsud, 1983).

The findings of this study revealed that the academic achievement for internal-locus-of-control students was significantly higher than that for externals ( $p < .05$ ). Therefore this finding supports the Rotter (1966) hypothesis that internals are more engaged in achievement-related behaviour than externals. Also, the result showed a significant

positive relationship between self-esteem and academic achievement ( $p < .05$ ). The further examination of the data indicated that external-locus-of-control students tended to overestimate their academic achievement, while internals had more accurate predictions for their own academic achievement (Maqsud, 1983). The effect of socioeconomic status on academic achievement will be discussed in later section in this chapter.

Although this study, partially, covered one of the disadvantages mentioned before relating to previous research (Johnson & Kanoy, 1980), i.e. the gap between achievers and underachievers, the study has other deficiencies. First, the author (Maqsud, 1983) used the BSAB in order to measure self-esteem, but throughout the article he used the terms 'self-concept' and 'self-esteem' interchangeably, though these two terms are usually used for two independent constructs, notwithstanding that they might have a positive correlation with each other. Secondly, this study was carried out in Nigeria, in a country that is essentially in a third- world condition, whereas the instruments that were used, such as those used for measuring locus of control, self-concept or self-esteem, and intelligence, were constructed in developed or western countries. These kinds of instruments are usually culturally bonded, and may not be appropriate tools for using in developing or underdeveloped countries.

In another study Wilhite (1990) tried to investigate further the relationship between self-efficacy and locus of control as predictors of achievement among college students. The subjects consisted of 184 college students who enrolled in an introductory psychology course as a required course. Several instruments were used in this study. Among them there were the Self-concept of Academic Ability Test (SCAAT), for measuring self-efficacy; the Concept Mastery Test, as a measure of



academic aptitude; the Adult Nowicki-Strickland Internal-External Control Scale, for assessing locus of control; and the Everyday Memory Questionnaire (EMQ), as a self-assessment measure of memory. After applying a stepwise multiple-regression analysis for predicting academic achievement, it was shown that EMQ scores ( $p < .0001$ ), the locus of control measure ( $p < .0001$ ), and the SCAAT scores ( $p < .0021$ ), all accounted for significant shares in the academic achievement variance, especially scores on EMQ. The direction of this relationship was the same across four measures used by Wilhite: positive student's evaluation of his or her memory, externality of locus of control, positive score on SCATT, and level of academic achievement. Also a low and non-significant relationship was found between scores on the SCAAT and the locus of control measure. In accord with this finding, Wilhite suggested that the SCAAT measures characteristics that are independent of the individual's locus of control. The finding that externality rather than internality was significantly associated with academic achievement is unexpected. According to the author of this article, this finding suggested that there is a need to investigate how characteristics of the academic context may mediate the relationship between locus of control and achievement.

However, as the author pointed out, the appropriateness of generalizing these findings to the other contexts is suspect, because the nature of various courses or subjects is different, one from the other. In addition to the above reason, Rotter (1975) mentioned that many college students who believe that external factors control or affect the outcome of most situations are using a defence mechanism, and he called them 'defensive externals', because this kind of response is not a reflection of their true locus of control. In this regard Rotter (1975) believes that those students who believe their achievement is affected by external factors are less likely to continue their studies through to higher education. Furthermore, the finding of Wilhite's study

might be attributed to Levenson's suggestion that was briefly introduced in Chapter 2 (Levenson, 1981). In other words, the college students might perceive controllability over powerful others in Levenson's Scale, while, Adult Nowicki-Strickland Internal-External Control Scale does not differentiate between powerful others and chance dimensions and both type of attitudes are classified as external attitude.

In another view, attribution theory has been developed by Heider's (1958) hypothesis. He has suggested that the performance of an individual may be attributed to the person or the situation, and that either of these attributions or causes may be stable or unstable. Heider has followed the academic achievement of students for many years. It should be mentioned that researchers with different attitudes, as a result of different theoretical orientations, tend to use different vocabularies and different methods in discussing their researches. Consequently, much of the time, similarities regarding concepts and findings from different theoretical backgrounds are not identified in empirical research (Stipek & Weisz, 1981). However, on the basis of attribution theory, Weiner (1979) conceptualized an attributional model of achievement-related behaviour that was discussed in the previous chapter.

In an empirical research project designed to develop a standardized questionnaire for measuring self-perception in relation to academic achievement among Iranian junior high- school students, with a randomly selected sample of 1897, the following results were obtained (Khayyer, 1990). Students who perceived themselves as successful students tended to attribute their achievement to internal factors (ability and effort), while students who perceived themselves as unsuccessful students tended to attribute their achievement to external factors (task difficulty and chance). In addition, among students who had positive attitudes towards their achievement, those who attributed

their success to internal factors had a higher mean GPA than students who attributed their success to external factors ( $p < .001$ ). On the other hand, this difference was not observed among students who perceived themselves as unsuccessful students. In other words, there was no significant difference between the GPA of unsuccessful students who attributed their lack of success either to internal or to external factors. Further, the scores of the questionnaire on stability factors (ability and task difficulty) were less correlated with GPA for both students who perceived themselves as successful and students who perceived themselves as unsuccessful ( $r = 0.17$  and  $r = 0.38$ ,  $p < .001$ , respectively). The correlations regarding instability factors (effort and chance) and GPA were reported as 0.28 ( $p < .001$ ), for students who perceived themselves as successful and 0.44 ( $p < .001$ ), for those who perceived themselves as unsuccessful. In general, the findings of this research partially supported Weiner's attributional model of achievement-related behaviour.

Bar-Tal, Goldberg, and Knaani (1984) in another study, carried out in Israel, tried to examine the attributional model of achievement-related behaviour among 92 Grade Seven children, aged 12-13, drawn from two schools. One of these schools was regarded as 'disadvantaged', by the Israeli Ministry of Education, because the students who enrolled in it mostly belonged to a lower income population. The second school regarded as 'advantaged', mostly had students from the upper income population. Comparison of these two socioeconomic classes and sex differences will be discussed in a later section of this chapter.

In the Israeli study, four similar instruments were used, in each instrument 24 causes of success or failure were listed, and the subjects were asked to rate these causes on the dimensions of 'locus of control', of 'stability', of 'controllability', and finally to

evaluate their recently received grade (GPA) 'outcome' as a success or failure, and then indicate the relative influence of each of the 24 causes on their grade. The answers to each cause on each instrument were given on a five-point rating scale (Bar-Tal, Goldberg & Knaani, 1984).

The results of this study indicated that the majority of the students in both groups, 'advantaged and disadvantaged' attributed both success and failure to 'preparation for a test at home'. Also other causes that were frequently mentioned were mostly related to effort attributions. The researcher argued that the four causes suggested by Weiner were evaluated somehow differently from the original category. The authors of the above study (Bar-Tal, Goldberg & Knaani, 1984), evaluated ability and effort as internal and moderately stable, while test difficulty and luck were evaluated as external and unstable. Therefore, according to this study there is a difference between the evaluation of effort and task difficulty in relation to the original classification, because prior effort was evaluated as an unstable factor and task difficulty was evaluated as a stable factor. Weiner (1974), and Greenberg, Saxe, and Bar-Tal (1978), mentioned that effort is often perceived as a stable trait. Frieze and Snyder (1980) also mentioned that attribution to effort will characterize school achievement more than achievement in other contexts. Bar-Tal, Goldberg, and Knaani (1984) mentioned that Weiner's categorization of four causes can be considered as an example, because individuals may perceive different meanings in the four causes; therefore they suggested it is necessary to allow subjects to evaluate the causes on only three dimensions, 'locus of control', 'stability', and 'controllability' (Bar-Tal, Goldberg, & Knaani, 1984).

Another controversial issue, regarding self-attribution in the achievement-related context, is whether these attributions resulted from more or less cognitive

informational processing, or from a motivational need to enhance self esteem. Miller and Ross (1975) in their review concluded that in the attribution of failure there was no evidence for a self-serving effort, whereas in the attribution of success there was evidence for a self-serving effort. However, they suggested that this result reflected biased information processing rather than the need to enhance self-esteem. In contrast, Zuckerman (1979), in his review of related literature, found that in both success and failure situations, in most experimental studies, self-serving attributions are better explained in motivational rather than information-processing terms.

However, in an experimental study, Callaghan and Manstead (1983) tried to examine the issue of whether self-attribution in academic situations is logical or self-serving. Seventy students whose average age was 16 years 8 months from North Lancashire Grammar School took part in this study as subjects. One questionnaire and two experimental tasks were used as instruments. In the questionnaire, the students made attributions regarding the results of the Education O-level examination; in other words, the feelings of the subjects were expressed on a rating scale whose poles were pleasure and disappointment by placing a cross on a 10 cm. scale. The experiment was based on two successive anagram tasks.

According to a self-serving model of attribution, it is anticipated that success will be attributed to internal factors and failure to external factors. On the other hand, it is anticipated that in an informational-processing model, a consistent outcome will be attributed to stable factors while an inconsistent outcome will be attributed to unstable or variable factors (Callaghan & Manstead, 1983).

However, in the above study (Callaghan & Manstead, 1983), subjects rated the number of correct solutions which they expected to gain out of ten before practice and the main task. In the success condition subjects were told that the average score that would be expected was four. In the failure condition subjects were told that the average score that would be expected was six. Furthermore, the anagram tasks in the success condition were easier to solve than anagrams in the failure condition. All the anagrams were soluble. Subjects were designated to one of the four experimental conditions randomly. The four conditions were based on two performance outcomes (success or failure) and two successive tasks (practice and main). Therefore, the four conditions consisted of success followed by success, success followed by failure, failure followed by success, and failure followed by failure. Subjects were allowed five minutes to determine their scores after each task. Also, after each task causal attributions of outcome were made by the subjects. Regarding these causal attributions the subjects were asked, "To what extent do you consider the following factors to have been influential in determining your score on the test?" (p. 16). In response to this question, subjects put a cross on each of four 10cm. semantic-differential scales: ability, effort, task difficulty, and luck. Finally, at the end of the second task, subjects were requested to make two ratings in relation to another similar task, just as they had before, and on their anticipated enjoyment in performing such a task (Callaghan & Manstead, 1983).

Comparison of the results regarding measures prior to any experimental manipulation indicated that those who failed on the practice task had higher expectations (mean = 5.83) in comparison to those who succeeded (mean = 4.14), ( $p < .001$ ). Also students who succeeded on the main task had more satisfaction with their O-level examination performance (mean = 3.45) than students who failed on the main task (mean = 2.09), ( $p < .01$ ). The analysis of attributions associated with the result of the experimental

tasks indicated that the subjects showed stronger ability attributions when following practice failure than following practice success ( $p < .01$ ). Also students who failed on the practice task had stronger ability attribution on the main task ( $p < .01$ ), and those who failed on the main task made stronger ability attributions for this outcome than those who succeeded ( $p < .06$ ). With reference to Weiner's attribution theory, success or failure on the practice task was not related to effort on that task. Regarding task difficulty, students who failed on the main task had stronger task attribution than those who succeeded ( $p < .001$ ). Those students who failed on the practice task had stronger luck attributions than those who succeeded ( $p < .05$ ). The same finding was true on the main task ( $p < .05$ ). Regarding internality, students who failed on the practice task had more internal attribution for the main task than those who succeeded on the practice task ( $p < .05$ ). Also students who succeeded on the main task had more internal attribution for that outcome by comparison with those who failed ( $p < .01$ ). Attribution to stability was stronger for those who failed on the main task than those who succeeded ( $p < .005$ ). Expectation for future task outcomes showed some significant differences apparently due to the practice task. Students who succeeded had higher expectations than those who failed ( $p < .005$ ). Also in relation to the main-task outcome, those students who succeeded had higher expectations than those who failed ( $p < .001$ ). But no significant effect was found in relation to the interaction between practice and main-task outcome (Callaghan & Manstead, 1983). However, the sex of the subjects indicated some differences in relation to their attribution patterns that will be discussed in a later section in this chapter.

The above results, according to Callaghan and Manstead (1983), supported partially a self-serving model of causal attribution for both success and failure. Callaghan and Manstead (1983) mentioned that, although the internality did not change as a result of the practice-task outcome, students who succeeded on the main task regarded their

attributions as being more related to internal factors than those who failed. Otherwise, there was no finding to support the logical information-processing model. This means that the findings did not support any consistent outcomes' being attributed to unstable factors. Also, failure in both situations, practice and main task, had a stronger attribution to luck than in the success condition. This also could be regarded as support for a self-serving model of causal attribution (Callaghan & Manstead, 1983).

There is, however, more evidence to support the idea that self-attribution models are influenced more by self-serving or motivational variables (Stipek & Weisz, 1981), but generalizing the results of experimental design research in real-life situations should be considered cautiously, because there is a big difference between an experimental condition and a real-life situation, especially when variables in the affective domain are involved.

In spite of various researches that indicated moderate and significant positive relationships between locus of control and academic achievement, Hansford and Hattie (1982) in their review using meta-analysis suggested that the relationship between self-regard and academic achievement is neither precise nor clear. These authors noted in their article that Wylie (1979), concluded that the correlations between achievement indices and overall self-measures tend to be quite small, and there is no evidence to support the commonly accepted idea that the variables achievement and self-regard are strongly associated.

However, in a meta-analysis, the results of 128 studies with a total sample of 202,823 individuals and 1136 correlations between self-ratings and achievement measures



were analysed (Hansford & Hattie, 1982). The results of this study indicated that the range of the 1,136 correlations was between -0.77 and 0.96 with a mean of 0.212. Among these correlation coefficients there were 994 positive, 22 zero, and 170 negative. During this meta-analysis, the authors classified self-measures into 15 categories. One of these categories comprised self-perception measures. They identified 15 correlation coefficients expressing relationships between self-perception and overall achievement measures. The mean of these correlations was 0.26, with standard deviation 0.09. On the other hand, they classified performance and/or achievement into another 15 categories. They identified 210 correlation coefficients regarding the relationship between reading and self-measures, the mean of these correlations being 0.18 with standard deviation 0.27. Also they recognised 194 correlations regarding the relationship between mathematics and self-measures, the mean of these correlations being 0.20 with standard deviation 0.21. As a whole, the lowest and the highest mean correlations between different self-measures and achievement-terms, achievement in different subject, were reported for self-assurance (0.14) and self-concept of ability (0.42) respectively. The lowest and the highest mean correlations between different performance and/or achievement and self-measures were reported for reading (0.18) and Grade Point Average (0.34) respectively (Hansford & Hattie, 1982).

The level of these mean correlation coefficients seems very small (Hansford & Hattie, 1982). Of course Hansford and Hattie (1982) mentioned that the use of the term 'average' or 'typical' relationship should be considered cautiously, because these averages consist of a number of other variables with different capacities, and each of them can affect the size these averages. In other words, these variables such as grade level, socioeconomic status, self-test or self-term used, type of achievement measure,

sampling, design quality, and definition of each variable, can influence on the results of a study (Hansford & Hattie, 1982).

By further analysis Hansford and Hattie (1982), concluded that those studies which had higher quality, utilising nationally representative samples, and in which the reliability coefficients were reported, are more likely to report relatively low correlation coefficients between self-measures and performance and/or achievement. In regard to self-measures, this meta-analysis has shown that the more specific self-concept produced more positive correlations than the generalized measures of self-concept and self-esteem (Hansford & Hattie, 1982). On the other hand, Stipek and Weisz (1981) in their article stated that McGhee and Crandall (1968) revealed evidence that the locus-of-control questionnaire predicted teachers' grades more strongly than scores on standardised achievement tests. Regarding this finding, they suggested that teachers' grades usually reflect factors such as effort, persistence, and initiative directly, and all of these factors are measured directly by locus-of-control questionnaires. Standardized achievement tests, however, reflect such factors indirectly by assessing skills that are acquired by the student.

At the end of this meta-analysis (Hansford & Hattie, 1982) it was suggested that certain gaps were observed in relation to self-measures in the literature. They mentioned that a few studies were concerned with very young children's self-concepts, and the effect of home environment as an intermediate variable between self-measures and achievement. Furthermore, they mentioned that there are some problems regarding present tests of self-concept of ability and unreliable measures of academic achievement such as GPA and teacher ratings.

Although this meta-analysis has made a valuable contribution to self-measures and achievement, the variety of self-measure questionnaires and also the variety of achievement tests and other indices of achievement, create some limitations of this meta-analysis. For instance, 15 tests regarding different self-perceptions were identified and categorized under one heading. Each of these tests may be constructed on the basis of a specific theory of self-perception, and each theory has a specific definition for self-perception. Therefore the operational definition of self-perception in each theory might differ from other theories, so that different results could be expected from different theories. This problem also applies to different achievement tests. Therefore, it would not be surprising if the means of these correlations at different age levels, with different cultural, educational, and social backgrounds, and with different research designs, might tend to decrease, particularly in cases where some of these correlations were negative.

In another study, Stipek and Weisz (1981) reviewed and discussed causal direction between locus of control and school achievement. They mentioned that the association between locus of control and academic achievement is usually considered in terms of an internal locus of control affecting academic achievement; but, because these researches are usually correlational and cross-sectional, this conclusion cannot clearly justify a causal relationship. They stated that Friend and Neale (1972), and Frieze and Weiner (1971), reported that students are more likely to take responsibility for their success than their failure. Therefore, it may be concluded that the correlations between locus of control and academic achievement probably show that students who are high achievers in school accept responsibility of their achievement and students who are low achievers attribute responsibility to other sources (external causes). Stipek and

Weisz (1981) mentioned that the association between locus of control and achievement might be fictitious, because both of these variables may have a shared variance with another third variable, such as mental age, socioeconomic status, or IQ.

In relation to causal direction, Stipek and Weisz (1981) stated that the few causal analyses have identified locus of control as a cause of achievement, rather than vice versa. This result should be considered cautiously, because the data present shaky support for this conclusion (Stipek & Weisz, 1981). Stipek and Weisz (1981) noted that in a study conducted by Stipek (1980), in order to determine the direction of causality between locus of control and academic achievement, examined 89 first graders at the beginning and at the end of school year. The results of this study, that were based on path and cross-lagged panel correlation analysis, indicated that locus of control caused achievement. In other words, scores of locus of control at the beginning of first grade could predict achievement at the end of school year better than achievement at the beginning of school year could predict for locus of control at the end of school year. However, according to Stipek and Weisz (1981), further research is needed to investigate the direction of this casualty.

#### **4. Academic-Achievement Feedback and Locus of Control**

From the social-learning theory point of view, a behaviour is influenced by both expectancy and reinforcement value; therefore, any changes in these two variables can cause changes in the behaviour. Hence, in order to change behaviour, it is easier to change expectancies (Rotter, Chance & Phares, 1972).

In a study conducted in 21 classrooms from three schools in the San Francisco, involving 559 Fifth- and Sixth- Grade students from various socioeconomic and racial backgrounds, the effects of feedback practice were examined, regarding achievement behaviour, and its influence on self-perception of the students (Oren, 1983). The investigator of this study sought a relationship between the patterns of students' attributional tendencies and the classroom feedback and evaluation structure. In this study the author introduced the notion of 'attributional dispersion', which characterizes the pattern of attributional tendencies of students in the classroom, and attributional tendency is operationally defined as a measure that is based on individuals' attributional conclusions in the classroom environment. In this regard, the various attributional conclusions are condensed in a single unidimensional attributional tendency scale (from fully internal to fully external). The results of this study showed that the achievement feedback can affect causal-explanation patterns of success and failure of the students. The direction of this effect showed that, when the feedback structure is rich, more specific, and individualized, the attributional patterns of low-achieving students are closer to those of high-achieving students (Oren, 1983). Also, it has been shown that the feedback influences the low achievers more than the high achievers (Oren, 1983).

Another study carried out with 340 male and female university students examined the effects of a high- and a low-expressive lecture, locus of control and contingent or noncontingent feedback on academic achievement and attributional patterns of the students (Magnusson & Perry, 1989). The results of this study showed that expressive instruction improved the performance of external locus-of-control students who received contingent feedback, but this improvement did not occur for those who received noncontingent feedback. The students who received contingent feedback experienced more control over their performance than those who did not receive

contingent feedback. This finding may also be the result of expressive instruction (Magnusson & Perry, 1989). These authors concluded, from the general pattern of their findings, that both internals and externals benefit from classroom environment in which contingent feedback is offered to them. In other words, expressive instruction is an effective method for internals, though not for externals; but by changing external locus of control through contingent feedback, externals can benefit from expressive teaching (Magnusson & Perry, 1989).

The results of the above studies suggested that classroom evaluation and feedback structure is an important component of an educational system that can influence the students' perceptual system and perhaps their academic abilities.

One of the aims of the present study is to test the effects of feedback practices, regarding achievement behaviour and their influences on locus of control of elementary-school children. In this relation, in this study the general (not individualized) results of academic achievement tests will be used as feedback. The operational reasons about the administration of feedback will explain in Chapter 4. In addition, although many investigations concentrated on self-perception, in terms of locus of control, and its relation to academic achievement, little work has been carried out on feedback effects of academic achievement on locus of control, particularly in the natural classroom environment.

In conclusion, previous research, although clarifying some aspects of locus of control and achievement behaviour, leaves many questions outstanding that future research should attempt to answer. In other words, despite the large number of researches that

have been carried out in this field of study, sometimes the results are inconsistent. This inconsistency may be the result of differences in definitions of variables, sampling, instruments for measuring variables and finally the cultural backgrounds where these researches were developed. Also it seems further tests are needed in order to determine the direction of this causality (whether locus of control affects achievement, or achievement affects locus of control), because information about direction can help teachers and educators to plan their programs in such a way as to improve the academic achievement of the students. Furthermore, future research should consider in causal models possible mediating variables, particularly family background. Including these important variables might help identify not only the causal direction more clearly, but also the potential contribution of these variables to both locus of control and academic achievement.

It is now necessary to review the literature on these mediating variables, including sex, age or grade, socioeconomic status, family size, and language background, and their relationship to both locus of control and academic achievement.

## **5. Sex, Locus of Control and Academic Achievement**

Outcomes of different studies regarding sex differences in relation to locus-of-control have indicated contradictory results. Some of these studies did not find any different pattern for locus of control scores for males or females (e.g. Bar-Tal & Darom, 1979). In another study the researchers reported that between advantaged and disadvantaged students, on the basis of grade-point average, no differences were found between male and female students regarding causes for success and failure in each socioeconomic status group (Bar-Tal, Goldberg & Knaani, 1984). Even among

bright elementary school children, no relationships were found between sex and either self-concept or locus of control (Johnson & Kanoy, 1980). Hansford and Hattie (1982), through their meta-analysis, concluded that there were not any significant differences between the means of these correlations regarding self-measures and achievements between males and females.

On the other hand, on the basis of other findings, Callaghan and Manstead (1983), have indicated that some sex differences have been found in locus-of-control and academic achievement. It has been shown that males and females presented different patterns of causal attributions for similar achievement outcomes. Nowicki and Strickland (1973), mentioned that in early grades female achievement could not be predicted from the Nowicki-Strickland locus-of-control scale, but, in Fifth and Seventh Grade, it has been shown that a significant relationship existed between locus of control and academic achievement. Chadwick, Bahr and Stauss (1977) found that self-esteem is more related to GPA for males than for females on the basis of a North American Indian sample. Also Hansford and Hattie (1982), referred to a report by Rubin (1978), that the relationship between self-esteem and academic achievement is higher at an earlier age for girls than boys in a sample of children aged nine, twelve and fifteen years. For further support Hansford and Hattie (1982) also reported that Primavera, Simon, Primavera (1974) indicated that self-concept and academic achievement are more related among girls than boys.

In contrast to self-esteem and self-concept Stipek and Weisz (1981) in their review mentioned that there is a stronger association between internal locus of control and achievement for boys than girls, especially when the Children's Nowicki-Strickland Internal-External (CNS-IE) scale is used. Callaghan and Manstead (1983) in an



experimental study mentioned above, found that females were more internal for both practice and main-tasks performance than males. Also, in relation to externality, male-student attributions were more primarily related to task difficulty. It was also found that in failure situations, in both the practice and the main tasks, females were much more likely than males to make internal attributions. In the above study, the researchers also found some differences in relation to effort attributions. In this study males indicated stronger effort attributions than females on the main-task outcome, whether this was success or failure, when followed by success on the practice task; and when failure on the practice task was followed by failure on the main task, females showed stronger effort attributions than males by comparison with main-task success following by failure on the practice task. Dweck, Davidson, Nelson, and Enna (1978) also noted that girls are more likely to attribute their failure to their poor ability than were boys.

However, it seems differences in locus of control in males and females also varied in relation to different measures of academic achievement. For example, in a study that investigated the relationship between locus of control and two measures of academic achievement in males and females, the following results are reported (Kennelly & Mount, 1985). Externality of locus of control was negatively and significantly related to both grade-point average and the Iowa Test of Basic Skills, while this relationship for girls was significant only for grade-point average (Kennelly & Mount, 1985).

The findings of these studies regarding sex differences are inconsistent. The inconsistencies make it difficult to reach a final judgment about the pattern of locus of control in the two sexes. However, it seems that one of the factors that causes different results for the two sexes is the different sex roles that are expected from

males and females in different societies. Callaghan and Manstead (1983) stated that McKee and Sherriffs (1957) found that both male and female college students regarded males more highly than females. Bar-Tal (1978) mentioned that females rated their ability less than males especially after successful outcomes. Nowicki and Walker (1973) found that the relationship between locus of control and academic achievement is significant only for females who are low in 'social desirability', not for females who are high in social desirability. More recently, Stipek and Weisz (1981) concluded that females who were high in social desirability might have answered the locus-of-control questionnaire in accordance with the social acceptability in the society rather than to their true belief. It appears that it should not be expected that locus of control would be associated with academic achievement for this group of girls.

It is necessary to review previous researches regarding sex differences in academic achievement. A few studies have shown that there is no significant difference between the achievement of boys and girls. For instance, in a study in Australia at Year 9 two standardised achievement tests, PATHMATH and TORCH, were used for measuring academic achievement, no significant differences on academic achievement between males and females students were found (Ainley, Foreman & Sheret, 1991). In another, earlier study, Hilton and Berglud (1974) indicated that there were no significant differences in mathematics academic achievement between male and female students in fifth grade, but the differences grew steadily larger, favouring males, during high-school years. Also Chipman and Thomas (1985) indicated that no sex differences were found between mathematics scores that students received at high school level, but overall on all subjects female students received higher grades than male students.

However, the majority of research findings did show sex differences on academic achievement. Generally, these researches revealed that girls' school achievement is higher than boys' school achievement (Khayyer, 1986; March, 1989), but in other studies carried out in Australia the reverse direction was found: a lower achievement rate was reported for girls by comparison with boys (Sampson, 1965; Adams, 1985). It should be mentioned that Khayyer's (1986) study was carried out in single-sex elementary schools. Therefore, one of the factors that may be considered for comparing academic achievement of boys with girls is the type of schooling, in terms of single-sex or co-educational schooling.

In spite of the above findings about Australian female students, it has been reported that more female students now complete Year 12 than boys because first, male students have more opportunities to continue their study in apprenticeship programs, and, secondly, the social attitudes of people in relation to females' education have changed in comparison to the past (Farmer, Vispool & Maehr, 1991). However the cultural pressure might vary in different social environments. For instance, in a study carried out in Norway (Skaalvik, 1983), it was concluded that education, or more specifically academic achievement, has different values for males and females. Skaalvik mentioned that, traditionally, the boy is perceived as the wage earner by his family. Hence, his education is paid more attention than a girl's, even before the high-school level. In other words, in societies with accepted traditional attitudes to sex roles, the pressure for academic success on girls will be weaker than boys. Even in societies where new attitudes towards sex roles are accepted, still the traditional norms and expectations exist in practice (Dowling, 1982).

In another point of view, it has been shown that students differentiate some subjects of study as having either masculine or feminine characteristics. Generally, it was found that woodwork and metal work were rated as highly masculine, and cookery and typing were rated as highly feminine subjects. After the above subjects, physical science and mathematics were rated as masculine and modern language, biology and psychology were rated as feminine subjects (Weinreich-Haste, 1979; 1981). A similar study was carried out after a decade by Archer and Macrae (1991) to test whether or not any change has occurred in students' attitudes regarding this masculinity-femininity dichotomy of the subjects. The results showed that gender stereotyping of school subjects was reduced by comparison with the previous study. However, the results of Weinreich-Haste's (1981) study by comparison with Archer and Macrae's (1991) study indicated both similarities and differences. In both studies, home economics and typing were rated as feminine subjects, whereas physics was rated as a masculine subject; but several subjects that were rated as masculine or feminine subjects in the earlier study (1981) were rated as neutral in latter study (1991). For example, mathematics which was rated as masculine, and English, French, and biology which were rated as feminine subjects in 1981, were all rated as neutral subjects in 1991. Consequently, this trend of attitude change suggests that gender stereotyping might have been reduced in present decade (Archer & Macrae, 1991).

Furthermore, previous researches indicated some sex differences regarding attitudes towards school in western or developed countries. Fraser (1980) stated that, in a sample of about 2000 third- and fourth-grade primary students in England, it was found that girls tended to have more favourable attitudes toward school by comparison with boys (Barker-Lunn, 1972). The above finding was confirmed in the United States among a sample of three thousand primary school students (Haladyna

&Thomas, 1977). Also, in Australia the same result was found for Year Seven students in Canberra (Keeves, 1972).

In addition to sex differences regarding attitudes toward school, some researchers reported sex differences in attitudes towards different subjects, especially mathematics and English courses. The researchers reported that boys favour mathematics more than girls in a large sample size (Marsh, 1989; Fraser, 1980). In contrast, it was found that girls favour English and social studies more than boys (Marsh, 1989; Fraser, 1980). On the basis of these findings, Marsh (1989) concluded that, consistent with traditional sex stereotypes, it can be predicted that girls are better in verbal constructs, whereas boys are better in mathematical constructs, but these differences were diminishing by comparison with earlier reports.

Regarding students' perception of parental pressure and academic achievement, it has been reported that in societies with a traditionally sex-role attitude the pressure on girls in regard to academic achievement is weaker by comparison with boys. Also in societies where new attitudes towards sex roles have been established, still traditional norms and expectations can be observed (Dowling, 1982). However, the cultural pressure may persuade the girls to accept the traditional female role in order to protect their self-esteem by devaluating the school (Skaalvik, 1983). Skaalvik (1983), in his research tried to compare parental pressure for boys and girls in relation to academic performance in Second- through Eighth-Grade students. He found a negative significant association between academic performance and identified parental pressure for boys at all grades after Year 2. By contrast, for girls this negative significant correlation was found only in second and third grades, but not at higher levels (Skaalvik, 1983).

Furthermore, no significant relationship between academic achievement and self-esteem was found for boys in second and third grades, but from fourth grade on there was found a significant correlation that showed that lower academic achievement was associated with lower self-esteem. On the other hand, for girls this relationship was found only in the second and third grades, not beyond the third grade (Skaalvik, 1983). In other words this finding indicates that academic achievement in early grades at elementary school plays an important role in the formation of girls' self-esteem (Skaalvik, 1983).

However, the results of Skaalvik's (1983) study supported the view that low-achieving boys feel stronger parental pressure than high-achieving boys, while levels of achievers make no difference to the girls in this respects. Also, it was found that girls who have a long history of low-achieving tend to devalue the school and school-work, while this is not true for boys. Another result of this study indicated that the boys who are low-achieving tend to lower their self-esteem, but this is not true for the girls. The researcher (Skaalvik, 1983), mentioned that all of the above results tend to crystallise around the Year 4.

It is necessary to review more specifically the sex differences regarding academic achievement in mathematics and English language. Marsh (1989), found that, at the end of high school, male students achieve better than female students on mathematics tests, especially on tests that concentrate on problem solving. At elementary level and perhaps junior high school, however, there are no differences between the sexes regarding mathematics achievement. He also mentioned that sometimes the female

students have better achievement by comparison with male students on tests that emphasised only computations (Marsh, 1989). It has also been reported that, although the girls had better scores in mathematics on their records, they scored more poorly on mathematics standardised tests (Pallas & Alexander, 1983; Kimbal, 1989). This finding may suggest that girls show better performance in a familiar situation than in a novel or new situation. Also, it may suggest that girls are more able to predict teachers' expectation on teacher-made tests than on standardised tests.

In relation to verbal performance, some studies have compared male and female abilities. Regarding verbal ability, Marsh (1989) cited Maccoby and Jacklin (1974) in their review, and concluded that sex differences favouring girls in verbal ability are smaller than studies published before 1973, and also that these differences are substantially smaller than sex differences favouring males in mathematics achievement. The above findings were also supported in Marsh's study. Marsh (1989), on the basis of his data, concluded that verbal- and mathematics-attitude scores were not associated, while verbal- and mathematics-achievement scores were correlated. He also mentioned that the largest sex effect was observed in high-school grades, in the direction that girls had substantially higher grades than boys whether or not prior achievement and academic attitudes were controlled. However, he mentioned that, although girls had slightly poorer mathematics achievement by comparison with boys, they did not differ significantly from boys on verbal achievement.

However, some researchers believe that verbal achievement of students is related to the type of passage used, in relation to sex. For example, in a study carried out in Australia, three passages were developed (neutral, female-oriented and male-oriented) and 60 Year-4 students in co-educational primary school were tested (Johnson,

Gibbons, Kepsi & Parker, 1979). The results indicated that the best mean verbal-achieved performance for both sexes was obtained by female-oriented material, while the poorest mean performance was obtained by material of the opposite sex to the students. However, the sex of the examiner did not have any significant effect on the performance of either boys or girls (Johnson, Gibbons, Kepsi & Parker, 1979). It is noted, however, that this study was carried out 15 years ago, before some of the possible changes in attitudes, mentioned above, occurred.

In conclusion it seems sex differences in academic achievement in previous studies mainly depended on the students' grade level, the type of test and the time at which study was carried out. The majority of researchers believed that, as the level of students' grade increased, the gap between academic achievement of different sexes would probably widen. Also, some of the researchers argued that the tools for measuring academic achievement can affect the sex differences in academic achievement. In this regard it is suggested that using standardized achievement tests is more suitable than teachers' grade for identifying sex differences (Marsh, 1989). Also it has been shown that young girl students performed better than young boy students on tests emphasizing computation, whereas boy students showed better results on tests emphasizing problem solving (Marsh, 1989). Finally, it has been shown that the older the researches, the more gap was indicated between performance of boys and girls, while in recent researches, especially in the last decade, these differences were smaller (Marsh, 1989).

However, in spite of the above claim, a recent research projects with 2,586 gifted students in Year 2 through 6 found some sex-related differences in favour of boys (Mills, Ablard & Stumpf, 1993). In this study it was found that boys performed better



than girls on mathematical reasoning, including tasks requiring the application of algebraic rules or algorithms and also tasks requiring mathematical concepts and number relationships (Mills, Ablard & Stumpf, 1993). Also, Randhawa (1991), found superiority of boys over girls consistently on standardised achievement tests, in three samples of Year 10 students over a period of 11 years.

However, the sex differences in academic achievement might be attributed, at least in part, to the different sex role that is expected from two sexes by their parents and their societies. These expectations are also reflected in the different socialization patterns in different societies. In other words, stereotypic sex differences might have been reflected in academic achievement of the students. They therefore, might belong to different culture roles, and expectations for both sexes might create some differences in academic achievement.

Also, from a biological point of view, some sex differences might be attributed to anatomical and physiological differences between sexes. It appears that the brains of men and women are constructed differently, and process information in different patterns. In addition, the function and structure of the brain is influenced by the hormones. For the above reason, it should be expected that men and women might behave in different ways, because human behaviour is influenced by the interaction between hormones and the brain (Moir & Jessel, 1989). For example, the centres for language and spatial skills in women are located in both sides of the brain; while these skills in men are more controlled by specific parts of the brain. In men the right side of the brain appear to be responsible for spatial skills, and the left side controls the verbal skills; but in women the functional division between two sides of the brain is less specialized (Moir & Jessel, 1989).

Examination of electrical activity in the brain showed that, when working on an abstract problem, men tend to use the right side of their brains; while in women they tend to use both sides. In this regard, males are able to see and think in concepts and patterns and find abstract relationships between different concepts and link them; while females tend to treat each concept as an independent entity, master it, and then go to the next concept without trying to relate these concepts with each other. However, females learn to count earlier than males, but males, by comparison with females, show advantages in arithmetical reasoning. Therefore, when the nature of mathematics changes from computation to theory, the early female superiority begins to decrease (Moir & Jessel, 1989).

On the other hand, verbal superiority of women has also been perhaps partly explained by the differences of functional pattern in the brain. In women the language skills such as grammar, spelling and writing are more controlled in the left side of the brain; while in men these skills are located in the front and back of the brain. Therefore, women have higher performance, by comparison with men, in verbal tests (Moir & Jessel, 1989). In their analysis of some 400 research articles, Moir and Jessel (1989) offer an alternative, or supplementary, basis for sex differences in mental functioning, to the learning (or socialization) explanations referred to above.

## **6. Age or Grade, Locus of Control and Academic Achievement**

Another variable that may affect locus of control and academic achievement is the age or grade of the respondents. The trend of changes of locus of control showed that responses of the students tend to become more internal with increasing age (Nowicki

& Strickland, 1973). However, Bartel (1971) in his conclusion mentioned that, although scores on the Bialar Cromwell Scale have been highly correlated with achievement of older students rather than younger students, this pattern might be the result of superior reading ability among the older students.

Rotter (1975) reported that the association between locus of control and achievement is lower for college students by comparison with high-school students. He pointed out several reasons for this age difference. First, usually the college students, when located in achievement situations, find these situations to be less novel and less ambiguous for them. Therefore, the predicability of generalized reinforcement expectancies will be decreased for college students. Rotter (1975) pointed out that measures of generalized reinforcement show the highest prediction in unfamiliar, novel situations. Secondly, Rotter mentioned that those students who believe that their academic achievement is controlled by external forces are less likely to continue their studies toward higher education, so that students in higher education might be unrepresentative of the general population in this regard.

As mentioned before, Wilhite (1990) found a significant association between externality and academic achievement among college students. Rotter suggested that many college students who believed that external factors control their outcomes are 'defensive externals', and this apparent attitude is not a reflection of their true attitudes. Hansford and Hattie (1982) pointed out that there is an increase in the correlations reported for locus of control and academic achievement as the grade level increased, from preschool to secondary (0.12 to 0.27). But this trend was not true for college students; in other words the correlations showed a decreasing trend at the

college or university level. They mentioned, however, that this finding may be the result of the selectivity of the sample (Hansford & Hattie, 1982).

On the other hand, in a review of researches, in which children in Grade 1 to 7 were involved, no significant correlation was found between grade level and the size of the effect for ability, effort, task difficulty and luck (Whitley & Frieze, 1985). Also, it has been shown that younger children cannot discriminate between ability and effort attribution (Nicholls, 1984). Discrimination between ability and effort mainly develops in junior high school (Farmer, Vispoel & Maehr, 1991).

However, various researches consistently concluded that the general attitude toward school decreased with increasing grade level. This attitude deterioration was less among girl students than boy students (Wisenthal, 1965; Kniveton, 1969).

It can be concluded that the researchers would be advised to consider the age or grade levels of the students in their interpretation of the results of locus-of-control measures. Also, they might select the appropriate tools for measuring this concept according to the results of previous studies. Hence one should avoid using measures which divide internal factors into ability and effort, and external factors into task difficulty and chance, with elementary-school children.

## **7. Socioeconomic Status, Locus of Control and Academic Achievement**

In world-wide educational studies, especially in developed countries, a significant association has been consistently found between different aspects of psycho-educational concepts and socioeconomic status. Before discussing some of these associations, it is necessary to explain some indicators of socioeconomic status.

It should be mentioned that the concept of social class or socioeconomic status is very complicated, and its use usually leads to a number of issues regarding its theoretical and practical implications. The indicators that have been used for determining socioeconomic status are usually income, education, occupation, or a combination of at least two of these.

One of the factors that may be used as an indicator for socioeconomic status is income, because it is highly associated with the economic or material circumstances of the family (Bank & Finlayson, 1973). In other words, poverty has a direct effect on the quality of family life, bad housing, malnutrition and higher rates of sickness. Also, it has indirect effects on family relationships and patterns of child-rearing (Bank & Finlayson, 1973). Poverty, especially if it occurs over a long period of time in terms of financial insecurity, may have an influence on value orientation (Bank & Finlayson, 1973). However, the effects of poverty, whether direct or indirect, can influence the perception of individuals and develop a negative perception toward social activities including education.

However, in relation to measuring and collecting accurate data on information about income, there have been some difficulties that are well known to social scientists (Bank & Finlayson, 1973). In addition, in research that has been carried out in Australia, it has been shown that the Index of Economic Resources could be excluded as a measure for socioeconomic status. Most importantly, it was concluded that the direct measure of income is the weakest indicator for socioeconomic status (Linke, Oertel & Kelsey, 1988).

The second factor that is well established as an indicator for socioeconomic status is level of education, and in a great deal of research level of parental education has been used for indicating socioeconomic status (Bank & Finlayson, 1973; Carpenter & Hayden, 1985; Fotheringham & Creal, 1980). The direct effects of parental education are mainly related to 'educability' of the home. In a practical sense, parental education can help in many ways in order to enrich the family environment in areas such as helping with homework, developing intellectual activities, and creating more pressure for educational success (Bank & Finlayson, 1973). The indirect effects of parental education are pervasive; in other words, level of education can affect style or way of life, including parent-child interaction, linguistic style, parental value, and parental behaviour (Bank & Finlayson, 1973).

The third factor that is widely used as an indicator for socioeconomic status in recent research is parental occupation. In most of the studies that were developed in educational discipline, the parental occupation was used as an indicator of socioeconomic status (Bank & Finlayson, 1973; Farmer, Vispoel & Maehr, 1991; Ainley, Foreman & Sheret, 1991; Maqsud, 1983). Although the definition of socioeconomic status as occupational status, or as the indicator of socioeconomic

status, may be criticized, it can be said that it is closely linked to income and social status or prestige. It is also convenient to use this indicator, because it is derived from information which can be easily collected and coded (Bank & Finlayson, 1973). However, its link to income and social prestige, as two major aspects of socioeconomic status, makes it a more suitable indicator of socioeconomic status than any other single measure (Bank & Finlayson, 1973).

One of the scales for measuring social differentiation and social stratification in Australian society is the Australian National University scale that was developed in second half of 1964 and revised in 1973. According to this scale, occupation was classified into 16 hierarchically ordered categories. These 16 categories are based on collective judgments about their relative social standing. These 16 ranked categories in the ANU 1 scale were: upper professional, graziers, lower professional, managerial, shop proprietors, farmers, clerical workers, armed service and police, craftsmen, shop assistants, operatives, drivers, service workers, miners, farm workers and labourers respectively, while the 16 ranked in ANU 2 scale with percent of workforce in the 1971 Census were: upper professional (2.64%), graziers (1.53%), managerial (7.14%), lower professional (8.24%), farmers (3.43%), clerical workers (19.68%), shop proprietors (0.72%), armed service and police (1.74%), craftsman (15.42%), farm workers (2.62%), drivers (4.45%), shop assistants (5.17%), service workers (8.31%), miners (0.68%), operatives (10.37%) and labourers (7.86%) respectively (Broom, Jones, Jones, McDonnell, 1977).

The rank ordering of each occupational group in each scale revealed a high correlation between the two scoring systems. The correlation between these two ranks by the

Spearman formula was reported as 0.92, and the product-moment correlation (Pearson) was reported as 0.83 (Broom, Jones, Jones, McDonnell, 1977).

Further analysis indicated that the ANU 16-point scale of occupation had a substantial intercorrelation with other scales of occupational prestige like Congalton's (1963) short and extended occupational scales (Jones & Jones, 1972).

The ANU 1 16-point scale was also condensed into a 6-point scale. These six groups are: professional (groups 1-3), managerial (groups 4-6), white collar (groups 7-8), skilled manual (group 9), semiskilled manual (groups 10-12) and unskilled manual (groups 13-16) (Broom, Jones, Jones, McDonnell, 1977).

Some researchers prefer to use the 6-point ANU scale because the product-moment correlation between two series of scoring is very high, at 0.97. Also, some researchers, particularly in predicting behavioural outcome, used the 6-point ANU for determining the socioeconomic status (Keeves, 1972; Ainley, Foreman & Sheret, 1991).

Regarding the relationship between locus of control and socioeconomic status, it has been found that students of low-socioeconomic status were more external than those of high-socioeconomic status (Ludwigsen & Rollins, 1971). Bar-Tal et al. (1984) stated that Ravin et al. (1980) in their study found that advantaged children, according to the basis of their socioeconomic status, attributed their achievement more to internal rather than external causes, and disadvantaged children attributed their failure more to



stable rather than unstable causes. Also it was found that internal beliefs were inconsistently associated with socioeconomic status (Crandall, Crandall & Katkovsky, 1965). Nowicki and Strickland (1973) found that internality was significantly associated with higher occupational levels of parents specifically for fathers, when measuring with the Nowicki-Strickland Locus-of-Control scale. However, when Nowicki and Strickland computed the correlation between locus of control and parental education, out of 12 correlations that were computed for different grades and sexes, only two were significant; and both of these were in the male groups (Nowicki & Strickland, 1973). Nowicki and Strickland pointed out that this low level of significant correlation may be the result of using the highest level of parental education for the analysis, without differentiating between father's or mother's education.

On the other hand, the results of some studies did not indicate any relationship between socioeconomic status and locus of control. For instance, Maqsd (1983) in a study carried out in Nigeria did not find any significant relationship between socioeconomic status and locus of control among Nigerian adolescents. Maqsd (1983) stated that this finding was supported by the Gore and Rotter (1963), who reported no significant correlation between socioeconomic status and locus of control among college students. Hansford and Hattie (1982), in their meta-analysis, examined 556 correlations that expressed the relationship between self-measures and socioeconomic status. The results showed that individuals from lower-socioeconomic families had a less positive association between their self-measures and their achievement. Hansford and Hattie (1982) noted that West and Fish (1973) in their review, found no significant interaction between socioeconomic status, self-concept, and achievement. However, finding a less positive correlation between the self-measure and achievement may be the result of empirical problems regarding defining

and measuring socioeconomic status, and the techniques that are used for assessing this variable (Hansford & Hattie, 1982). In order to examine whether the relationship between self-measures and achievement is influenced by interactions between sex, grade level and socioeconomic status, a three-way analysis of variance was employed, using sex, grade level, and socioeconomic status as independent variables (Hansford & Hattie, 1982). After excluding data on the college or university sample, the results of the analysis of variance indicated no significant interactions between variables (Hansford & Hattie, 1982).

In conclusion, different results from different studies in different societies are to be expected, because of the following reasons. First, on one hand, variation of the definition of socioeconomic status reflects different perceptions of social scientists regarding socioeconomic status, and on the other hand, different perceptions reflect different ideologies regarding social class or socioeconomic status. Secondly, as mentioned before, researchers used different indicators for identifying socioeconomic status, and these indicators, although they may correlate with each other, when they are used with other variables separately, such as locus of control, they may produce different results. Thirdly, variation of standard of living in different societies produces different expectations and perceptions among individuals in the societies; therefore each society may have a unique characteristic for determining social class or socioeconomic status.

Hence, social pressure (usual expectations that are anticipated from an individual within a culture) may vary with social environment, sex, and age of the subject. Generally, as a result, academic achievement in one society may have negligible

effects on different self-regards, including locus of control, while in other societies it may have significant effects.

Also, it has been shown that socioeconomic status of the family has significant effects on academic achievement of the children. Fraser (1959) stated that the majority of students who fail at school have grown up in disadvantaged families. Physical, cognitive and emotional development of children are highly dependent on the socio-psychological aspects of the family. The growth of potential developmental areas, including achievement, mainly occurs during the first few years of life, and the influence of the family on these developmental areas is very important (Fotheringham & Creal, 1980).

The effects of family characteristics on academic achievement and intelligence may be divided into two main categories: status variables and process variables. Although status variables such as socioeconomic status - for example education, occupation and income of parents - are important in predicting academic achievement, they tell little about how their effects are mediated to the student. Conversely, process variables, such as home-language models, involvement of parents in children's achievement, academic home guidance, and social participation of the family, are closer to being mediating variables (Fotheringham & Creal, 1980).

The correlation between socioeconomic status and academic achievement in various studies varies between 0.35 and 0.50, depending on the methodology of the study and whether or not the study focuses on achievement-test scores or educational attainment (Fotheringham & Creal, 1980). Low-socioeconomic students by

comparison with high-socioeconomic students preferred significantly more work-achievement contexts than school-achievement contexts (Farmer, Vispoel & Maehr, 1991). It has been reported that academic achievement, for those students who indicated that their parents wished them to continue their studies beyond high school and for students from higher socioeconomic status, was higher than for students who did not indicate such wishes and for those students from a low- socioeconomic background (Ainley, Foreman & Sheret, 1991). One of the possible explanations for the significant difference in academic achievement between high- and low-socioeconomic status is that students of higher-socioeconomic status tend to have more favourable attitudes towards education, school, and teachers (Ainley, Foreman & Sheret, 1991). In a research project in Nigeria, it was reported that there was a significant relationship between socioeconomic status and school achievement. The explanation for this finding was that the students from the higher socioeconomic status tend to have a more favourable attitude toward school than other socioeconomic backgrounds (Maqsud, 1983).

In a comprehensive study in England, Bank and Finlayson (1973) found a significant difference between the academic achievement of working-class and middle-class students. They reported that there is evidence to support the hypothesis that working-class parents have lower educational aspirations than middle-class parents. The middle-class parents are more likely to send their children to grammar schools and also tend to have higher occupational aspirations for their children. Also, it was mentioned that parents from middle-class families are more concerned about their children's progress (Bank & Finlayson, 1973). In another study carried out in Australia, it has been shown that those students who belong to the higher-socioeconomic level were more likely to continue their schooling. Also, in this study it has been shown that student-achievement levels in the upper-socioeconomic group

were significantly higher than the lower-socioeconomic group (Ainley, Foreman & Sheret, 1991).

Although different indicators have been used for determining socioeconomic status, the majority of these indicators have shown significant association with academic achievement. A study carried out in Australia compared the achievement of Victorian, Western Australian, and Queensland students at Year 12 on the basis of some indicators of socioeconomic status (Carpenter & Hayden, 1985). Among Victorians, female students whose fathers were well educated and whose mothers were not working had significantly better Year 12 results than other female students; while among male students those students whose mothers had higher education had significantly better results than other male students. The same results were found for both the Western Australian and Queensland male students. But the results of female students in Western Australia and Queensland differed from the Victorian female students. In these two states, Western Australia and Queensland, father's occupation rather than father's educational attainment was significant for predicting academic achievement at Year 12. Also, for Queensland female students, the mother's education was significantly related to better Year 12 results (Carpenter & Hayden, 1985).

In another study carried out in Canada, it has been reported that the socioeconomic status of the students, in terms of father's education, varied significantly with different levels of academic achievement. In this study, it was shown that the high achievers had fathers whose mean years of schooling was thirteen; the fathers of average achievers had the mean of eleven years; and finally fathers of low achievers had a mean of ten years of schooling (Fotheringham & Creal, 1980). Bank and Finlayson (1973) stated that the educational background of either father or mother

influences level of the child's academic achievement. For example, it has been found that eight percent of low-socioeconomic status mothers had tertiary education, by comparison with 67 percent of high-socioeconomic status mothers; and mothers with high- socioeconomic status had significantly better grades on the SRA (Science Research Associate) Verbal Form and Burt Reading Test (Parnicky, Williams & Silva, 1987).

In addition to parents' education, it has been indicated that there is a consistent relationship between father's occupation and academic achievement of the child at all levels of education with the possible exception of higher education (Bank & Finlyson, 1973). It has also been mentioned that, although the father's occupation is a more usual measure for measuring socioeconomic status, mother's occupation before marriage has been included in a few studies as an independent variable and was shown to have a significant influence, particularly on working-class children's success (Bank & Finlayson, 1973). However, the tendency for higher achieving children to have fathers in non-manual occupations was consistent at high-school level (Bank & Finlayson, 1973). In addition, in spite of the homogeneity, from the socioeconomic point of view in the sample studied by Bank and Finlayson (1973) in England, social class as measured by fathers' occupation had a relationship to academic achievement in all three kinds of schools - comprehensive, grammar, and selective secondary schools. The above study did not indicate any relationship between mother's occupation and the academic achievement of the students. Also, the above result was true of maternal grandfather's occupation, although both of these variables have been found to be significant in other studies (Bank & Finlayson, 1973).

Further researches regarding mother's work or employment showed negative effects of this variable on academic achievement of the children. For example, Milne, Ginsburg, Myers and Rosenthal (1986) consistently found that mother's employment has a negative effect on both reading and mathematics achievements in both elementary- and high-school students among White students from two-parent families. However, this effect was positive and significant among Black elementary-school students from one-parent families.

However, the size of this effect among White elementary-school students from two-parent families varies with the amount of time that mothers involved in the work. In other words, the students whose mothers worked full-time (40 hours per week) had lower achievement than students whose mothers worked part-time (Milne, Ginsburg, Myers & Rosenthal, 1986).

Heyns and Catsambis (1986) pointed out that the effects of mother's employment are highly related to socioeconomic status of the families. In other words, they stated that by omitting students from lower socioeconomic background from the sample, the positive effect of mother's employment on academic achievement was also omitted. Also, Heyns and Catsambis (1986) pointed out mothers' employment during their children's high-school years is positively related to the academic achievement of their children.

It seems that working mothers have not enough time to help their children in their homework and also to attend parent-teacher conferences. In contrast, nonworking mothers have more time to participate in both of these activities (Milne, Ginsburg,

Myers & Rosenthal, 1986). Furthermore, today mothers' role in their children's intellectual growth is very important. Educators and psychologists emphasize the role of parents in providing environments in order to stimulate and foster children's intellectual development. In the preschool period this activity involves promoting language and verbal development. In school-age children, this activity refers to overseeing and encouraging educational achievement and, sometimes, participating in school programs. This movement from physiological and psychological domains to the cognitive domain significantly increases the responsibilities of a parent (Lareau, 1989).

In sum, the effect of mother's work on the student's academic achievement is a complex phenomenon, and it needs more research, particularly, when other family characteristics are involved. In addition, inconsistencies among previous researches emphasize the need for further studies.

As mentioned before, in spite of the difficulty of collecting and using accurate data on income, some researchers used this indicator for determining socioeconomic status. For instance, Bank and Finlayson (1973) mentioned that, as may be expected, income is associated with occupation, and it has been shown that there is a low positive relationship between higher income and academic success, though this relationship is very slight.

On the other hand, some researchers employed process variables, such as home environment, as indicators of socioeconomic status and used these variables to determine the relationship between socioeconomic status and academic achievement.



For example, for a systematic analysis of previous studies, 18 studies of 5,831 school-age (first through to twelfth grade) students in eight countries over a 19-year period, which considered the correlation of home environment and academic achievement, were selected for further analysis (Iverson & Walberg, 1982). The results of this analysis indicated that home factors were differentially correlated with different kinds of achievement, such as language, arithmetic, and reading. Moreover, the correlation between home environment and these kinds of achievement were higher than with IQ or intelligence. According to this analysis it was found that the correlations between home environment and school achievement were slightly higher, when older students were involved, with the sample identified by sex (rather than unspecified sex), with middle socioeconomic students, and where multiple correlations (rather than simple correlations) were employed (Iverson & Walberg, 1982). Furthermore, by quantitative analysis, it was concluded that academic ability and achievement were more associated with the measures of socio-psychological environment and intellectual stimulation in the home than with the socioeconomic status of the parents, which is usually indicated by occupation and/or years of education (Iverson & Welberg, 1982).

In addition, Fotheringham and Creal (1980) stated that Van Alstyne (1929) had found a significant correlation (0.60) between mental age and father's reading to the child among three-year-old children. Also, they noted that Fraser (1959) reported a multiple correlation of 0.69 between children's IQ and home variables including the number of books in the home, among 400 twelve-year-old Scottish students. In another study carried out in Canada it was found that knowledge of the family home-process variables increased the association of children's reading comprehension and arithmetic computation scores (Fotheringham & Creal, 1980). They concluded that the influence of the home environment operates upon initial levels of ability of the children when

they arrive at school at early childhood, and then affects attitudes towards education (Fotheringham & Creal, 1980).

Also, there is some evidence that shows socioeconomic status is moderately related to child rearing in the family. In general, it has been shown that middle-socioeconomic status parents are more likely to use love-oriented or psychological methods of discipline, whereas working-class parents are more likely to use ridicule, or physical punishment in rearing their children (Bank & Finlayson, 1973). Also, it has been found that middle-socioeconomic status mothers of four-year-old children usually use reasoning and explanation in communicating with their children, while the working-class mothers usually use authority, and require that the child should respect the adult (Bank & Finlayson, 1973). There is evidence that working-class parents, by comparison with middle-class parents, tend to have lower educational aspirations. In other words, middle-class parents prefer to retain their children in school longer than other social classes, tend to have higher occupational aspirations for their children and tend to show more interest and more concern about their children's progress in the school.

More specifically, some researchers concentrated on the relationship between socioeconomic status and different contexts of academic achievement. It has been reported that socioeconomic status is positively related to both reading and mathematics (Rosenthal, Baker & Ginsberg, 1983). In addition, it has been found that both block design and vocabulary performance are significantly associated with parental education and family income (Steelman & Doby, 1983). Parental education, however, was the only predictor of block-design performance for Black students, while, in addition to family size, parental education, family income and maternal

status were all associated with vocabulary performance for Black students (Steelman & Doby, 1983).

In summary, one of the factors most related to academic achievement is socioeconomic status of the family. The above discussion has considered the relationship between different measures of socioeconomic status and academic achievement. Although each of these indices is associated with academic achievement, the degree of associations differs slightly from one index to another. For example, Bank and Finlayson (1973) selected seven indices of socioeconomic status: father's occupation, father's and mother's secondary education, further or higher education, family income and parental grandfather's occupation. The results indicated that the index of father's occupation was correlated to all other indices, and this was also true for income and father's and mother's secondary education. However, parental grandfather's occupation was not related to either income or higher education of either parent. Also the indices of further or higher education were not associated with each other (Bank & Finlayson, 1973). Perhaps, where the mother has less education than the father, the father steps in and compensates for the mother's education and supplements her modelling more than when she has better education. It has been found that mother's occupation was not related to academic achievement, and this was also true for maternal grandfather's occupation, although these two indices have been shown to be important variables in other studies (Bank & Finlayson, 1973). Consequently, in addition to father's occupation, only parental educational background and parental grandfathers' occupation had a marked and consistent relationship with academic achievement in Bank's and Finlayson's (1973) study.

There are several explanations for the positive association between socioeconomic status and academic achievement. Hoover-Dempsey, Bassler and Brissie (1987) reported that higher-socioeconomic-status parents pay more attention to their children's achievement because they are aware of the importance of education, and they tend to be more involved in the school and therefore they may take a more active role in supporting school programs than parents of lower-socioeconomic status. It may also be possible that higher-socioeconomic schools can attract more qualified teachers who have more efficacy both in teaching and in involving parents in school programs (Hoover-Dempsey, Bassler & Brissie, 1987). In regard to this point, Lightfoot (1981) mentioned that, in schools with above-average socioeconomic status, parents usually regard themselves as partners with teachers instead of inferiors or subordinates.

It seems that it is necessary to pay more attention to the effects of socioeconomic status on both locus of control and academic achievement. This is because, first, the contribution of socioeconomic status to locus of control and academic achievement is not clearly determined, especially at elementary-school level. Secondly, the effects of socioeconomic status, by comparison with other variables such as sex, age, and family background, in predicting locus of control and academic achievement could be considered more variable, because the negative effects of socioeconomic status may be compensated by the enrichment of the school environment.

## **8. Family Size, Locus of Control and Academic Achievement**

Findings of various studies have indicated contradictory results regarding family size and its relation to locus-of-control. For example, Zajonc (1976) has indicated that,

with Rotter I-E Locus of Control, increased externality was associated with later-born children and larger family size when the partial correlation coefficient was computed. Also, it has been indicated that internal beliefs were moderately related to family size when the Intellectual Achievement Responsibility (IAR) questionnaire was used as a measure for locus of control (Crandall, Crandall & Katkovsky, 1965). In another study carried out in India, the results showed that subjects from small families had a higher rating of internality. In this study, the Tamil version of Rotter's Internal-External Locus-of-Control scale was used for measuring locus of control and no significant relationships were found between sex, income and locus of control (Rama & Natarajan, 1981).

On the other hand, Parnicky, Williams and Silva (1987) in their study compared subjects from small families with subjects from large families regarding their locus of control. After employing multiple regression analysis, they found neither birth order nor family size significantly increased the predicability of locus of control. Similar results were found by Kohen and Schooler (1969) who reported no significant relationship between birth order and 'perceptual flexibility' or 'sense of control over fate' among male students.

It is necessary to note that the last two studies mentioned above were carried out with students at college level. Hence, one of the possible explanations for these findings is that students at this level are mature enough to feel independent from their families. Regarding findings at elementary- and high-school levels, it may be possible that large family size is a correlate, if not the consequence, of low socioeconomic status. In other words, it can be concluded that a true relationship might exist between socioeconomic status and locus of control.

However, several studies have dealt with the relationship between family size and academic achievement. Iverson and Walberg (1982) reported that the typical correlation between the number of children in the family and academic achievement was  $-0.25$ . In reanalyzed data from several studies, in order to find the effect of family size on educational attainment, after adjusting for age, socioeconomic status, religion, community size and intact family, the researcher found that family size had a significant negative effect on educational attainment (Hauser & Sewell, 1985).

On the other hand, in a study carried out in England no significant relationship was found between family size and academic achievement. The researchers of this study mentioned that the above unexpected result may be attributed to the relative homogeneity of the family size within schools (Roodin, Broughton & Vaught, 1974). In another study Olneck and Bills (1979) indicated that the relationship between the number of siblings and tested ability will be significantly reduced if parental IQ is taken into account, since higher-than-average parental IQ.s mitigate the negative effect of large families.

One study has attempted to find the relationships between family size, and vocabulary, and block-design performance, among Black and White students separately (Steelman & Doby, 1983). The results of this study indicated that family size is inversely related to the vocabulary performance for both Black and White children. On the other hand, family size was not significantly related to block design performance for both Black and White children.

However, there are many explanations for the above findings. Roodin, Broughton and Vaught (1974) mentioned that the large- sized families, to some extent, related to the culture of poverty, and there is a relationship between family size and socioeconomic status. Therefore, the negative correlation found between family size and academic achievement would be expected. Also, the intellectual activity of the child is a function of the intellectual environment of the home. This intellectual environment is dependent on the ability level of all the members of the family who are older than the child. Therefore, when the number of children in the family increases, by comparison with the number of adults, the home environment will be less stimulating for intellectual development (Steelman & Doby, 1983). In other words, when the number of children in the family increases, the attention any child receives from the parents will be reduced (Steelman & Doby, 1983), even though this attention might in part be substituted, for the younger children, by attention from older siblings.

In a similar vein, there are some possible explanations for deficiency in language development in large families. Steelman and Doby (1983) mentioned that language learning requires interaction with other persons. In other words, the amount of stimulation that is provided by these persons, such as parents, affects the development of verbal abilities of the children. Therefore, in large families the parental attention, or the amount of stimulation that is provided by the parents, will be reduced. Consequently, family size can affect the verbal ability of the children (Steelman & Doby, 1983). On the other hand, number of children in a family is related to the educational background of the parent. In other words, usually in the large families, the educational level of the parents is lower than the small families. Consequently, the low levels of parental education tend to impair the verbal abilities of the children (Steelman & Doby, 1983).

However, it is nevertheless necessary to determine the effect of the family size, by comparison with other variables already mentioned, on both the locus of control and academic achievement.

## **9. Non-English-Speaking and English-Speaking Backgrounds, Locus of Control and Academic Achievement**

Surprisingly, in spite of pervasive studies of the internal-external locus-of-control dimensions, few studies have been concerned with cross-cultural differences in recent years. However, in a multicultural society like Australia, it is desirable to compare locus-of-control beliefs among students who come from different cultures with different language backgrounds.

In an American study, Gurin, Gurin, Lao and Beattie (1969) found that Blacks did show more external beliefs than Whites in their global perception. Phares (1976) stated that in a cross-cultural study, Hsieh, Shybut and Lotsof (1969) found that Anglo-Americans are more internal than American-born Chinese and also Chinese born in Hong Kong. Also, Phares (1976) reported that Jessor, Graves, Hanson and Jessor (1968) examined a tri-ethnic community (Anglo-American, Spanish and American-Indian), and found that Anglo-Americans did show greater internal scores by comparison with the other groups.

Likewise, Lefcourt (1976) in a study compared 60 Black and 60 White subjects in regard to their locus of control. The resulting t-test was significant ( $p < .05$ ) and



showed that Blacks expressed more external control than Whites. In another study three samples of boys, a group from an orphanage in Mexico, a group of Mexican-Americans and a group of Anglo-Americans (non-orphanage groups), were compared in relation to their locus-of-control scores (Medinnus, Ford & Tack-Robinson, 1983). In the above study, all the subjects in three samples were selected from lower-middle-class and upper-lower-class families. A significant difference was observed between the Mexican and Mexican-American samples in relation to the locus-of-control scores, the latter scoring higher on internal locus of control. The difference between Mexican-American and Anglo-American boys was not significant. However, the Anglo-American boys had the highest score on internality direction.

More recently, in a longitudinal study Black and White adolescents were compared in relation to their internal control (Tashakkori & Thompson, 1991). The results of this study indicated that Blacks had significantly lower perceptions than Whites regarding internal control over events. As a whole, all of the subjects, either Blacks or Whites, shifted towards greater internal locus of control over time. In spite of this shift, Blacks consistently had less tendency towards internality than Whites (Tashakkori & Thompson, 1991).

On the other hand, Phares (1976) stated that when the IAR questionnaire was used, neither Solomon, Houliham, and Parelius (1969) nor Katz (1967) could find any significant difference in internal control belief between the two races (i.e. Black and White). These investigators attributed their unexpected findings to the fact that achievement situations may seem more controllable for Blacks than the wider range of situations that is measured in the other locus-of-control scale. In similar vein, in a study that was carried out in Australia, no significant differences were found in locus-

of-control orientation between Aborigines and Whites. In spite of this non-significant result, there was a trend for Aboriginal males to be more internally oriented than White males, and for Aboriginal females to be more external than White females (Twomey, 1981).

However, the investigators have presented several explanations for the above findings. First, Blacks have suffered longstanding socioeconomic inequalities, and the causal perceptions of Blacks, particularly Black males, might develop such external control or a lack of self efficacy to control their own activities and cultural events (Tashakkori & Thompson, 1991).

In a similar pattern, Phares (1976) mentioned that variations in locus-of-control scores may possibly be attributed to the differences in access to power or to the existence of social barriers to group mobility. In other words, those ethnic groups that have relatively little access to social mobility, opportunity for social activity, significant power or material advantages may show higher external scores on locus-of-control scales (Phares, 1976). Lefcourt (1976) stated that Griffin (1962) explained the situation in which Blacks naturally learn to attribute their behaviours to external factors, because the attitude of their ancestors, that the following attitude was transmitted to them: "these things are not directed against him personally, but against his race, his pigmentation. His mother or aunt or teacher long ago carefully prepared him, explaining that he as an individual can live in dignity, even though he as a Negro cannot" (p.16).

Also, there is some evidence to suggest that children of directive parents probably tend to be externally oriented, while children of nurturing parents tend to be internally oriented (Loeb, 1975; Katkovsky, Crandall & Good, 1967). It is apparent that, because of differentiation in child-rearing in various cultures, different attitudes regarding controlling events are developed among children.

Again, inconsistency among some of findings may be related to the constructs that are measured at different levels of specificity. Different measures are usually based on different attributes or different constructs, hence the outcomes of these measures may differ from each other. On the other hand, Blacks and Whites may react to these measures differently, because some items may produce certain cognitive or evaluative sets that are culturally or socially significant for Blacks or Whites (Tashakkori & Thompson, 1991). In other words, if Blacks and Whites use different reference groups or criteria for their locus of control, it is not surprising that different patterns of causality for these two groups will be found.

However, it is necessary to carry out more investigations about locus-of-control on cross-cultural differences, especially in multicultural societies like Australia. In addition, as Phares (1976) mentioned:

Most of the work is correlational in nature and conveys little about the exact mechanisms that mediate such relationships. Such work may also encourage a kind of stereotyped approach to research that obscures rather than illuminates such mechanisms. (p.151)

From the academic-achievement point of view, there exists a considerable amount of literature that deals with non-English-speaking backgrounds or ethnic minority groups. The majority of these studies indicated that these groups obtain comparatively lower performance or achievement scores than other groupings in society. In spite of their lower performance in academic achievement, some studies showed that these groups have more positive attitudes toward schooling than other groupings in society. For example, Farmer, Vispoel and Maehr (1991) reported that minority students preferred school-achievement more than other achievement contexts. As a result, Farmer et al. (1991) concluded that the minority students were more ego-involved in the school-achievement context than White students. Also, Ainley, Foreman and Sheret (1991) indicated that students from a recent non-English-speaking family background were more interested in school achievement than Australian students or students from an English-speaking background.

In a similar vein, Williams (1987) and Ainley, Foreman and Sheret (1991) reported that students from non-English-speaking backgrounds completed Year 12 more often than students from English-speaking and Australian-born backgrounds. Also, it has been reported that Hispanics showed more propensity than Whites to remain at high school in certain parts of the United States (Rumberger, 1983). In this regard, Hayden (1982) proposed that these results showed that there may be higher levels of aspiration among students of certain ethnic backgrounds and possibly stronger parental encouragement for pursuing formal education.

In addition, Williams (1987) reported that immigrants had marginally higher-status jobs than both the Australian-born and the English-born groups and they were more likely to have planned for further education. Also, Poole, de Lacey and Randhawa

(1985) stated that Martin and Meade (1979) and Meade (1981, 1983), reported that, in a longitudinal study of Sydney high-school students, immigrant adolescents of non-English-speaking backgrounds stayed in school more than those of English-speaking backgrounds. Furthermore, they reported that immigrant students obtained a higher proportion of high grades in an external examination. However, there were considerable variations among immigrant sub-groups. For instance, Greeks achieved better than Lebanese, and the Italians, Lebanese and Maltese in a higher proportion left school earlier or obtained lower results than other ethnic groups (Poole et al., 1985).

However, in spite of indications that adolescents from a non-English-speaking background tend to have high educational aspirations and stay longer at school than Australian students, such results do not necessarily mean that they have high academic achievement by comparison with their Australian counterparts (Poole et al., 1985). Although students from a non-English speaking background found school more satisfying by comparison with Australian-born or English-speaking-background students, their academic achievement was lower than those who were born in, or whose parents were both born in, an English-speaking country (Ainley, Foreman & Sheret, 1991).

Also, in a comprehensive study with a nationally stratified cluster sample of 8,100 students in Year 1 through Year 6, in the United States, students from homes where Spanish was regularly spoken and students from homes where English was the only language spoken, were compared on school achievement (Rosenthal, Baker & Ginsburg, 1983). In this study the achievement variable was divided into two concepts: achievement level and learning. Achievement level was defined as the

autumn-term score of each subject on the Comprehensive Test of Basic Skills (CTBS), and learning was defined as the spring CTBS score minus the fall score. Subsequently, scores were analysed on two types of achievement (reading-achievement level and mathematics-achievement level) and two types of learning (reading learning and mathematics learning). The results showed that achievement levels were significantly related to language background, particularly for reading achievement. For reading-learning, English students do learn moderately better than those from a Spanish background, but for mathematics-learning the relationship between learning and language background was inconsistent. However, when race and/or ethnicity and socioeconomic status were controlled, the relationship between achievement and home use of Spanish was not very large.

As a whole, the researchers concluded that home background is more important than home language for reading achievement level, but home language still has a considerable effect. In relation to mathematics achievement level, the effect of language is less than for reading. For reading learning, the effect of language is small, but for mathematics learning, because of the inconsistency of the results among Spanish students, the researchers could not reach a firm conclusion (Rosenthal, Baker & Ginsburg, 1983).

In a similar vein, in another study carried out in Australia, 336 primary-school children from seven countries of origin (Australia, Britain, Chile, Yugoslavia, Italy, Greece, and Turkey) were tested on several measures including cognitive tests (de Lacey & Rich, 1979). This project was designed to examine relationships between country of origin, sex, age, length of residence in Australia and cognitive and linguistic performance. In order to measure the cognitive and linguistic ability the

Peabody Picture Vocabulary Test (PPVT) and Auditory Association (AA), a sub-test of the Illinois Test of Psycholinguistic Abilities (ITPA), were used. The results indicated that the majority of the immigrant subjects obtained very low scores in the cognitive test and AA sub-test.

Also, in spite of some fluctuation in score levels between non-British immigrant groups, none of these groups achieved a higher level. It is necessary to point out that a high proportion of the families of immigrant children came from low-income origins and this status continued in Australia (de Lacey & Rich, 1979). Also, Steelman and Doby (1983) stated that Jensen (1980) found, in the United States, Black children performed lower than White children on IQ tests especially on non-verbal tests. The same result was reported by de Lacey, Barlow and Ronan (1985) in Australia.

However, there are many explanations for deficiencies in academic achievement of non-English-speaking background students. First, one of the major problems that is responsible for this lower performance is language. From this point of view, it is likely that language-minority children perform poorly in school because they do not understand lessons that are taught in the English language (Rosenthal, Baker & Ginsburg, 1983). From another point of view, some researchers proposed that students' linguistic development in their home language other than English is another source of their lower academic achievement (Brown, Rosen & Hill, 1980). Secondly, some investigators pointed out that many students from non-English-speaking backgrounds are from low-socioeconomic-status families, which may also contribute to their lower performance (Rosenthal, Baker & Ginsburg, 1983; de Lacey & Rich, 1979).

In another study, it has been reported that about 50 percent of the difference in academic achievement between English and Hispanic students was explained by socioeconomic status and ethnicity, and 50 percent explained by other factors, especially any other language background (So & Chan, 1982). Thirdly, Rosenthal, Baker and Ginsburg (1983) reported that Felice (1978) found that discrimination toward students from a minority or non-English-speaking background may also affect their academic achievement in school.

Finally, regarding the finding that higher continuation rates obtain for non-English-language or minority students in school, or that they complete Year 12 at a higher proportion rate than others, it has been mentioned that this group may have higher levels of aspiration and possibly stronger parental encouragement to continue formal study (Hayden, 1982). Also, this situation may be attributed to the higher motivation of the immigrants, because immigrants need to succeed perhaps to justify their emigration, and their children, despite their lower grades, stay longer in secondary schools (Poole, de Lacey & Randhawa, 1985).

Most of the above studies compared the academic achievement of students from an English-speaking background to students from a non-English-speaking background at high-school level. However, the above results may not be applicable at the elementary-school level, because students at this level are more flexible in adapting themselves to a new language and, furthermore, learning at this level may not require advanced English language, particularly in mathematics learning and mathematics achievement. Furthermore, it seems that some personality factors such as locus of



control of non-English-language-background students may differ from English-language-background students. As a result, the academic achievement of the two groups also differs. However, this aspect of the problem needs more investigation, particularly in a multicultural society like Australia.

However, another variable that may be associated with locus of control and academic achievement is birth order, but this variable will be excluded in this study because of two reasons. First, birth order is usually highly associated with family size. Therefore, for studying its effects on locus of control and academic achievement, it is better to control the family size. Secondly, there are many variables that are involved in the present study, and it seems appropriate to leave this complex variable to be considered by future research.

In summary, in this review some of the variables which can be associated with locus of control and academic achievement were discussed. These variables were sex, age or grade, socioeconomic status, mother's work, family size and language background. Locus of control and academic achievement of the students have been considered as very important variables by educational scientists for a long time. In spite of much research that have been carried out in these areas, it seems the findings to date are not sufficient to explain the influence or effect of these important variables on each other. Furthermore, as shown in this review, sometimes these results are inconsistent with each other. This inconsistency may be the result of different definitions of variables, sampling, instruments for measuring variables, research design and finally the cultural backgrounds where these researches were developed.

However, it is suggested that these kinds of studies should be refined more than before, because of the following reasons:

First, most of the variables which are associated with academic achievement are culturally bonded, and the culture of a society will change gradually during time. In other words, culture is a dynamic process. Therefore, the attitude toward education, sex role, child rearing etc. are likely to change gradually, and some effects of these changes on locus of control and academic achievement of the students are unavoidable.

Secondly, generally the foundation of formal education is based on elementary school in most societies. The importance of this level of education in developing different aspects of cognition and personality of the individuals is not negotiable particularly for educational scientists. Therefore, these kinds of studies could be more concerned with this level, because early school leaving or school failure at a higher level of education may be the result of some deficiency at the elementary level.

Thirdly, in the majority of the studies for measuring academic achievement of the students, the investigators used instruments, such as teachers' rank and school examination, whose reliability and validity are sometimes questionable. Some investigators, particularly in underdeveloped and developing countries, used standardised tests that are not designed for these kinds of cultures. Hence, in these situations it is suggested that suitable standardised tests be developed for measuring academic achievement.

Fourthly, the majority of the studies that were developed in Australia considered high-school students especially at Year 10 or beyond, because education in Australia is compulsory up to Year 10, and usually students who have better academic achievement or who are more motivated continue their studies beyond Year 10. Therefore, there is a need to investigate the correlates of school academic achievement in the early stage of education, because at this stage the deficiency of children's academic achievement can be prevented much more easily than at later stages.

Fifthly, inconsistencies among previous researches, regarding some of the demographical and familial variables and their relations to both academic achievement and locus of control, is another important aspect that needs further investigations.

Finally, the most important aim of this research is to determine the contribution of each independent variable in predicting the dependent variables. Previous researchers mostly sought to determine the relationship between some independent variables and academic achievement and locus of control separately. In other words, it is proposed here that the contribution be determined of different independent variables such as, sex, socioeconomic status, family size, parent's occupation, and language background in predicting academic achievement and locus of control.

However, in order to investigate the effects of the different independent variables, mentioned above, on locus of control and academic achievement, the following research questions should be answered clearly:

- 1) What is the relationship between locus of control and academic achievement?
- 2) Does academic-achievement feedback affect students' locus of control?
- 3) Are there any significant differences between boys and girls in relation to academic achievement and locus of control?
- 4) Are there any differences between different socioeconomic status in relation to academic achievement and locus of control?
- 5) Are there any differences between different grades in relation to academic achievement and locus of control?
- 6) Are there any differences between working-mother and non-working-mother students in relation to academic achievement and locus of control?
- 7) What are the relationships between elements of family background (socioeconomic status, mother's work, family size, and language background) and academic achievement, and locus of control?
- 8) Are there any differences between students of English-speaking and non-English-speaking background in relation to academic achievement and locus of control?
- 9) What are the effects of demographic, family-background variables and locus of control on measures of academic achievement?
- 10) What are the effects of demographic, family-background variables and academic achievement on locus of control?

11) What are the sizes of the effects of sex, age, socioeconomic status, mother's work, family size and language background on academic achievement and locus of control?

In the next chapter the methods and procedures, in order to answer the above questions, will be discussed.

## **Chapter 4**

### **Methods and Procedures**

Before discussing methods and procedures, several models that were tested in the present study will be presented and then several variables which are the basis for this study will be operationally defined in this chapter. Subsequently, population and sampling, instruments, designs and procedures for data collection and statistical procedures will be discussed.

#### **1. Models for the Present Study**

The studies which were reviewed in the preceding chapters most often are correlational and do not consider the contribution of each independent variable in predicting locus of control or academic achievement.

Models that are planned for this study propose causal relationships between independent and dependent variables. In order to achieve the aims of this study, five models are proposed.

1.1: Model for causal relationship between some demographic and familial variables (independent variables) and academic achievement (dependent variable) (Figure 4.1):

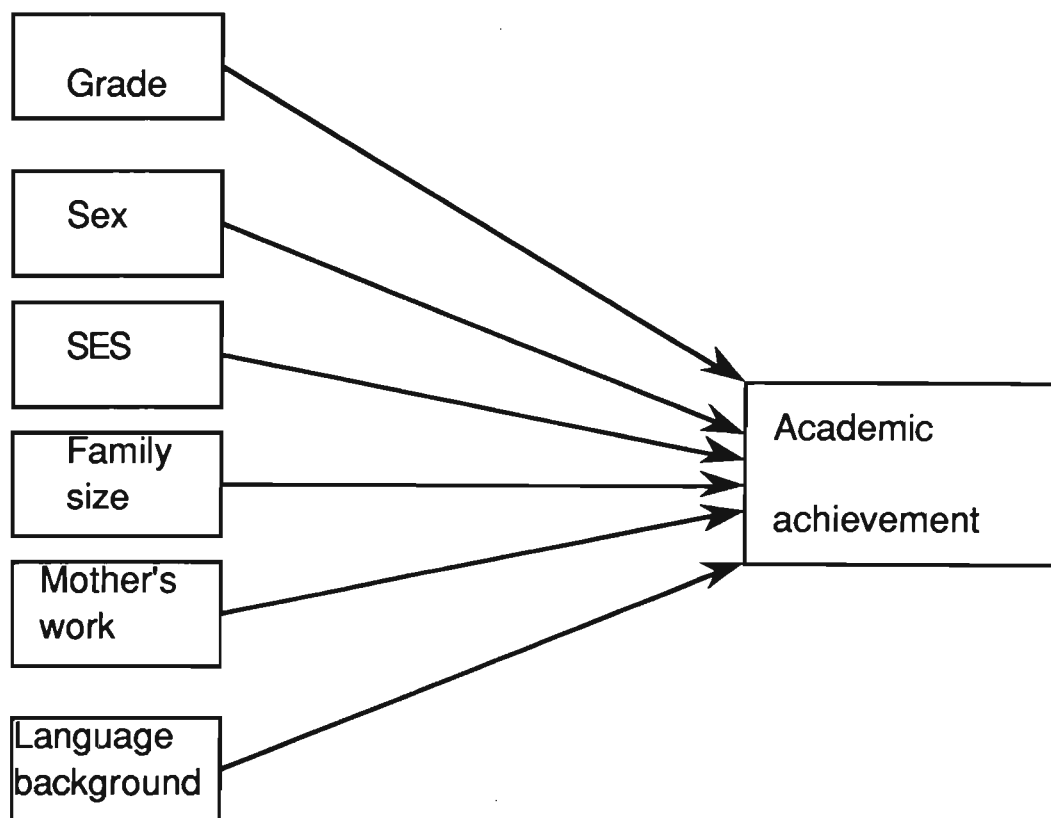


Figure 4. 1: Prediction of academic achievement from independent variables

1.2: Model for causal relationship between demographic and familial variables (independent variables) and locus of control (dependent variable) (Figure 4.2):

1.3: Model for causal relationship between demographic, familial and locus of control variables (independent variables) and academic achievement (dependent variable) (Figure 4.3).

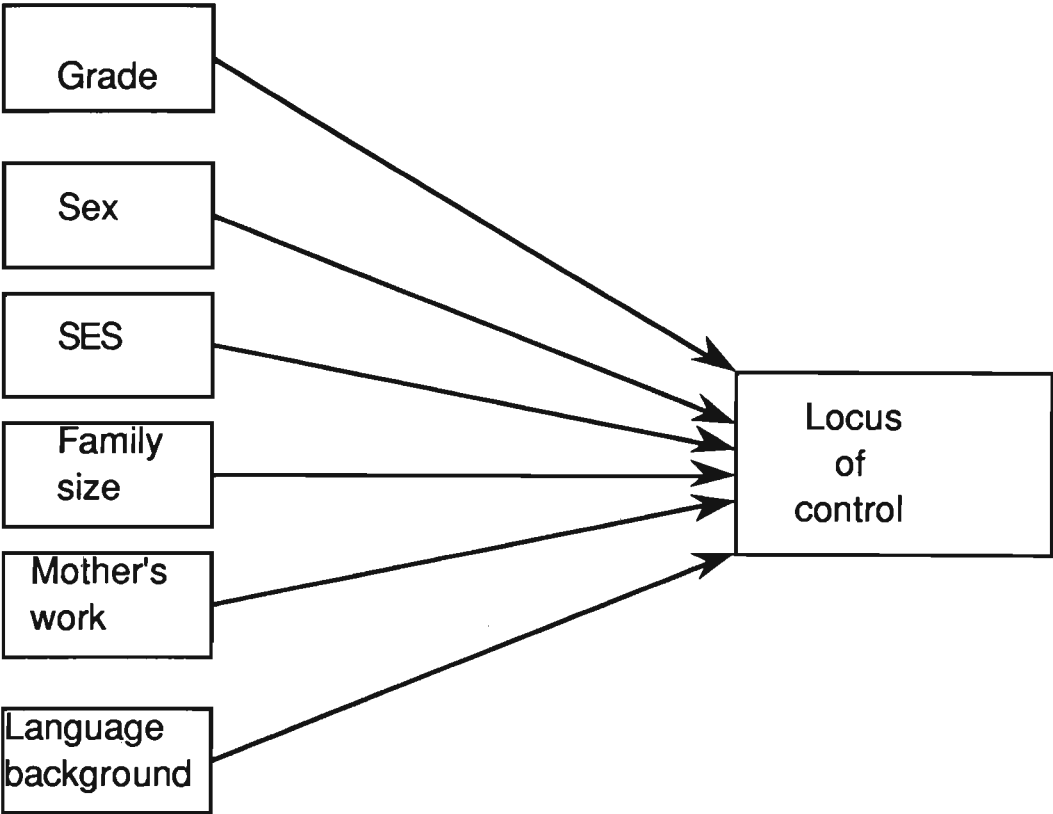


Figure 4. 2: Prediction of locus of control from independent variables

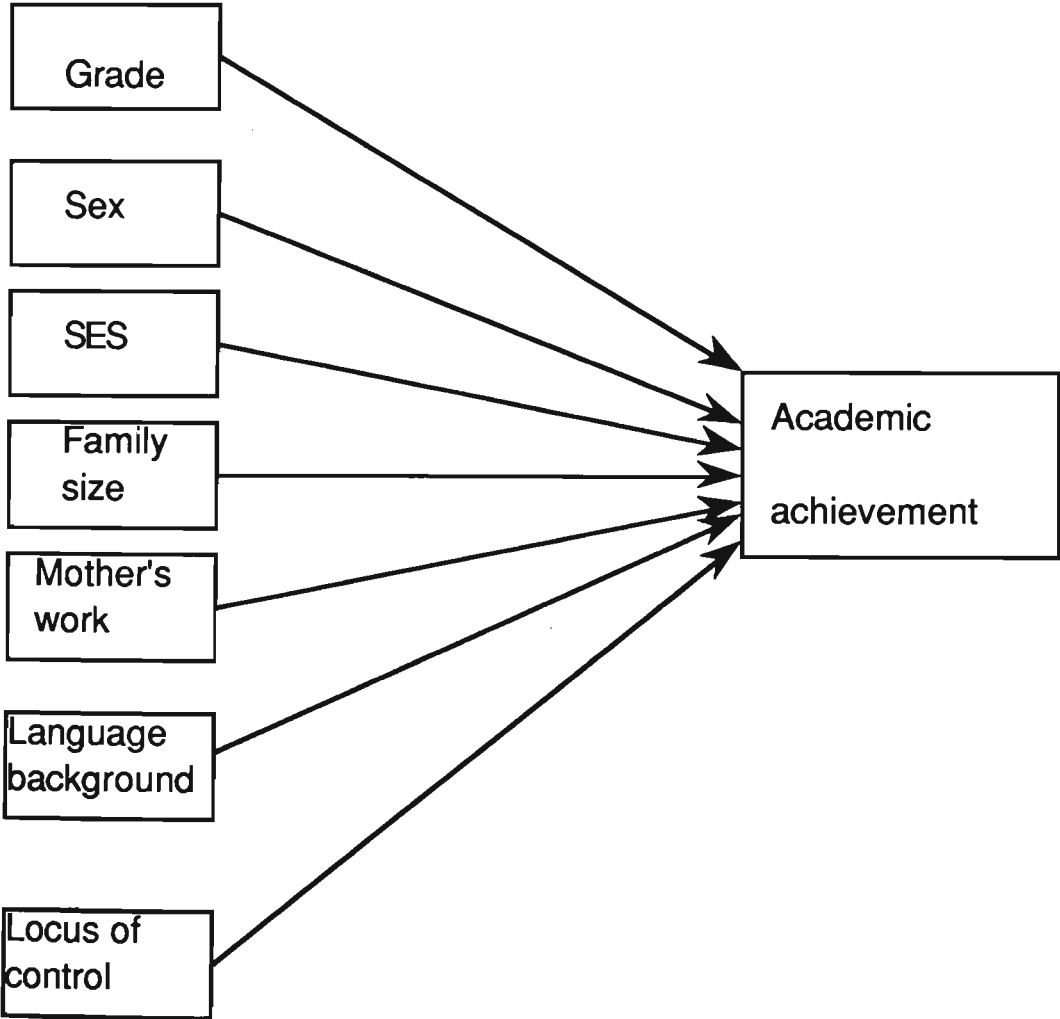


Figure 4. 3: Prediction of academic achievement from independent variables



1.4: Model for causal relationship between demographic, familial and academic achievement variables (independent variables) and locus of control (dependent variable) (Figure 4.4).

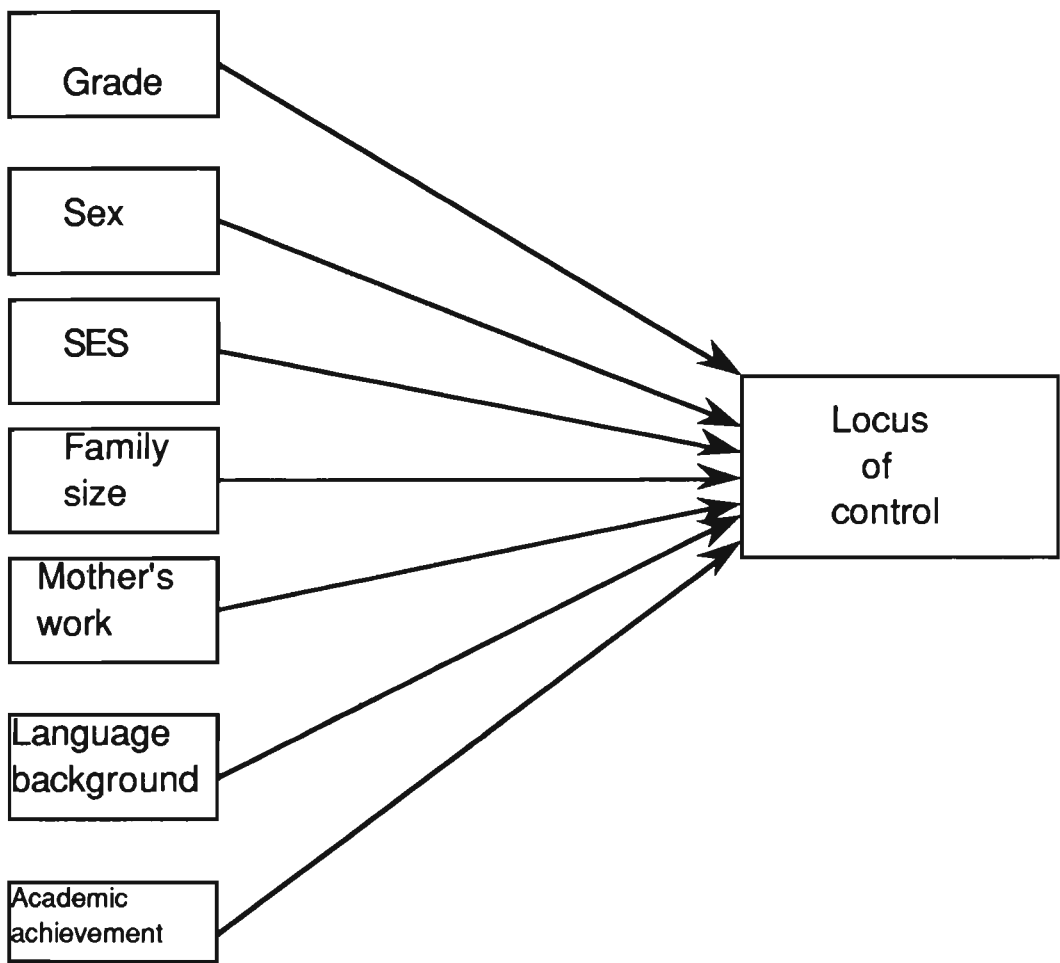


Figure 4. 4: Prediction of locus of control from independent variables (including academic achievement)

1.5: Model for causal relationship between demographic and familial variables (independent variables) and academic achievement and locus of control (dependent variable) (Figure 4.5).

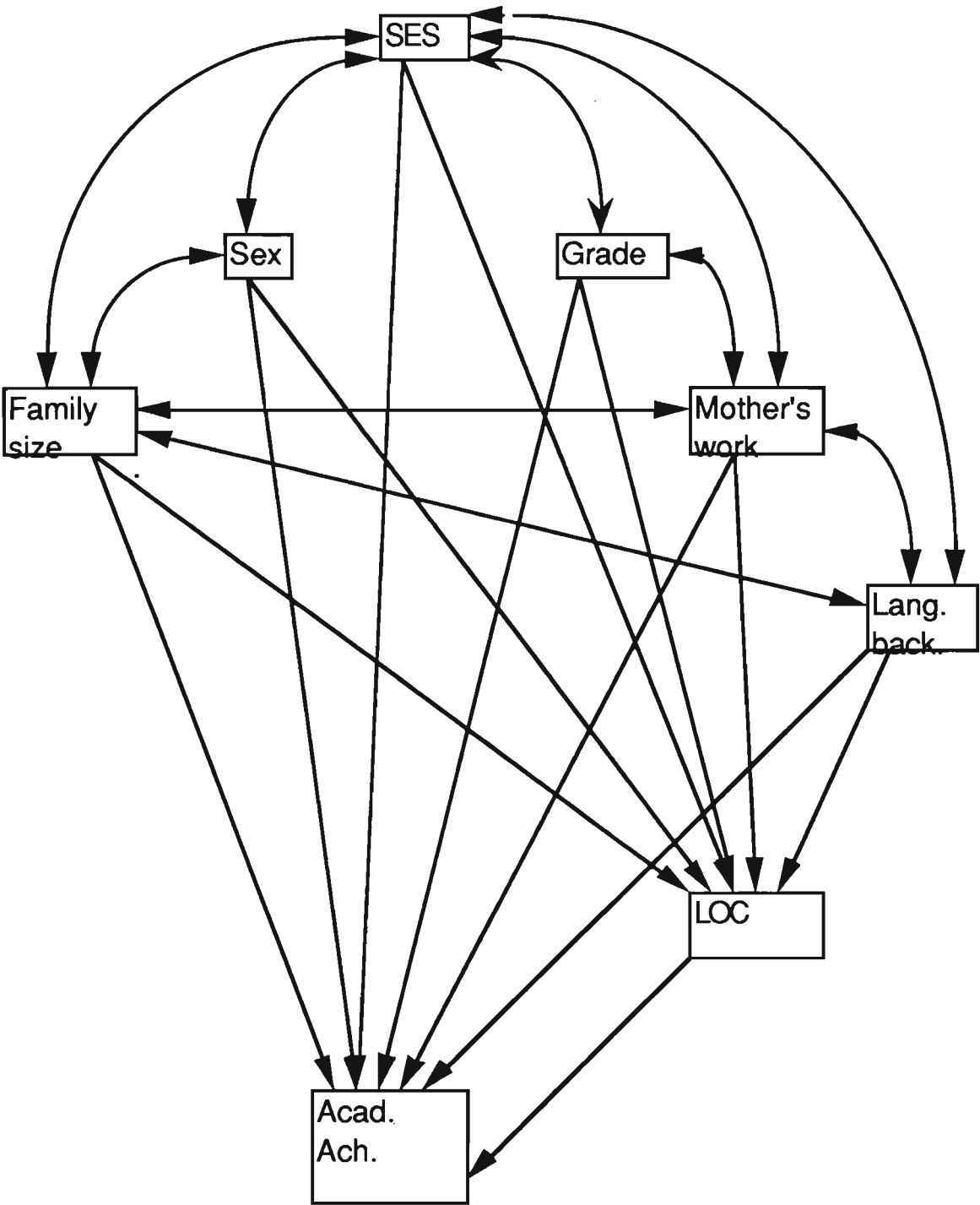


Figure 4. 5: Causal model of academic achievement

The above model (Fig. 4.5) is suggested because, among the variables that are studied in this research, academic achievement and locus of control are more variable than demographic or familial variables.

In all of these proposed diagrams, a proposed causal relation is shown by a uni-directional arrow from the independent variable to the dependent variable. Also, a proposed non-causal correlation between variables is shown by a bi-directional arrow. The results of these models will be presented in Chapter 7.

1.6: In order to test expectancy shift or change (on locus of control scale) the following model (Table 4.1) is suggested:

**Table 4.1**  
**Expectancy-shift model**

Groups	Test 1	Test 2	Treatment	Test 3
Experiment	Academic Achievement	LOC1	Feedback on Acad. Achiev.	LOC2
Control	Academic Achievement	LOC1	No-feedback	LOC2

Further information about the above model will be discussed later under the heading of achievement feedback and its effects on locus of control.

## **2. Definition of Variables**

Seven main variables which were the core of this study are as follow:

**2.1 Sex:** In this study the subjects were divided to either male (boy) or female (girl). The subjects indicated their sexes in an item in a brief questionnaire. The grammatical term 'gender' (Fowler, 1983) is not used.

**2.2 Grade (age):** Subjects in this study were categorized according to their grades at elementary school. The criterion for grade was the grade that the subjects were studying during data gathering. The grades that were determined for this study are Years 3 through 6 at elementary school level. The grade of students was determined by school regulations and the subjects indicated their grades on the questionnaire.

**2.3 Socioeconomic status:** The socioeconomic status of the subjects was determined by father's occupation, as stated by the subjects in the questionnaire. Then, it was coded according to the Australian National University six-point scale of occupation (Broom, Jones, Jones & McDonnell, 1977). For assurance about subjects' statements regarding their fathers' jobs, each case was verified as far as possible by the teacher of each class.

According to the ANU six-point scale, all of the occupations were classified into six categories. Further information about this occupational scale was explained in Chapter 3, and further explanation about the coding procedure of the father's occupation in this study will be given later in this chapter under the heading 'Scoring and Coding'.

It should be noted that the other indicators such as parents' education or income could not be considered in this study, because the investigator was not permitted to have access to the files of the students. Also, the students at these ages probably did not have valid information about their parents' education or income.

**2.4 Family size:** Family size is the total number of brothers and sisters who live with the subject. In other words, the subject himself or herself was excluded in this variable, which was quantified by the subjects' response to a question in the questionnaire. It was considered that the subjects' information on this question would be reliable.

**2.5 Language background:** Students' language background is a variable that may affect other variables in this study. This variable was measured by this question: "Do you speak any other language besides English at home?" The student's answer to this question can be either 'yes' or 'no'. If his or her answer was 'yes' he or she was categorized as 'non-English-language background', otherwise he or she was categorized as 'English-language background'. It should be noted that a non-English-language background student was included in this study who was resident at least one year in Australia or another English-language country, according to the information from the teacher or the principal of the school.

**2.6 Mother's work:** This variable was measured by this question: "Is your mother working?" The student's answer to this question can be either 'yes' or 'no'. Then the next question was "If yes, does she work part time or full time?". If the student's answer to the first question was 'yes' his or her answer was categorized as 'working mother', otherwise 'non-working mother'. Again, the teacher assisted with this question where the researcher was in doubt. [Note: The term 'non-working mother' is a technical one only, and was selected because children of school understand the term

in the sense used here. It is not intended to imply that mothers performing home duties at home do not carry out works.]

In the present study mother's occupation could not be considered as an indicator for socioeconomic status, because first, about 39 percent of students' mothers had only home duties; secondly, among those who were working the majority of them (about 56 percent) worked on part-time basis; and thirdly, the variety of part-time jobs, in terms of hours of work, is much greater than for full-time jobs, which makes for considerable difficulty in categorizing them. Also, according to recent statistics, more than half of the women who were working were employed in two occupational groups, 31 percent in the clerical category and 24 percent in the salesperson and personal service category (Australian Bureau of Statistics, 1993).

In addition, as mentioned in Chapter 3, it has been shown that mother's occupation was not associated with the academic achievement of the students, while father's occupation was highly associated (Bank & Finlayson, 1973). This finding might be the result of the differences between full-time and part-time jobs, because it has been shown that the students whose mothers worked full-time had lower achievement than students whose mothers worked part-time (Milne, Ginsburg, Myers & Rosenthal, 1986). Therefore, in the present study the investigator preferred to use father's occupation as an indicator for socioeconomic status as in some of the other studies (Bank & Finlayson, 1973; Fotheringham & Creal, 1980; Carpenter & Hayden, 1985). More information about the distribution of mother's occupation, in the present study, will be presented in Chapter 5.

**2.7 Locus of control:** Locus of control was measured by Nowicki-Strickland questionnaire. The total score on this questionnaire shows the extent of externality.

More details about this questionnaire will be explained later in this chapter under the heading, 'Instrument'.

**2.8 Academic achievement:** Academic achievement is defined in terms of two Australian standardized group achievement tests. The first is a reading comprehension test and the second is a mathematics test, and combination of standard-scaled scores of these two standardized tests made standard-scaled score of academic achievement. These two tests could be combined, because their scaled scores have the same means and the same standard deviation. These two tests will be introduced in more detail in the Instrument section in this chapter.

### **3. Population and Sampling**

This study was carried out in the Illawarra region of the state of New South Wales, Australia. The Illawarra region is the third largest urbanized area in New South Wales in Australia (McDonald & Wilson, 1990/91). This area (Illawarra) is centred about 80 kilometres south of Sydney, and Wollongong is the centre of the area. The urbanized population of this area is about 235,000 people (McDonald & Wilson, 1990/91) and the total population of the region was estimated at 309,444 in 1986. About half of this population lived in Wollongong (Illawarra, Census for 1986, 1989).

The population of the Illawarra consists of a relatively high proportion of non-English-speaking backgrounds with 22.7 percent being overseas-born and more than half of these (12.8%) originating from non-English-speaking countries (McDonald & Wilson, 1990/91). These migrant groups mostly came from countries in Southern Europe such as Yugoslavia, Portugal, Spain, Italy and Greece. Most of these groups have rural backgrounds with poor skills both in literacy and numeracy, even in their

own language. Other migrant groups came from the Middle East especially Lebanon and Egypt, South-east Asia and Central America (McDonald & Wilson, 1990/91).

In addition, a high proportion of male workers in this area is in 'blue collar' occupations and the unemployment rate in this area is significantly higher than most other parts of New South Wales or of the whole nation. For example, the unemployment rate in the Illawarra, New South Wales and Australia was reported as 13.1, 10.1 and 9.2 percent, respectively (Illawarra, Census for 1986, 1989). Also, the distribution of managerial occupation in the Illawarra, New South Wales state and Australia was 7.7, 11.2 and 11.7 percent, respectively, while the distribution of blue collar workers was 17.1, 14.3 and 14.4 percent, in that order (Illawarra, Census for 1986, 1989).

In addition, according to a study that was carried out in New South Wales, correlation coefficients between socioeconomic status of higher education students, aged 17-24 years, that were measured by the ANU scale and the corresponding postcode socioeconomic score was reported as .75 for Sydney and .53 for Wollongong (Jones, 1991).

Furthermore, the distribution of males and females without formal education or employment qualification is high in this region. The statistics showed that the proportion of males over the age of 15 who were not at school ranged from less than 14 percent to 75 percent in different parts of the Illawarra. This range was reported for females as from 55 percent to a maximum of 85 percent. Particularly the drop-out rate is higher among in lower-socioeconomic groups than elsewhere (McDonald & Wilson, 1990/91).



Therefore, according to the above evidence, the Illawarra region by comparison with other parts of Australia tends to be lower than average, in terms of socioeconomic status. In other words, evidence showed that Greater Wollongong has an over representation of low-socioeconomic students. Also, according to the above evidence, it can be concluded that this socioeconomically disadvantaged area has many cultural and educational impediments by comparison with other areas in Australia, in terms of main-stream educational attainments as mentioned earlier in this chapter.

### 3.1 Population

The population of this study consisted of all students in Year 3 through 6 at elementary-school level who attended primary public schools in 1993 in the Illawarra region. The list of primary-public (state) schools printed in the local Telephone Directory in 1993 was used for the sampling selection. The total number of primary public schools thus printed was 64 distributed throughout the region.

### 3.2 Sampling

Subjects of this study, as mentioned before, were selected from Years 3 through 6 in primary public schools in the Illawarra region. The method of stratified random sampling was employed and the following procedures were used for selecting the subjects.

The Illawarra region was divided into two parts on the basis of family income: families who earned less than \$15,000 and above \$15,000 annually, in terms of previous research (McDonald & Wilson, 1990/91). The postcode of each area was then identified, and the location of each primary public school on the map of the Illawarra region in relation to the above two categories was determined. Then, three

schools from the upper-income level and three schools from the lower-income level were selected randomly.

However, as mentioned above, the Illawarra region tends to be below average in socioeconomic status; therefore reference should be made to state average indicators rather than local ones to ensure that the sample of schools is representative in this regard.

After the selection of the schools, some educational experts in the Faculty of Education, University of Wollongong and Department of School Education in Wollongong, who are experienced in the determination of socioeconomic status were asked to verify the socioeconomic status by the name and/or geographical location of the selected schools (Linke, 1993).

As was expected, according to the judges the six schools that were selected tended toward low-socioeconomic status. However, as a result of the experts' advice, one of these six schools was omitted and then from the areas that tend toward upper-socioeconomic status one school was selected randomly. Therefore, after following the above procedure, it is argued that the sample in this study is representative of the state of New South Wales.

In each school, one class in each year (Years 3, 4, 5, and 6) was selected for the purposes of this study. In the schools in which there was more than one class in each year, the experimental class was selected randomly from among them. Hence, six classes in each year were selected for this study and in total, the sample size consisted of 502 students, 235 boys and 267 girls. Further characteristics of this sample will be discussed in the next chapter.

Also, in order to measure the academic-achievement feedback and its effects on locus of control, out of these six schools two schools were selected randomly. Further discussion about the purpose of this study will be given in the survey design part of this chapter.

## **4. Instruments**

In order to measure the variables of this study, four instruments were administered to the subjects. They are now described:

### **4.1 Family-background questionnaire**

This questionnaire contains seven questions which mainly measure the family backgrounds of the subjects including grade, sex, family size, family-language background, father's occupation, and mother's job status.

### **4.2 Reading-comprehension achievement test**

The Tests of Reading Comprehension (TORCH) were used for measuring the reading comprehension of the students (Mossenson, Hill & Masters, 1988). The TORCH tests were constructed by staff of the Curriculum and Research Branch of the Western Australian Education Department in 1982. This set of tests consists of fourteen untimed reading tests in two booklets which are suitable for students in Year 3 through 10. These passages or tests vary in length from approximately 200 to 900 words.

These passages have been taken from longer passages, but each passage can be used as an independent unit as a test. A passage is administered to students and the students

retell that passage in different words on a retelling form. Each passage is very similar to a short story or a descriptive article. The retelling form contains gaps relating to the original passage and the students are required to fill the gaps in one or more of their own words (Mossenson, Hill & Masters, 1988).

The fourteen tests presented in two booklets vary in item difficulty, so that it is possible for users or teachers to select appropriate tests according to the abilities of particular students (Mossenson, Hill & Masters, 1988).

The nature of TORCH tests enables students to produce their own interpretations regarding the passages in the test. In other words, a range of responses is possible for each item. Therefore, lists of typical responses for each item included in the test manual were used for scoring each test (Mossenson, Hill & Masters, 1988).

#### 4.2.1 Test scoring

The score keys for each TORCH test are presented at the end of the manual and these keys determine in each item which response is an 'acceptable response' or an 'unacceptable response'. However, if a response does not appear on the key, it should be judged by its semantic similarity to the responses in the list by the scorer.

An individual's raw score or the total number of acceptable responses on any one of the TORCH tests can be converted to a scaled score or TORCH score by referring to the table at the end of each scoring key. This score (TORCH score) enables the teachers or users of the tests to compare the results of the tests with one another. Also, the TORCH tests have group-referenced norms. These norms are based on percentile ranks and stanine scores.

#### 4.2.2 Technical information

The standardization of the TORCH tests was developed with 2,698 students in Year 3 to 10 in Government schools in Western Australia. Eight of the 14 tests were standardized on a much larger sample of students in Year 3 through 10 in public schools in Western Australia in November 1984. Australian reference-group norms for TORCH tests were obtained indirectly from the 1984 norms for the Progressive Achievement Tests in Reading (Mossenson, Hill & Masters, 1988).

#### 4.2.3 Reliability and validity

The reliability of the tests was practically determined by Kuder-Richardson Reliability (KR 20), indicating the internal consistency of the items in the tests. According to the coefficient yielded, the authors of the test concluded that the items all appear to measure the same skill (Mossenson, Hill & Masters, 1988). The size of this coefficient is not reported in the test manual. Also, in the manual of the test, it was reported that a conservative estimate of test-retest reliability is widely used to report estimate on the results of a single administration of the test (Mossenson, Hill & Masters, 1988); but neither the coefficient nor the procedures for determining this kind of reliability is reported in the test manual. However, the standard error of measurement (SEM) for the tests, that is based on the reliability coefficient, is reported for each test in the test manual (Mossenson, Hill & Masters, 1988).

Validity is reported for TORCH tests in terms of content validity, obtained by a detailed examination of the content of the tests by different methods such as the selection of the items, and their appropriateness and representativeness, and also by comparing the items with accepted curricula (Mossenson, Hill & Masters, 1988).

### **4.3 Progressive Achievement Tests in Mathematics (PATMATHS)**

Another test that is administered as an indicator of academic achievement is PATMATHS (Progressive Achievement Tests in Mathematics). This test is adopted in Australia in order to assist teachers in evaluating the level of mathematics achievement of their students in the basic skills and understandings of mathematics.

The PATMATHS tests have been developed by the Measurement and Evaluation Division of the Australian Council for Educational Research (ACER). This series of tests is an Australian adaptation of the Progressive Achievement Tests developed by the Test Development Division of the New Zealand Council for Educational Research.

This set of tests consists of three tests at various difficulty level, and each test has an equivalent form. All of the questions in these tests are designed in multiple-choice format and each test covers a range of general mathematics topics. All of the tests are time-limited and the students should answer each test in 45 minutes. Time for administration and preparation for answering the questions should be added to this time (ACER, 1984).

PATMATHS tests have been standardized for Year 3 through 8 in the following categories:

Test 1 (Form 1A or 1B) Years 3, 4, and 5 (47 items),

Test 2 (Form 2A or 2B) Years 5, 6, 7, and 8 (57 items),

Test 3 (Form 3A or 3B) Years 6, 7, and 8 (55 items).

#### 4.3.1 Scoring

As pointed out before, all of the items of the tests are designed in multiple-choice format, so that scoring the tests is an easy task. Subjects answer each question on the special answer sheet that is designed for the tests, and the answer sheet can be scored by hand or machine-scored. Each question has only one correct answer and the sum of correct responses on each test is the raw score of the test. In order to compare the raw scores of different classes and different tests, the raw scores can be converted to scaled scores. Like TORCH, two kinds of scaled scores have been developed for PATMATHS tests. The first one is the PATMATHS scaled scores, and the second one is the norm-referenced percentile rank and stanine scores. The Table for converting raw scores to PATHMATHS scale scores, percentile rank and stanine scores is presented at the end of the manual of the test (ACER, 1984).

#### 4.3.2 Technical information

The standardization procedures of the tests in Australia were studied in November 1983 in order to obtain Australian norms. The sample size for this study was 456 students for each test at each year level selected from 76 different schools. It should be noted that the samples of primary and secondary schools were selected separately and in each school one class at each year level was selected. If in a school where there were two or more classes at a particular year level, one of them was selected randomly. All of the states of Australia, New South Wales, Victoria, Queensland, South Australia, Western Australia, Tasmania, Australian Capital Territory and Northern Territory, were included in the study of standardization. Further information regarding sampling and standardization is available in the manual of the tests (ACER, 1984).

#### 4.3.3 Reliability and validity

The reliability of the tests was measured by Kuder-Richardson reliability (KR 20), indicating the internal consistency of the items in the tests. According to this type of reliability, the items appear to measure the same skill. The range of the Kuder-Richardson coefficients reported for the tests is between .81 and .94. Also, the standard error of measurement (SEm) for the tests is reported for each test in the manual (ACER, 1984).

Again, the only validity that is reported for the tests is content validity. The content validity of the tests was examined by an extensive review and revision of the items by committees of teachers and mathematics specialists. During this process the content, structure, and emphases of the tests were compared with accepted curricula and common textbooks. Also, the selection, appropriateness, and representativeness of the items was carefully examined (ACER, 1984).

#### 4.4 Nowicki-Strickland Locus of Control Scale

The Nowicki-Strickland locus of control scale, based on Rotter's definition of external-internal control of reinforcement, is a paper-and-pencil questionnaire. This standardized questionnaire consisted of 40 questions that can be answered either 'yes' or 'no'. The items of this questionnaire describe reinforcement situations in relation to motivational and interpersonal factors such as achievement, dependency and affiliation (Nowicki & Strickland, 1973).

The administration of the Nowicki-Strickland locus of control scale does not require any special training. Only familiarity with general test procedures and with the test items in order to read them to the students is enough for administering it. In this



regard, although the subjects in Year 5 or above can answer the items by themselves, it is suggested that, in order to make sure students understand each item, the examiner should read the questions aloud to the students. The reading of each item should be repeated. The administration of the items usually take from ten to fifteen minutes. In this regard, administration of the test in younger groups needs more time than with older groups. This scale can be administered from Year 3 through 12 (Nowicki & Strickland, 1973).

#### 4.4.1 Scoring

The total score of the test is the total number of the items which are answered in an externally controlled direction. For example, the first item of this questionnaire is "Do you believe that most problems will solve themselves if you just don't fool with them?" If a subject answers 'yes' to this question, he or she will move toward external locus of control. Another example, the second item of this questionnaire is "Do you believe that you can stop yourself from catching a cold?" Hence, if a subject answers 'no' to this question, he or she will move toward external locus of control. Therefore, the higher the score, the more externally controlled is the attitude (Nowicki & Strickland, 1973).

#### 4.4.2 Technical information

The final form of the scale was begun on a large number of items (n=102) based on Rotter's definition of the internal-external locus of control dimension.

These items were constructed with the co-operation of school teachers in order to make the items readable at least for Year 3 students, as well as being appropriate for older students (Nowicki & Strickland, 1973).

These items were given to nine clinical psychologists who were asked to answer the items in an external direction. After the judgment of this group, items in which there was complete agreement were used for a preliminary form of the scale, and the number of these items was 59. These items were administered to 152 students from grades 3 through 9. Then, to seek more homogeneity among the items, item analysis was applied. After the item analysis and also the comments of teachers and students in the sample, the final form of the scale with 40 items was constructed (Nowicki & Strickland, 1973).

The final form of the scale was administered to a large sample in Years 3 through 12 to obtain reliability, demographic and validity information. The sample of this study consisted of 1017 primary and secondary students, most of whom were Caucasian (Nowicki & Strickland, 1973).

#### 4.4.3 Reliability and Validity

Various methods were used for determining the reliability of the questionnaire.

Test-retest reliabilities in Years 3, 7, and 10 with six weeks interval, were reported as .63, .66, and .71 respectively (Nowicki & Strickland, 1973).

Also, split-half reliabilities, to indicate internal consistency of the test using the Spearman-Brown formula, were reported as .63 for Years 6, 7, and 8; .74 for Years 9, 10, and 11; and .81 for Year 12. Although the items of the test are not arranged according to difficulty level, these reliabilities are satisfactory (Nowicki & Strickland, 1973).

In addition, the relationships among all of the items of the test were determined by biserial correlation for males and females in Years 3, 7, and 11. The range of these correlations was between .012 and .648. It has been pointed out that the item-total relationships are moderate but consistent for all ages (Nowicki & Strickland, 1973).

The validity of the questionnaire, was determined by discriminative and construct validity.

According to those who construct locus of control scales, this construct should have a low correlation with social desirability and intelligence constructs. In this regard, Nowicki and Strickland reported non-significant correlations between these two constructs (social desirability and intelligence) on one hand, and locus of control on the other (Nowicki & Strickland, 1973).

Also, in terms of construct validity, it has been reported that the Nowicki-Strickland locus-of-control scale, applying the principle of convergent validity, showed moderate correlation with other measures of locus of control such as the Intellectual Achievement Responsibility scale and the Bialer-Cromwell scale (Nowicki & Strickland, 1973). In addition to the above evidence for construct validity of the test, the relationship between the Nowicki-Strickland locus of control and other demographic, achievement-competence, constitutional and personality variables support this validity (Nowicki & Strickland, 1973). For instance, Nowicki and Strickland (1973) found a significant relationship between the locus of control scale and social class in the direction that the higher social class was associated with more internality. In terms of race, blacks tend to score more externally than whites. Also, the theoretical assumption that internality is associated with high academic achievement was supported by the Nowicki-Strickland questionnaire. In addition to

the above variables, in terms of personality variables it has been shown that internality is associated with high self-esteem (Nowicki & Strickland, 1973).

Therefore, according to the above evidence, it can be concluded that the Nowicki-Strickland locus of control scale is a reliable and valid instrument for measuring locus of control.

## **5. Procedures**

### **5.1 Permission**

In order to gather data from the selected schools and to administer the instruments, permission from several sources had to be obtained. The relevant organizations and persons were as follow:

#### **5.1.1 New South Wales, Department of School Education, South Coast Region**

In order to carry out the research in the designated schools, the permission of the Department of School Education in South Coast Region is required. Therefore, the investigator applied for this permission, and after discussing the aims and procedures of the research, the permission was granted under several conditions. A copy of this permission letter is included in Appendix A at the end of the thesis.

#### **5.1.2 Human Experimentation Ethics Committee in the University of Wollongong**

According to the regulations of the University of Wollongong, each experiment or item of research, in which human beings are involved as subjects of the study, must be approved by the Human Experimental Ethics Committee. This committee also

granted its permission. A copy of the permission note is enclosed in Appendix A at the end of the thesis.

#### 5.1.3 Publishers or authors of the standardized instruments

Three kinds of standardized instruments were used in this study. Two kinds of achievement tests, TORCH and PATHMATHS, were commercially available; therefore the Graduate School of Education purchased these tests from the publishers. However, the third instrument, the Nowicki-Strickland Locus of Control scale, was not commercially available. Permission for using this scale was granted by both the publisher and the first author of the scale. A copy of the relevant permission note is also enclosed in the Appendix A.

#### 5.1.4 Principals of the schools

According to the permission of the Department of School Education, the principal of each school was required to agree to the research being carried out in his or her school. Hence, the investigator approached the principal and explained the aims of the research and the procedures of data collection. In addition, a summary of the research proposal with a cover letter from the investigator was submitted. Permission from all six principals of the schools was granted for carrying out the research.

#### 5.1.5 Parents

Again, before the fieldwork, the investigator was required by the Department to obtain the permission of the children' parents for the children to take part in the tests. Hence, a letter with a permission slip was provided for this purpose. This letter, with a cover letter by the principal of the school, was send to each parent before testing sessions.

Only children who returned the permission slips signed by their parents took part in the testing sessions. This letter with the permission slip is enclosed in Appendix A.

5.2 Pilot study

Before administering the achievement tests on the sample, it was necessary to administer the tests to a pilot group to ensure the Forms and difficulty level of the tests were suitable for the children in the survey. After administering TORCH and PATHMATHS tests and consulting with some experienced teachers, the following tests (Table 4.2) were selected for the entire sample:

**Table 4.2: Selected achievement tests for administration**

Year	TORCH (Test story titles)	PATHMATHS
3	Grasshoppers	Form 1A
4	The bear who liked Hugging people	Form 1B
5	Getting better	Form 2A
6	Feeding puff	Form 2B

The sample size of this pilot study was 80 students in Years 3 through 6 (20 students in each class). This group was excluded from the main study.

5.3 Administration of instruments

After determining the achievement tests, the investigator had a session with the teachers of the classes which were involved in the study in each school. In this session the investigator explained the aims and procedures of testing and introduced

each test to them. In addition a copy of the manual of each test was given to them. Also, in this session the investigator tried to acquire the teachers' co-operation during the testing and their help in collecting valid data. In each testing session the teacher read the instructions and also the practice examples of the tests to the students and encouraged them to do their best. The investigator was present with the teacher of each class, and both of them tried to handle the session according to the instructions in the manuals. It should be mentioned that, during the administration of the locus of control scale, the teacher of each class read the test item by item in a loud voice to the students, in all grades, according to the authors' instructions.

Administration of the tests took about 140 minutes. Because elementary-school pupils could not tolerate this duration in one sitting, the tests were administered in two sessions on separate days. Also, in order to control for order effects, the following procedure was followed according to Table 4.3:

**Table 4.3: Control for order effects**

Schools	Session I	Session II
School I	PATHMATHS	TORCH LOC
School II	PATHMATHS	LOC TORCH
School III	TORCH	PATHMATHS LOC
School IV	TORCH	PATHMATHS LOC
School V	LOC PATHMATHS	TORCH
School VI	LOC TORCH	PATHMATHS

As mentioned before, the number of students who took part in the study was limited because of a variety of reasons. On one hand, as already mentioned, only the students who were permitted to do so by their parents could take part in the testing sessions. In total about 80 percent of the parents gave permission to their children to take part in the experiments. On the other hand, the administration of the tests in two sessions created some limitations for the study. For example, some of the students that took part in the first session were absent in the second session or vice versa, and also a few students during the testing process did not complete the test in one of the testing sessions. Data from all of these students were excluded from the study.

## **6. Scoring and coding**

### **6.1 Scoring the instrument**

Both of the achievement tests, TORCH and PATHMATHS, and the locus of control scale, were scored and raw scores of the achievement tests were converted to scaled scores according to the test manuals. The scoring was verified with a further check.

On the family-background questionnaire, father's occupation was scored on the basis of the six-point ANU score. Before scoring the father's occupation, this item was verified by consulting the teacher of each class as far as possible, because young students may have had limited information about their fathers' occupations. After verification, this item was scored by the investigator for all of the students. However, because of the relative subjectivity of scoring, this item was scored by another doctoral student in the Sociology Department. Then, a Pearson product-moment correlation was applied between two scorings. The inter-scorer reliability was .91. Although the scoring of father's occupation in this study was reliable, in the case of



disagreement between two scorers the score was resolved by a discussion between them.

## 6.2 Coding information

After scoring the achievement tests, the locus-of-control scale and other familial background variables, these data were coded numerically in a computer-coding sheet in the following order:

Grade: was coded either as 3 (third), 4 (fourth), 5 (fifth) or 6 (sixth).

Sex: was coded either 1 (boy) or 2 (girl).

Family size: was coded as the total number of brothers and sisters.

Language background: was coded either 1 (non-English-language background) or 2 (English-language background).

Father's occupation: was coded either 1 (unskilled), 2 (semiskilled), 3 (skilled), 4 (clerical), 5 (managerial), or 6 (professional). Besides this hierarchical coding based on the ANU six-point scale, two additional codings were added for further analysis: 0 (unemployment) and 9 (father's occupation not stated or father's death). Of course, these two codes were not used in all of the analysis regarding socioeconomic status. Also, because the number of unemployment responses was limited (about 10 responses), they were added to code 9.

Mother's working: was coded either 1 (working) or 2 (not working).

Type of mother's work: was coded either 1 (part-time) or 2 (full-time).

Reading test: standard scaled score was coded.

Mathematics test: standard scaled score was coded.

Locus-of-control scale: was coded in direction of externality (high) according to the test manual.

In case of subjects who participated in academic-achievement feedback and its effects on locus of control, their second scores on the locus-of-control scale were coded in the same way as their first scores on this scale.

## **7. Design**

Although in the second chapter the independent and dependent variables of the study were described briefly, before discussing the design it is necessary to state these variables again in more detail.

### **7.1 Independent and dependent variables**

In research, some variables are antecedent and some are consequent. The variables that are a consequent upon antecedent variables are called dependent variables, and variables that are antecedent to the dependent variables are called independent variables (Ary, Jacobs & Razavieh, 1985).

In this study sex, grade, socioeconomic status, family size, mother's work and language background were always independent variables. Two other variables,

academic achievement and locus of control, served as both independent and dependent variables in different stages of the analysis.

In some stages of the analysis, the locus-of-control variable was added to the independent variables mentioned above. Therefore, in these stages of analysis, sex, grade, socioeconomic status, family size, language background, mother's work and locus of control were independent variables and academic achievement was a dependent variable.

On the other hand, in other stages of the analysis, the academic-achievement variable was added to the original independent variables. Therefore, in these stages of the analysis, sex, grade, socioeconomic status, family size, language background, mother's work and academic achievement were independent variables and locus of control was a dependent variable.

## 7.2 Stages of analysis

Various stages were developed in order to answer the research questions of the study. These stages will now be discussed:

### 7.2.1 Stage One: Comparison of academic achievement on the basis of each of the independent variables.

Some of the independent variables of this study are continuous and some of them are discrete variables. In this regard, family size and locus of control are continuous variables, but sometimes in order to answer the research questions more clearly and also because of using appropriate statistical measures, these variables were converted to discrete variables on the basis of their means. For example, on the basis of the

mean of the locus of control scale, the students were divided into internal (below the mean) and external (above the mean), locus of control. On the other hand, other variables (sex, grade, socioeconomic status and language background) are discrete or non-continuous variables. However, academic achievement in this stage was regarded as a continuous variable.

In this stage, academic achievement of stated groups was compared on the basis of the independent variables. For example, academic achievement of boys and girls or English- and non-English-language background were compared with each other.

#### 7.2.2 Stage Two: Comparison of locus of control on the basis of each independent variable.

In this stage, sex, grade, socioeconomic status, language background and academic achievement were independent variables and locus of control was the dependent variable. Sex, grade, socioeconomic status and language background were regarded as discrete variables, and academic achievement, family size and locus of control were regarded as continuous variables. But sometimes, as in Stage One, these variables were converted to discrete variables on the basis of their means. For instance, on the basis of the mean of the academic-achievement measure, the students were divided into high (above the mean) and low (below the mean) achievers. However, in this stage, locus of control was regarded as a continuous variable.

### 7.2.3 Stage Three: Prediction of academic achievement and locus of control.

#### 7.2.3.1 Substage (a) Academic achievement

The aim of this substage was to determine the contribution of each independent variable (sex, grade, socioeconomic status, family size, language background and locus of control) in predicting the dependent variable (academic achievement).

#### 7.2.3.2 Substage (b) Locus of control

The aim of this stage was to determine the contribution of each independent variable (sex, grade, socioeconomic status, family size language background and academic achievement) in predicting the dependent variable (locus of control).

As can be seen, first at this substage locus of control was regarded as an independent variable, while formerly it was regarded as a dependent variable. Also, the reverse of this analysis is true about academic achievement; in other words, first at this stage academic achievement was regarded as a dependent variable, while subsequently it was regarded as an independent variable.

### 7.2.4 Stage Four: Path analysis between independent and dependent variables

In order to test the effects of the independent variables in predicting the dependent variables, and also to determine direct and indirect effects of each independent variable on each dependent variable, the procedure of path analysis was employed. In other words, the model (Figure 4. 5), that was presented before in this chapter, was tested by path analysis. This analysis was carried out according to the Table 4.4. In other words, in Stage One, academic achievement was regressed on the sex, grade,

socioeconomic status, language background, mother's work, family size, and locus of control variables. In Stage Two, locus of control was regressed on the sex, grade, socioeconomic status, language background, mother's work, and family-size variables.

Path analysis is a method for studying the direct and indirect effects of independent variables (taken as causes) on dependent variables (taken as effects). It should be noted that by path analysis we can not discover causes, but it is a method that can be applied to a causal model proposed by the investigator on the basis of previous literature and theoretical consideration (Kerlinger & Pedhazur, 1973). In this relation Kerlinger and Pedhazur (1973) stated that:

One of the important applications of path analysis is the analysis of a correlation into its components. Within a given causal model it is possible to determine what part of a correlation between two variables is due to the direct effect of a cause and what part is due to indirect effects. For example, when causes are correlated, each cause has a direct effect on dependent variable as well as an indirect effect through the correlations with the other causes. (p. 314)

In order to determine the indirect effect of each independent variable, in the proposed model, on dependent variables, the matrix-correlation analysis was employed among independent variables.

**Table 4.4**  
**Stages and variables in path analysis**

Stage	Dependent variable	Independent variable
1	Academic achievement	Sex Grade SES Language background Mother's work Family size Locus of control
2	Locus of control	Sex Grade SES Language background Mother's work Family size

7.2.5 Stage Five: Achievement feedback and its effects on locus of control

As mentioned before, another aim of this study was to test the effect of feedback practices regarding achievement behaviour, in terms of academic-achievement feedback, and its influence on locus of control. In order to achieve this goal, in two schools, after administration of the achievement tests the locus of control scale was administered to all of the students. After three weeks, in one of these schools the general results of the achievement tests in the form of frequency distribution and status of the means of the class (both reading and mathematics means) by comparison with normative data (Australian norm references) were reported to the classes. Then, after the feedback was given, the same locus of control scale (Nowicki-Strickland Scale) was administered again to all of the students in each class in this school.

In the second school, also after three weeks, the locus-of-control scale was administered again without reporting the general results of achievement tests to the children.

It should be noted that the investigators could not get the permission of the principal for reporting the individualized feedback to the students.

When the means of the class were above the means of normative data, the process of giving feedback to the class was as follows. In front of the class, the experimenter said to the students "The scores of the majority of the students in this class, in both mathematics and reading tests, were above the average of other students in other classes in the same Grade throughout Australia. For most of you, well done."

In one case (Year 6), the students were above the mean of normative data in mathematics but slightly below the mean of normative data in reading comprehension. The process of giving feedback to the class was as follows. "The scores of the majority of the students in mathematics were above the average of other students in other classes in the same Grade throughout Australia, but the scores of some of you in reading comprehension were slightly below the average of the majority of other students in other classes in the same Grade throughout Australia. However, particularly in mathematics, for most of you, well done."

In contrast, when the means of the class were below the means of normative data, the process of giving feedback to the class was the opposite of the first statement. In other words, the experimenter said "The scores of the majority of the students in this class, in both mathematics and reading tests, were below the average of other students in other classes in the same Grade throughout Australia. Most of you should study harder in future for better scores."



Therefore, it is supposed that the feedback in Years 3, 5 for both tasks (mathematics and reading) is 'encouraging'; in Year 6 is 'encouraging' for mathematics and 'discouraging' for reading and in Year 4 is discouraging for both tasks.

After the above experiment the means of locus of control were compared with each other, in both feedback and non-feedback groups.

## **8. Statistical procedures**

Two main categories of statistics were employed for analysis of the data in this study: descriptive and inferential.

### **8.1 Descriptive statistics**

In order to describe the characteristics of the sample, various measures of descriptive statistics such as measures of central tendency, mainly mean, and measures of variability, mainly standard deviation, were used. Also, the characteristics of the sample on the basis of various variables, were compared by frequency and percentile in cross-tabulation forms.

### **8.2 Inferential statistics**

Various measures of inferential statistics were used in order to analyse the data. These kinds of statistics will be discussed below according to the stages of analysis which were explained previously under the heading of 'stages of analysis' in the design part in this chapter.

In order to analyse the data in Stages One and Two, the statistics that were mostly used are: product-moment (Pearson) correlation, matrix correlation, and simple or one-way analysis of variance.

In Stages Three and Four, in order to determine the contribution of each independent variable in predicting each dependent variable, and also to determine the direct and indirect effects of each independent variable on each dependent variable, multi-factor regression, stepwise regression, matrix correlation and path analysis were employed.

Finally, in Stage Five, for measuring the effects of achievement feedback on locus of control, mainly the t-test for dependent groups, Pearson correlation, two-way analysis of variance and the Wilcoxon matched-pair signed-ranks test were used.

The statistical package that was used for the data analysis was Stat-view package (Statview 512+, 1986).

In the next chapters (Chapters 5, 6 and 7) the results of this study will be presented in terms of the above Stages.

Chapter 5

Results: Academic Achievement and Its Relation to Students' Family Background

Before presenting the results of the academic-achievement tests in relation to the independent variables of the study, it is necessary to describe some of the statistical characteristics of the sample.

1. Characteristics of the sample

As mentioned before, the sample of this study consisted of 502 students in Years Three through Six (235 boys and 267 girls). As is shown in Table 5.1, the percent distribution of the students in the sample in Grades Three through Six was 18.13, 23.90, 28.49 and 29.48 respectively.

Table 5.1: Distribution of students according to grade and sex in the sample

Sex		Grade				Total
		3	4	5	6	
Boy	n	47	49	60	79	235
	%	20.00	20.85	25.53	33.62	100
Girl	n	44	71	83	69	267
	%	16.48	26.59	31.09	25.84	100
Total	n	91	120	143	148	502
	%	18.13	23.90	28.49	29.48	100

In Table 5.2, percent distribution of the sample according to father's occupation of the students and percent distribution of occupation in the original study carried out by Broom et al. (1977) is presented. As is shown in most cases, the percent distributions in the sample are similar to percent distributions in the ANU study. In other words, it may be concluded that the characteristics of the sample regarding occupation or socioeconomic status is representative, at least at state level.

**Table 5.2: Percent distribution of father's occupation in the sample by comparison with ANU 1 scale in 1971**

-----		
	Percent	
ANU 1 scale	Sample	ANU 1 in 1971
-----		
Unskilled manual	16.95	19.47
Semiskilled manual	19.53	19.99
Skilled manual	14.16	15.42
White collar	19.74	21.42
Managerial	10.95	11.29
Professional	18.67	12.41
 Total	 100.00	 100.00
-----		

Also, the distribution of father's occupation among students' grades, shown in Table 5.3, indicates an appropriate distribution of father's occupation among various grades.

It should be pointed out that in this Table, and also in most of the subsequent Tables, the total number of the students may not total 502 (total number of the students in the sample), because of missing data. For example, the total number of the students in Table 5. 3, is 466, because 36 students did not answer this question (what is your father's job?), or did not know their fathers' occupations.

**Table 5.3: Distribution of father's occupation across students' grades**

Father's occupation		Grade				Total
		3	4	5	6	
Unskilled manual	n	26	21	19	13	79
	%	29.21	18.26	14.50	9.92	16.95
Semiskilled manual	n	13	24	28	26	91
	%	14.61	20.87	21.37	19.85	19.53
Skilled manual	n	10	20	17	19	66
	%	11.23	17.39	12.98	14.50	14.16
White collar	n	16	22	31	23	92
	%	17.98	19.13	23.67	17.56	19.74
Managerial	n	5	8	12	26	51
	%	5.62	6.96	9.16	19.85	10.95
Professional	n	19	20	24	24	87
	%	21.35	17.39	18.32	18.32	18.67
Total	n	89	115	131	131	466
	%	100	100	100	100	100

Source: Calculated from present research data

Mother's work and job status among mothers who were working are indicated in Table 5.4 and Table 5.5 respectively. It is apparent that the majority of the students' mothers work (61 percent), most of them on a part-time basis (56 percent).

**Table 5.4: Distribution of mother's work**

Mother's work	n	Percent
Working mother	300	60.61
Non-working mother	195	39.39
Total	495	100

Source: Calculated from present research data

**Table 5.5: Distribution of job status among mothers who work**

Job status	n	Percent
Full-time	131	43.67
Part-time	169	56.33
Total	300	100

Source: Calculated from present research data

Distribution of working mothers according to father's occupation is indicated in Table 5.6. As it can be seen, the majority of working mothers came from the categories white-collar, professional and semiskilled manual (13.98%, 13.12% and 12.04% respectively), while non-working mothers came more from unskilled manuals, semiskilled manuals and skilled manuals (8.17%, 7.53% and 6.02% respectively).

**Table 5.6: Distribution of mother's work according to father's occupation**

Father's occupation		Work status		Total
		Working mother	Non-working mother	
Unskilled manual	n	41	38	79
	%	8.82	8.17	16.99
Semiskilled manual	n	56	35	91
	%	12.04	7.53	19.57
Skilled manual	n	38	28	66
	%	8.17	6.02	14.19
White collar	n	65	27	92
	%	13.98	5.81	19.79
Managerial	n	26	24	50
	%	5.59	5.16	10.75
Professional	n	61	26	87
	%	13.12	5.59	18.71
Total	n	287	178	465
	%	61.72	38.28	100

Source: Calculated from present research data

In Table 5.7 and Table 5.8 the distributions of the students' language-speaking backgrounds in regard to their sex and their fathers' occupations are shown. In total, 79.68 percent of the students came from English-speaking families, and 20.32 percent came from non-English-speaking families. Although the number of girls was more than the number of boys in non-English-speaking group, it should be noted that, as was

indicated in Table 5.1, the total number of girls was also more than the number of boys in the sample.

**Table 5.7: Distribution of English and non-English-speaking background according to sex of the students**

Language background	Sex			Total
		Boy	Girl	
English-speaking	n	192	204	396
	%	38.63	41.05	79.68
Non-English-speaking	n	41	60	101
	%	8.25	12.07	20.32
Total	n	233	264	497
	%	46.88	53.12	100

Source: Calculated from present research data

As it has been shown in Table 5.8, the majority of the students in English-speaking group came from semiskilled manual, white collar and professional families (16.74%, 16.74% and 15.45% respectively), and in the non-English-speaking group the majority of the students came from unskilled manual, managerial and professional (4.51%, 3.22% and 3.22% respectively).

In summary, the distribution of the students regarding some of the important independent variables of the study showed that the sample has a balanced distribution on these variables.



**Table 5.8: Distribution of family language background according to father's occupation**

Father's occupation	Language background		Total
		English-speaking	Non-English-speaking
Unskilled manual	n	58	21
	%	12.45	4.51
Semiskilled manual	n	78	13
	%	16.74	2.79
Skilled manual	n	52	14
	%	11.16	3.00
White collar	n	78	14
	%	16.74	3.00
Managerial	n	36	15
	%	7.72	3.22
Professional	n	72	15
	%	15.45	3.22
Total	n	374	92
	%	80.26	19.74

Source: Calculated from present research data

**2. Academic achievement tests in relation to independent variables**

Before a comparison of academic achievement tests is made in relation to the independent variables of the study, the means and standard deviations of scaled scores of mathematics, reading-comprehension tests and combination of these scaled scores (academic achievement) are presented in Table 5.9. According to this Table the means of scaled scores in reading-comprehension and academic achievement (a combination of reading comprehension and mathematics tests) slightly increased from Years 4 to 6. However, in Year 3 these means were higher than the means in Year 4, though these means were lower than the means in Year 5 and 6. The means of the scaled scores of the mathematics test consistently increased from Year 3 to Year 6.

### 2.1 Academic achievement and sex

In Table 5.10, the means and standard deviations of mathematics, reading-comprehension and achievement scores in relation to sex are presented. Also, the result of analysis of variance (ANOVA), for testing the differences between boys and girls regarding their achievement tests, is shown in this Table.

As has been indicated, the means of girls in all tests were higher than the means of boys, and the difference between the means for reading comprehension and academic achievement were significant. In other words, girls achieved better than boys in both the reading comprehension test and academic achievement ( $p<.0001$ ).

### 2.2 Academic achievement and socioeconomic status

In order to categorize socioeconomic status into three categories: low, middle and high, unskilled and semiskilled manual were combined; skilled and white collar were combined; and managerial and professional jobs were combined. In other words, low socioeconomic status consisted of unskilled and semiskilled manual jobs; middle socioeconomic status consisted of skilled manual and white collar jobs; and finally high socioeconomic status included managerial and professional jobs.

In order to test the differences between the means in three levels of socioeconomic status, the mean of the mathematics test and the result of the ANOVA are presented in Table 5.11. As was expected, the mean of the mathematics scaled scores increases, with socioeconomic status, from low to high levels. Significant differences were found between different levels of socioeconomic status regarding mathematics scaled scores by the ANOVA analysis ( $p<.0001$ ). In addition, the direction of differences, tested by Sheffe F-test, is presented in the Table, and the differences were all significant ( $p<.05$ ).

Table 5.9: Means and standard deviations of scaled scores in achievement tests

Year	n	Tests					
		Math.		Reading		Acad. ach.	
		Mean	S.D.	Mean	S.D.	Mean	S.D.
3	91	45.69	4.59	41.90	11.65	87.59	14.39
4	120	47.51	6.41	37.75	13.62	85.26	17.94
5	143	48.22	3.98	39.62	11.78	87.89	13.99
6	148	51.77	5.14	46.40	12.68	98.24	15.81
Total	502	48.64	5.53	41.61	12.90	90.26	16.44

Table 5.10: Means and standard deviations of scaled scores in achievement tests

Sex	Math.		Tests				df	F math.	F read.	F ach.
	Mean	S.D.	Reading		Acad. Ach.					
			Mean	S.D.	Mean	S.D.				
Boy	48.52	6.05	38.71	13.22	87.18	17.33				
Girl	48.74	5.04	44.16	12.07	92.97	15.13	501	.202	23.34*	15.93*

\*p<.0001

The same results were found for both reading comprehension and academic achievement in relation to socioeconomic status, and these results are presented in Table 5.12 and Table 5.13.

### 2.3 Academic achievement and language background

The means and standard deviations of the achievement tests in English-speaking and non-English-speaking students were compared in Table 5.14. All of the means (mathematics, reading comprehension and academic achievement) of English-speaking students were higher than the means of non-English-speaking students. Although the results of the ANOVA test showed significant differences between all of the means of these two groups of students (English-speaking and non-English-speaking), the difference between means of mathematics was smaller than the means of reading comprehension or academic achievement.

### 2.4 Academic achievement and mother's work

Table 5.15 and Table 5.16 show the means and standard deviations of achievement scaled scores and the results of the ANOVA among two groups of mother's work (working-mother and non-working mother), and mother's job status (part-time and full-time) respectively. After employing the ANOVA, no statistically significant differences were found either between the means of the achievement-test results of working and non-working-mother students or between the means of achievement-test results of part-time and full-time working, among the working-mother students. The similar finding was reported in an American study (Chubb & Moe, 1990).

Table 5.11: Mean and standard deviation of mathematics scaled score in low, middle and high SES

SES	n	Mean	Mathematics scaled score S.D.	Sheffe F-test	df	F
Low SES	167	46.97	5.42	4.33* (Low vs. middle)		
Middle SES	161	48.71	4.73	16.87* (Low vs. high)	465	16.90**
High SES	138	50.55	5.97	4.38* (Middle vs. high)		

\*p<.05      \*\*p<.0001

Table 5.12: Mean and standard deviation of reading comprehension scaled score in low, middle and high SES

SES	n	Mean	Reading comprehension scaled score S.D.	Sheffe F-test	df	F
Low SES	167	37.57	12.39	4.61* (Low vs. middle)		
Middle SES	161	41.71	12.97	18.17* (Low vs. high)	465	18.182**
High SES	138	46.28	12.28	4.91* (Middle vs. high)		

\*p<.05      \*\*p<.0001

Table 5.13: Mean and standard deviation of academic achievement in low, middle and high SES

SES	n	Mean	Academic achievement S.D.	Sheffe F-test	df	F
Low SES	167	85.58	16.08	5.61* (Low vs. middle)		
Middle SES	161	90.42	15.91	22.73* (Low vs. high)	465	22.748**
High SES	138	96.84	15.34	6.11* (middle vs. high)		
*p<.05      **p<.0001						

Table 5.14: Means and standard deviations of achievement scaled scores in English speaking and non-English-speaking background

Lang. back	Tests					
	Math.		Reading		Acad. Ach.	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
Eng. back.	49	5.64	42.67	12.36	91.69	16.10
Non-Eng. back.	47.16	4.97	37.60	14.31	84.76	16.91
*p<.003      **p<.0004      ***p<.0002						
					8.95*	12.67**
						14.59***

Table 5.15: Means and standard deviations of scaled scores in working and non-working mothers

Mother's work	Tests					
	Math. Mean	Math. S.D.	Reading Mean	Reading S.D.	Acad. Ach. Mean	Acad. Ach. S.D.
Working-mother	48.97	5.91	42.22	13.13	91.16	17.30
Non-working-mother	48.04	4.90	40.75	12.66	88.88	15.17
No significant differences						

Table 5.16: Means and standard deviations of scaled scores in job status among working mothers

Job status	Tests					
	Math. Mean	Math. S.D.	Reading Mean	Reading S.D.	Acad. Ach. Mean	Acad. Ach. S.D.
Part-time	49.01	5.58	41.92	13.51	90.86	17.33
Full-time	48.93	6.34	42.62	12.67	91.55	17.33
No significant differences						

## 2.5 Relationships between independent variables and academic achievement

In order to determine the interrelationships between the independent variables of the study (grade, sex, family size, father's occupation, mother's work and language background) and academic achievement (mathematics, reading comprehension and the combination of these two tests), matrix correlation was employed.

In Table 5.17, the correlation coefficients between these variables are presented. Of these 36 coefficients 19 of them showed significant relationships.

As it has been shown in this Table, the grade of the students has significant relationships with socioeconomic status ( $p < .02$ ), mathematics ( $p < .001$ ), reading comprehension ( $p < .02$ ) and academic achievement ( $p < .001$ ). Among these four correlation coefficients, the correlation between grade and mathematics scaled scores was higher than the reading comprehension, academic achievement or socioeconomic status.

In relation to the sex of the students, this variable had significant correlation with father's occupation ( $p < .02$ ), and with reading scaled scores and academic achievement ( $p < .001$ ). Regarding the relationship between sex and father's occupation, the significant correlation means that the number of girls in high-socioeconomic status is greater than the number of boys (in the data analysis, as stated in Chapter 4, boys coded 1 and girls coded 2). Also, in relation to the significant correlation between sex and both reading comprehension scaled scores and academic achievement, it should be pointed out that girls had higher mean scores than boys on both of these variables.

Regarding family size, this variable had a significant correlation only with mother's work ( $p < .001$ ). In other words, among families whose mothers were not working, the



Table 5.17: Matrix correlation between variables \*\*\*

(1) Grade	(2) Sex	(3) Family size	(4) Father's occup.	(5) Mother's work	(6) Lang. back.	(7) Math. S.S.	(8) Read. S.S.	(9) Math+Read S.S.
(1) 1								
(2) -.037	1							
(3) .044	.052	1						
(4) .109*	.133*	-.089	1					
(5) -.011	.074	.181**	-.096#	1				
(6) .039	-.064	.07	.025	-.094#	1			
(7) .376**	.012	-.027	.263**	-.071	.121*	1		
(8) .143*	.207**	-.047	.266**	-.053	.164*	.486**	1	
(9) .239**	.172**	-.047	.297**	-.061	.171*	.714**	.957**	1

#p<.05      \*p<.02      \*\*p<.001

\*\*\*

In this Table and subsequent Tables the point-biserial correlation was used for determining the association between dichotomous variables and continuous variables; and phi correlation was used for determining the relationship between two dichotomous variables.

number of their children was greater than families whose mothers were working (in the data analysis, as pointed out in Chapter 4, mothers who worked were coded 1, and mothers who did not work were coded 2).

Also, father's occupation, as a representative of socioeconomic status in this study, had a significant correlation with all achievement variables: mathematics, reading comprehension and academic achievement ( $p < .001$ ). In other words, the socioeconomic status of the family was positively associated with mathematics scores, reading comprehension and academic achievement. Also, a slight significant negative correlation was found between socioeconomic status of the family and mother's work ( $p < .05$ ). In other words, the number of mothers who were working was greater than the number of mothers who was not working among the high-socioeconomic-status families.

In relation to language background of the family, as expected, this variable correlated significantly with all indices of achievement ( $p < .02$ ). In this regard, it can be stated that English-language background of family had a positive association with higher scores in mathematics, reading comprehension and academic achievement (in the data analysis, as stated in Chapter 4, non-English-speaking families were coded 1 and English-speaking families were coded 2).

Regarding the significant intercorrelations of the three indices of achievement (mathematics score, reading comprehension and combination of these two tests or academic achievement), the reading- comprehension test scores had more shared variance than mathematics-test scores with academic achievement.

In summary, this analysis showed that grade of students, father's occupation or socioeconomic status, and language background of the students had significant associations with all indices of achievement, while sex of the students significantly correlated with reading comprehension and academic achievement. It is noted mathematics was not associated with the sex of the students.

In the next chapter (Chapter 6), the results of locus of control in relation to the independent variables of the study and academic achievement will be presented.

## **Chapter 6**

### **Results: Locus of control and its relation to family background and academic achievement**

#### **1. Locus of control in relation to independent variables**

In this section, results concerning locus of control in relation to grade, sex, socioeconomic status, language background and mother's work will be presented.

##### **1.1 Locus of control and grade of the student**

Distribution of the locus-of-control means and standard deviations according to the students' grades is presented in Table 6.1. As is shown, when the grade increases from Years Three through Six the locus-of-control mean consistently decreases. In other words, with increasing age, the internality will be increased.

Also, the difference between means of locus of control in various grade levels were tested by ANOVA and the results of this test have indicated in Table 6.2.

**Table 6.1: Mean and standard deviation of LOC in Grade 3-6**

Grade	n	LOC Mean	S.D.
3	91	17.75	4.18
4	120	17.53	4.90
5	143	16.34	4.23
6	148	15.49	4.42
Total	502	16.63	4.53

**Table 6.2: Comparison of LOC means by ANOVA in various grade levels**

Grade	n	Mean	Sheffe F-test	Sig. levels
3rd and 4th	91 120	17.75 17.53	.43	No sig.
3rd and 5th	91 143	17.75 16.34	1.85	No sig.
3rd and 6th	91 148	17.75 15.49	4.825	.05
4th and 5th	120 143	17.53 16.34	1.54	No sig.
4th and 6th	120 148	17.53 15.49	4.61	.05
5th and 6th	143 148	16.34 15.49	.884	No sig.

As is shown in this Table only the differences between Years Three and Six, and Years Four and Six were statistically significant ( $p<.05$ ). However, the general result of ANOVA that is presented in Table 6.3 showed statistically significant differences between means of locus of control across various grades ( $p<.0001$ ).

**Table 6.3: Summary of ANOVA (LOC in various grade levels)**

Source of variance	df	Mean Square	F	p
Between groups	3	137.59	6.956	.0001
Within groups	498	19.78		
Total	501			

**Table 6.4: Mean and standard deviation of LOC in boys and girls**

Sex	n	LOC		df	F
		Mean	S.D.		
Boys	235	16.57	4.58	501	.087
Girls	267	16.68	4.48		

No significant difference

## 1.2 Locus of control and sex

As is shown in Table 6.4, the girls' locus-of-control mean is greater than boys' locus-of-control mean, but the difference between these two means was not statistically significant.

## 1.3 Locus of control and socioeconomic status

As pointed out in the previous chapter, fathers' occupations were condensed into three categories, termed low-, middle- and high-socioeconomic status. In Table 6.5, the mean and standard deviation of the locus of control in each of these three levels of socioeconomic status is presented and the differences between them were tested by ANOVA.

The result indicated that the mean of locus of control decreases with socioeconomic status from low to high levels of socioeconomic status. In other words, internal locus-of-control attitude increases with socioeconomic status from low to high levels. The ANOVA analysis showed significant differences between different levels of socioeconomic status regarding the locus-of-control attitude ( $p < .0008$ ). However, in testing the direction of differences, the Sheffe F-test, also indicated in the Table 6.5, showed significant differences between low-socioeconomic and high-socioeconomic status ( $p < .05$ ), and also between middle- socioeconomic and high-socioeconomic status ( $p < .05$ ).

Table 6.5: Means and standard deviations of LOC at three levels of SES

SES	n	Mean	LOC	S.D.	Scheff F-test	df	F
Low SES	167	17.31		4.58	.547 (Low v.s middle SES)		
Middle SES	161	16.79		4.3	7.179* (Low v.s high SES)	465	7.531**
High SES	138	15.36		4.52	3.815* (Middle v.s high SES)		
*p<.05	**p<.0008						



#### 1.4 Locus of control and language background

The means and standard deviations of locus of control in English-speaking and non-English-speaking backgrounds were compared in Table 6.6. The mean of locus of control in the non-English-speaking background was higher than the mean of the English-speaking background. This finding shows that non-English-speaking group had a more external-locus-of-control attitude than the English-speaking group, and the difference between these two means was statistically significant ( $p < .05$ ).

#### 1.5 Locus of control and mother's work

Table 6.7 and Table 6.8 show the means and standard deviations of locus of control and the results of the ANOVA among two groups of mothers' work (working mother and non-working mother), and mother's job status (part-time and full-time), respectively. Although the mean of locus of control among students whose mothers were not working was greater than for those students whose mothers were working, the difference was not statistically significant. Also, the mean locus-of-control score among students whose mothers were working on a part-time basis was greater than those students whose mothers were working on a full-time basis. Again this difference was not statistically significant.

**Table 6.6: Mean and standard deviation of LOC in English-speaking and non-English-speaking background**

Lang. back.	n	LOC		df	F
		Mean	S.D.		
English-speaking	396	16.37	4.56	496	6.497*
Non-English speaking	101	17.65	4.32		

\*p<.05

**Table 6.7: Mean and standard deviation of LOC for children with working mothers and non-working mothers**

Mothers' work	n	LOC		df	F
		Mean	S.D.		
Working-mothers	300	16.4	4.63	494	1.551
Non-working mothers	195	16.92	4.34		

No significant difference

**Table 6.8: Mean and standard deviation of LOC in job status among working mothers**

Job status	n	LOC		df	F
		Mean	S.D.		
Part-time	169	16.43	4.50	299	.012
Full-time mother	131	16.37	4.81		

No significant difference

### 1.6 Relationship of locus of control with other variables of the study

Matrix correlation was used in order to find the relationships between various independent variables of the study with the locus-of-control score, and the result of this analysis is shown in Table 6.9.

As is shown in this Table the grade of students had a negative correlation with locus of control ( $p<.001$ ). This negative correlation means that increasing age is associated with the development of an internal attitude among students.

Regarding fathers' occupation or socioeconomic status, this variable also had a negative and significant correlation with locus of control ( $p<.001$ ). In other words, low-socioeconomic status is associated with external locus of control, or high-socioeconomic status is associated with internal locus of control.

Table 6.9: Correlation of LOC with the other variables

Grade	Sex	Family size	Father's occup.	Mother's work	Lang. back.	Math. S.S.	Read. S.S.	Acad. S.S.
LOC	-.193**	.027	.028	-.18**	.039	-.106*	-.295**	-.253**
								-.299**
*p<.02      **p<.001								

In relation to language background of the family, a significant negative correlation was found with locus of control ( $p<.02$ ). This significant negative correlation means that the proportion of students from non-English-speaking backgrounds who had an external locus-of-control attitude is greater than the proportion of students from English-speaking backgrounds.

Regarding locus of control and its association with achievement tests, as expected, this variable negatively correlated with all indices of achievement ( $p<.001$ ). These negative correlations mean the greater achievement score is associated with more internality on the locus-of-control measure. In this regard, the mathematics-test results are more associated with locus of control than the reading-comprehension test results.

The relationships between achievement tests and locus of control according to various grades are presented in Table 6.10. According to this Table, the relationship between each achievement index with locus of control is significantly correlated in each grade, except for the mathematics in Year Five.

**Table 6.10: Pearson product-moment correlation between achievement tests and LOC in Grades 3-6**

Grade	n	Mathematics	Reading	Acad. ach.
3	91	-.268*	-.316**	-.341***
4	120	-.354***	-.195#	-.274**
5	143	-.15	-.205*	-.221*
6	148	-.329***	-.316***	-.356***
Total	502	-.333***	-.277***	-.33***

#p<.05      \*p<.02      \*\*p<.005      \*\*\*p<.001

2. Academic achievement and its relation to locus of control in different sexes

In Table 6.11, the product moment correlation between all indices of achievement tests and locus of control in boys and girls are presented. As is shown in this Table, all of these correlations were statistically significant ( $p<.001$ ). Also, the correlations between all indices of achievement tests and locus of control among boys were higher than among girls.

**Table 6.11: Pearson product-moment correlation between achievement tests and LOC in boys and girls**

Sex	n	Mathematics	Reading	Acad. ach
Boys	235	-.374*	-.338*	-.392*
Girls	267	-.291*	-.235*	-.283*

\*p<.001

3. Comparison of academic achievement in internal-external locus of control

In order to compare the means of various achievement indices between students who had an internal locus-of-control attitude and those who had an external locus-of-control attitude, the students in the sample were categorized into two groups. The basis for this classification was the mean of the locus-of-control measure for all of the students. In other words, those students whose scores were below the mean of the locus of control were assigned to the internal locus-of- control group, and those whose scores were above the mean of the locus of control were assigned into external locus-of- control group. After this classification, 238 students were located in the internal group, and 264 students were located in the external group. In Table 6.12, Table 6.13 and Table 6.14 the mean of the achievement-test scores of the internal locus-of-control students was compared with the mean scores of the external locus-of-control students in mathematics, reading comprehension and academic achievement respectively.

As indicated in these Tables, the mean of achievement-test scores for internal locus-of-control students was greater than the mean for external locus-of-control students. Also,

the difference between each achievement-test mean for internals and externals was statistically significant, according to the ANOVA analysis ( $p<.0001$ ).

4. Comparison of locus of control between high achievers and low achievers

For comparison of the locus-of-control means between high-achieving students and low-achieving students, the students were categorized into two groups, on the basis of their academic achievement scores. Those students whose academic achievement scores were below the mean of the sample were assigned to the low-achieving group, and those whose academic achievement scores were above the mean of the sample were assigned to the high-achieving group.

**Table 6.12: Comparison of mathematics means in internal and external LOC groups**

LOC	n	Mean	S.D.	df	F
Internal	238	50.26	5.48	501	42.133*
External	264	47.17	5.17		

\* $p<.0001$



**Table 6.13: Comparison of reading comprehension means in internal and external LOC groups**

LOC	n	Mean	S.D.	df	F
Internal	238	44.45	12.82	501	22.998*
External	264	39.04	12.45		

\*p<.0001

**Table 6.14: Comparison of academic achievement means in internal and external LOC groups**

LOC	n	Mean	S.D.	df	F
Internal	238	94.71	16.32	501	35.539*
External	264	86.24	15.51		

\*p<.0001

**Table 6.15: Comparison of LOC means in high and low achiever groups**

Academic achievement	n	Mean	S.D.	df	F
High-achiever	256	15.44	4.38	501	38.432*
Low-achiever	246	17.86	4.35		

\*p<.0001

After this categorization, as is shown in Table 6.15, 256 students were assigned to the high-achiever group and 246 students were assigned to the low-achiever group. As indicated in this Table, the mean of locus of control in the high-achieving group was lower than the mean of locus of control in the low-achieving group. Also, the result of the ANOVA analysis showed a significant difference regarding locus-of-control means between high-achiever and low-achiever groups ( $p<.0001$ ). In other words, high-achieving students had a more internal-locus-of-control attitude than low-achieving students.

### 5. Family size, locus of control and academic achievement

Family size, or the number of brothers or sisters of the subjects, is another variable of the study. In order to test the differences of the means of family size regarding both internal-external locus of control and high or low achievers, a two-way ANOVA was employed. In other words, on one hand, the mean of family size among internals and externals and, on the other hand, the mean of family size among high achievers and low achievers were compared. As is shown in Table 6.16, no significant differences were found either between internals and externals, or between high achievers and low achievers. Also, no interaction was found between variables.

**Table 6.16: Two-factor ANOVA (Int-Ext LOC and high versus low achievers) on family size**

Source	df	Mean Square	F-test	Sig. level
Int-Ext. LOC (A)	1	.305	.22	No sig.
High-Low achiever (B)	1	2.699	1.95	No sig.
AB	1	.743	.537	No sig
Within group	488	1.384		

#### 6. Summary of the above results

In summary, the mean of locus of control consistently decreased with increasing grade or age of the students. In other words, internality increased with grade or age of the students, and the overall differences between means of locus of control across grade or age of the students were statistically significant ( $p<.001$ ).

Also, significant differences were observed between the means of locus-of-control scores in relation to the English-speaking group verses the non-English-speaking group ( $p<.05$ ), and various socioeconomic status levels ( $p<.0008$ ). However, the means of locus-of-control scores between working-mother students and non-working-mother students, and mother's job status, were not statistically significant.

Regarding the relationships of the locus-of-control scores with other variables of the study, this variable significantly correlated with grade, socioeconomic status, language

background, and all indices of achievement (mathematics, reading comprehension and academic achievement). Also, the locus-of-control scores significantly correlated with all indices of achievement across grade of students, except for mathematics in Grade Five.

The results also showed that, when the students were divided into internals and externals, on the basis of the mean of the locus-of-control scores, there were found statistically significant differences between their performance on all indices of achievement (mathematics, reading comprehension and academic achievement) ( $p < .0001$ ). The direction of the difference showed that the achievement means of internals were greater than the means of externals. In addition, when the students were categorized into high achievers and low achievers, on the basis of the mean of the academic achievement, their locus-of-control means were statistically significant ( $p < .0001$ ).

However, no statistically significant interactions were found regarding the independent variables of the study (grade, sex, socioeconomic status, language background, and mother's work) on one hand, and high versus low achievers on the other hand, on the locus-of-control scores. Also, no statistically significant interactions were found in relation to the independent variables of the study on one hand, and the internal-external students on the other hand, on the academic achievement scaled scores.

Regarding the size of the students' families, the results showed that this variable did not associate either with the academic achievement of the students or with their locus of control. Also, no interaction was found in relation to internal-external and high versus low achievers in terms of the family size.

In the next chapter, (Chapter 7), the results of testing for any prediction of academic achievement and locus of control from the independent variables of the study are presented, together with the result of path analysis regarding the variables of the study and the effects of academic-achievement feedback on locus of control.

## Chapter 7

### **Results: Prediction of academic achievement and locus of control, and the effects of academic-achievement feedback on the locus of control**

First, in this chapter, the results of a regression analysis carried out to predict academic achievement and locus of control from the independent variables of the study will be presented. In other words, first the models (Models 1, 2, 3, and 4) that were presented in Chapter 4, will be tested. Secondly, in order to test Model 5, that was presented in Chapter 4, the results of a path analysis and finally, the results of academic achievement feedback on the locus of control, will be presented. Before presenting the above results, it seems necessary to have a brief review on statistical methods which are used in this chapter.

The basic task of science is to explain natural phenomena. Natural phenomena, particularly the phenomena and constructs of behavioural science such as academic achievement, socioeconomic status, reinforcement, learning and so on, are complex. By 'complex', in this regard, is meant that any phenomenon has many facets and many causes. In other words, 'complex' means that a phenomenon might have many sources of variation. Therefore in order to study a phenomenon, a construct or a variable scientifically a researcher must be able to identify the sources of variation of that variable. Stated differently, a scientist is basically concerned to explain variance. In other words, he or she tries to explain the variability of a target construct, called the

dependent variable, and its relations with other variables, called independent variables (Pedhazur, 1982).

The statistical technique that is called 'analysis of variance' is a well known procedure to behavioural scientists for analyzing the data and for explaining the variability of a construct. By means of this technique researchers are able to identify and to predict the variation in a dependent variable that is due to various independent variables. Another statistical technique called regression analysis, has been used less frequently by behavioural scientists, for example in educational studies, although this technique has some advantages over 'analysis of variance'.

Generally speaking, by means of regression analysis a researcher can analyze the variability of a dependent (endogenous) variable by resorting to information that is available from one or more independent (exogenous) variables. In other words, the researchers seeks to find changes in the dependent variable as a result of changes observed in the independent variables. Stated differently, the aim of this analysis is to determine how and to what extent variation in the dependent variable depends on manipulation of the independent variables (Pedhazur, 1982).

In regression analysis, when only one independent variable is involved in the study, the analysis is called 'simple regression'. When more than one independent variable is used in the study, the analysis is called 'multiple-regression analysis'. Of course in this case, it is possible to use simple regression analysis to each of the independent variables and the dependent variable. But it should be noted that the independent variables may be intercorrelated, or they may interact in their effects on the dependent variable. However, in this case, the application of 'multiple regression analysis' is recommended, because by means of this technique the researcher can analyze the

collective and separate effects of two or more independent variables on a dependent variable (Pedhazur, 1982).

In other words, by multiple-regression analysis, not only can we determine the effect of each independent variable on a dependent variable separately, but also we can determine the total effects of the independent variables on the dependent variable. The coefficient determination, denoted by  $R^2$ , represents the proportion of the total variation in a dependent variable that is explained by the independent variable of the study (Jobson, 1991). The square root of  $R^2$ , indicated by  $R$ , or the coefficient of multiple correlation, is equivalent to Pearson correlation (Jobson, 1991). During the interpretation the results of a multiple-regression analysis model, the investigator usually is interested in comparing the regression coefficients. The size of the regression coefficient depends on the scales of measurement used for the dependent variable and the independent variables which are involved in the model (Jobson, 1991). Two kinds of regression coefficients are presented after the analysis: the unstandardized coefficient and the standardized coefficient. Therefore, when the investigator intends to compare the size of the effect of each independent variable on the dependent variable, it is necessary to standardize the independent variables. In other words, in order to make meaningful comparisons, the researcher should compare the size of the standardized regression coefficients (Jobson, 1991).

Another kind of regression analysis is possible by means of the 'stepwise regression method'. This method is a sequential process in which the data are analyzed step by step, and at each step a single independent variable is added to the model. In this process, the selection procedure starts with no independent variables in the model and then sequentially adds one variable to the model, according to some stated criterion (Jobson, 1991). The first variable that is included in the model is the variable which has the most significant effect in determination of the dependent variable. In other



words, at the first step, the variable is added to the model whose partial F-statistic has the smallest p-value (Jobson, 1991). This process will be continued until all of the independent variables which have significant effect in the determination of the independent variable are included in the model. It should be noted that, when a variable is entered in the model it will remain throughout the process (Jobson, 1991).

Multiple-regression analysis, particularly in a complex model, has some advantages over analysis of variance. Some of these advantages are as follows:

First, in an analysis of variance, the independent variables of a study should be originally nominal (like sex or race), or the investigator should first categorize them and then apply the analysis of variance technique. Multiple regression is flexible enough to accept both nominal or categorized variables and continuous variables. Stated differently, categorical and continuous variables are treated alike in multiple regression. In addition, in analysis of variance when the investigator categorizes a continuous variable (like academic-achievement scores) into categorized variables (like, above average, average and below average), he or she may lose some information on this variable.

Secondly, in the analysis of variance technique, it is assumed that the independent variables involved in the study are uncorrelated. However, in a behavioural science like education, psychology or sociology, this assumption will probably not be satisfied, particularly in a non-experimental situation, because most of the independent variables that are involved in behavioural science are intercorrelated. This problem will be more serious when more than two independent variables are involved in the model. However, this problem may be solved when a multiple regression analysis is applied to the data. In other words, multiple regression can effectively analyze the variables that are correlated with each other (Kerlinger, 1986).

Finally, in the process of analysis of the data, the researcher is interested in comparing the results of various groups that are involved in his or her study and usually the number of the subjects in one group is not necessarily equal to the number of the subjects in the other group or groups. In this regard, Kerlinger (1986) stated that:

Moreover, if there are unequal n's in the groups, analysis of variance becomes still more inappropriate because unequal n's also introduce correlations between independent variables. The analytic procedure of multiple regression, on the other hand, takes cognizance, so to speak, of the correlation among the independent variables as well as between the independent variables and the dependent variables. (p. 558)

Therefore, in regard to the above points, there are many problems in the way of the analysis of data that analysis of variance cannot handle easily, but can be fairly handled with multiple-regression analysis.

### **1. Prediction of academic achievement from independent variables of the study**

The result of the multiple-regression analysis, in order to predict academic achievement from the independent variables of the study (grade, sex, socioeconomic status, family size, mother's work and language background), is shown in Table 7.1. As is shown in this Table, four independent variables had significant contributions in predicting academic achievement. The standardized regression coefficient showed the

size of the effect for each independent variable in predicting academic achievement. Therefore, according to these coefficients, socioeconomic status of the family, grade of the students, language background of the family and sex of the students had significant contributions in predicting academic achievement, respectively according to the size of effects. However, neither family size nor mother's work had a significant effect in predicting academic achievement.

**Table 7.1: Regression coefficient, and standard error (in parentheses) of the independent predictors of academic achievement**

Predictors	Academic achievement		Sig. level Beta weight
	Unstandardized coefficient	Standardized coefficient	
Grade	3.245 (.646)	.215	.0001
Sex	5.334 (1.414)	.163	.0002
SES	2.266 (.41)	.241	.0001
Family size	-.715 (.617)	-.051	No sig.
Mother's work	-.924 (1.467)	-.028	No sig.
Lang. back.	6.921 (1.769)	.168	.0001
Intercept	55.939		
n	460		
R	.429		
R-Squared	.184		
p (predictive equation)	.0001		

The strength of association between academic achievement and the independent variables of the study, or coefficient of determination (R-Squared), indicated that 18.4

percent of variation of academic achievement can be explained by the independent variables.

## **2. Prediction of locus of control from independent variables**

In Table 7.2, the results of the multiple-regression analysis regarding locus of control as a dependent variable in relation to the independent variables of the study is presented. In this regression analysis, it has been shown that three independent variables of the study made significant contributions in predicting locus of control. According to the standardized regression coefficients, grade, socioeconomic status and language background of the family made significant contributions in predicting locus of control, respectively according to the size of effects. In this analysis sex, family size and mother's work had no significant contribution in predicting locus of control.

The coefficient of determination (R-Squared) indicated that only 7.4 percent of variation of locus of control is explained by the independent variables of the study. In other words, variation of locus of control might be explained by other variables, such as school environment, that will be explained in Chapter 8.

**Table 7.2: Regression coefficient and standard error (in parentheses) of the independent predictors of the locus of control**

Predictors	Locus of control		Sig. level Beta weight
	Unstandardized coefficient	Standardized coefficient	
Grade	-.711 (.189)	-.172	.0002
Sex	.305 (.413)	.034	No sig.
SES	-.413 (.12)	.16	.0006
Family size	.095 (.18)	.024	No sig.
Mother's work	.089 (.429)	.01	No sig.
Lang. back.	-1.056 (.517)	-.094	.05
Intercept	20.933		
n	460		
R	.272		
R-Squared	.074		
p (predictive equation)	.0001		

**3. Prediction of academic achievement from the independent variables (including locus of control)**

The locus of control as an independent variable was added to the previous independent variables (grade, sex, socioeconomic status, family size, mother's work and language background) and then the stepwise regression analysis was employed in order to predict academic achievement. The aims of this analysis were first, to determine the contribution of each independent variable in predicting academic

achievement, and secondly, to determine how much the coefficient of determination for academic achievement would be increased by adding the locus-of-control variable.

The results, in Table 7.3, showed that all of the independent variables, except family size and mother's work, had a significant contribution in predicting academic achievement.

The results further showed that, among the independent variables, the best predictor of academic achievement was locus of control, and then socioeconomic status of the family, grade, sex and language background, in that order.

In addition, the coefficient of determination (R-Squared) showed that 22.3 percent of variation of academic achievement can be explained by the independent variables. Stated differently, if the locus of control was added to the previous independent variables (independent variables in Table 7.1), it can be concluded that 8.9 percent would be added to the variation of academic achievement that was explained by the previous independent variables. Also, as is shown in this table, more than half of the variation of academic achievement (15.1 percent of a total of 22.3 percent) can be explained by the locus of control and socioeconomic status of the family in this model.

#### **4. Prediction of locus of control from independent variables (including academic achievement)**

In Table 7.4, academic achievement as an independent variable was added to the previous or the original independent variables in order to predict the locus of control. Again, the purposes of this analysis are to determine, first, the contribution of each

**Table 7.3**  
**Stepwise regression coefficient of the independent predictors (including LOC) of academic achievement**  
**(n=460)**

Predictors Coef.	Academic achievement									
	1	2	3	4	5					
	F	Stan. Coef. +	F	Stan. Coef.	F	Stan. Coef.	F	Stan. Coef.	F	Stan.
LOC	44.91*	-.299	33.501*	-.254	25.894*	-.223	28.236*	-.23	25.198*	-.216
SES			32.972*	.252	30.409*	.239	25.05*	.216	25.19*	.214
Grade					15.417*	.17	17.108*	.177	17.067*	.175
Sex							13.51*	.156	15.477*	.165
Lang. back.									12.372#	.147
R	.299		.388		.422		.45		.472	
R-Square	.089		.151		.178		.202		.223	
p (predictive equation)	.0001		.0001		.0001		.0001		.0001	

\*p< .0001 #p<.0005

+ Standard Coefficient

independent variable in predicting the locus of control, and secondly, to determine the increasing rate of the coefficient of determination for locus of control as a dependent variable.

The results showed that grade, socioeconomic status and academic achievement made significant contributions to predicting the locus-of-control variable. Among these three variables, academic achievement had the greatest contribution in predicting the locus of control. After academic achievement, the grade of the students and the socioeconomic status of the family respectively made significant contributions to predicting the locus of control. In this analysis, the language background variable, in contrast to the previous analysis, that was presented in Table 7.2, had no significant contribution when academic achievement was entered into the analysis. In addition the coefficient of determination indicated that 11.3 percent of variation of locus of control is explained by the independent variables (including academic achievement). Also, it can be concluded that 8.9 percent of variation of locus of control can be explained only by the academic-achievement variable.

## **5. Causal model of academic achievement**

As mentioned in Chapter 4, in order to test the model that was presented in Chapter 4, two multiple regression analyses were used, and the intercorrelation between independent variables was also calculated in order to determine the relationship between independent (exogenous) variables. The results of one of these multiple regression analyses have already been shown in Table 7.2, in which the locus of control variable was regressed on the independent variables of the study. The results of the second one is indicated in Table 7.5, in which the academic achievement variable was regressed on the independent variables of the study (including locus of control). Also, as mentioned in Chapter 4, in order to determine the indirect effect of



Table 7.4  
Stepwise regression coefficient of the independent predictors (including academic achievement)  
of locus of control

Predictors	Locus of control					
	1	2	3			
	F	Stan. Coef.+	F	Stan. Coef.	F	Stan. Coef.
Acad.Ach.	44.91**	-.299	34.57**	-.268	25.849**	-.241
Grade			7.993*	-.129	7.576*	-.125
SES					4.168#	-.094
R	.299		.324		.336	
R-Square	.089		.105		.113	
p (predictive equation)	.0001		.0001		.0001	

\*\*p<.0001    \*p<.001    #p<.05

+ Standard coefficient

independent (exogenous) variables on dependent (endogenous) variables, the results of intercorrelation among the independent variables is presented in Table 7.6.

In order to test the model that was presented in Chapter 4, each of the variables that had a significant contribution in predicting both locus of control or academic achievement shows in the model by a unidirectional arrow from independent (exogenous) variable towards dependent (endogenous) variables. It should be noted that in this model independent or exogenous variables are grade, sex, family size, socioeconomic status, mother's work and language background. Again in this model dependent or endogenous variables are locus of control and academic achievement. Therefore, in this model the unidirectional arrows show causal direction from each exogenous variables toward each endogenous variables.

**Table 7.5: Regression coefficient, standard error (in parentheses) of the independent predictors (including LOC) of the academic achievement**

Predictors	Academic achievement		Sig. level Beta weight
	Unstandardized coefficient	Standardized coefficient	
Grade	2.69 (.64)	.178	.0001
Sex	5.572 (1.379)	.17	.0001
SES	1.944 (.405)	.207	.0001
Family size	-.641 (.601)	-.045	No sig
Mother's work	-.855 (1.43)	-.025	No sig.
Lang. back.	6.096 (1.732)	.148	.0005
LOC	-.781 (.157)	-.214	.0001
Intercept	72.281		
n	460		
R	.467		
R-Squared	.226		
p (predictive equation).	.0001		

Table 7.6: Intercorrelations between exogenous variables

	Grade	Sex	SES	Family size	Mother's work	Lang. back.
Grade	1					
Sex	-.037	1				
SES	.109*	.133**	1			
Family size	.044	.052	-.089#	1		
Mother's work	.011	.074	-.096#	.181***	1	
Lang. back	.039	-.064	.025	.07	-.094#	1
#p<.05	*p<.025	**p<.005	***p<.0005			

On the other hand, interrelationships between exogenous variables are indicated by arrowheads at both ends (bidirectional) among independent or exogenous variables. It should be mentioned that in this model the locus of control is an exogenous variable in the first stage, while it is conceived as an independent or exogenous variable in the second stage, in which it is also an exogenous variable in relation to academic achievement.

Stated differently, in order to calculate the path coefficient for causal inferences depicted in the model, first, variable 7 (locus of control) is regressed on variables 1 (family size), 2 (sex), 3 (SES), 4 (grade), 5 (mother's work), and 6 (language background) and secondly, variable 8 (academic achievement) is regressed on variables 1, 2, 3, 4, 5, 6, and 7.

After the analysis of the data, all of the significant coefficients (both correlation coefficients and path coefficients) are shown in Figure 7. 1.

As shown in this Figure, among the exogenous variables, three of them had significant direct effects on the determination of locus of control. These three variables were grade, socioeconomic status and language background. As is shown in the Figure, the other remaining exogenous variables, family size, sex and mother's work, have indirect effects on the locus of control through their significant correlations with the other exogenous variables. For example, family size, sex, and mother's work had indirect effects on locus of control through their significant correlations with socioeconomic status; or mother's work had indirect effect on the locus of control through its significant correlation with language background.

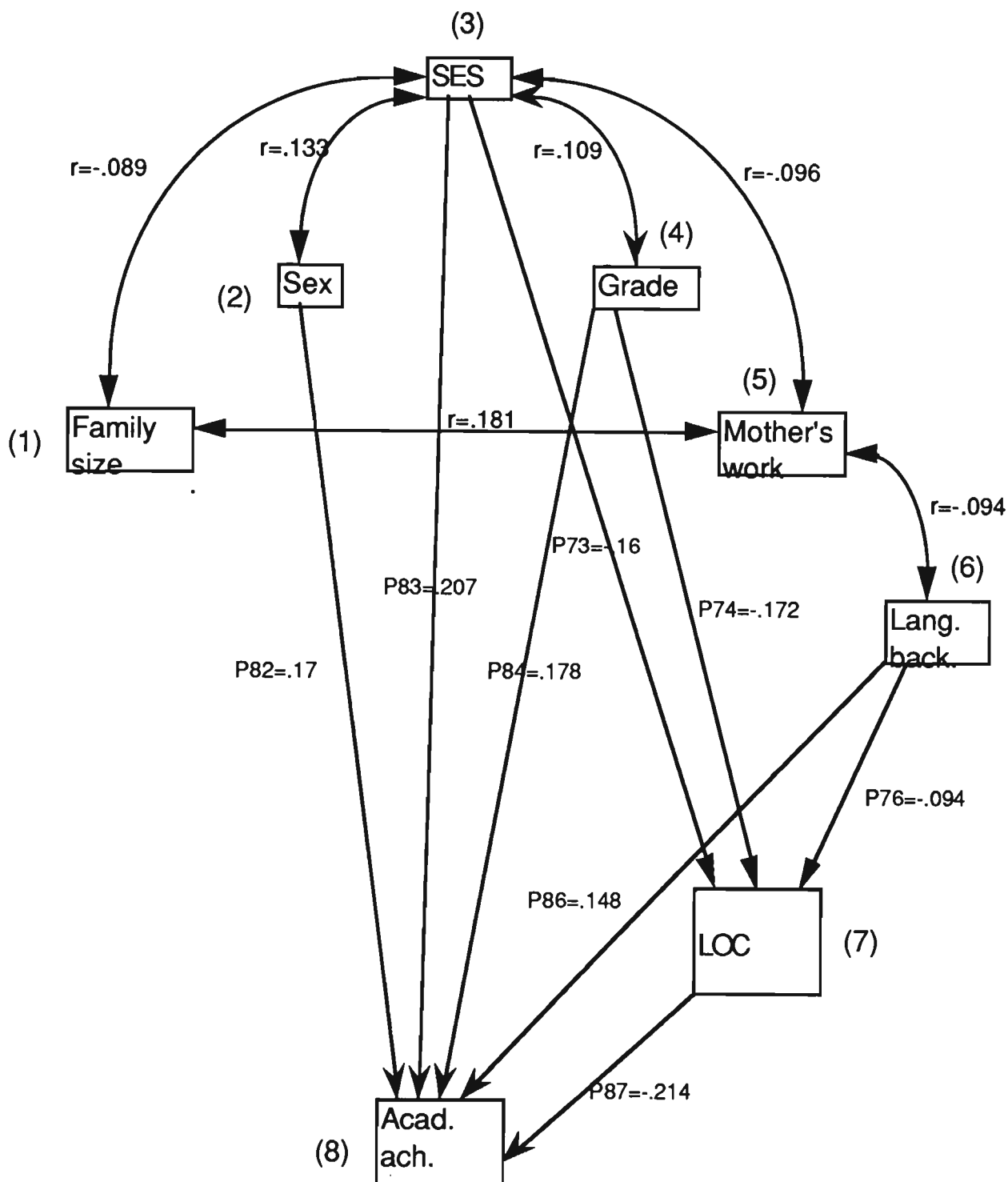


Figure 7. 1: Causal model of academic achievement (modified)

On the other hand, significant direct effects of academic achievement were contributed by sex, socioeconomic status, grade, language background and locus of control. Surprisingly, when the path coefficients of these variables were compared to each other, the direct effect of locus of control on academic achievement was greater than were the effects of each of the other exogenous variables, even more than socioeconomic status.

After the locus of control, socioeconomic status, grade, sex and language background had significant direct effects on academic achievement, in that order.

Again, the remaining exogenous variables, family size and mother's work, had indirect effects on academic achievement through their significant correlations with the other exogenous variables. For example, family size and mother's work had indirect effects on academic achievement through their significant correlations with socioeconomic status; or mother's work had an indirect effect on academic achievement through its significant association with language background.

However, it should be noted that, in this case, the possibility of a Type I error (accepting false hypothesis) becomes greater, because there are many correlations or comparisons involved in the analysis.

The same path-analysis for mathematics achievement and reading achievement is presented separately in the Appendix C at the end of the thesis.

## **6. Academic-achievement feedback and its effects on locus of control**

As pointed out in Chapter 4, in order to test the effects of academic-achievement feedback on locus of control, two schools, out of six schools in the original study,

were selected randomly and after administration of the achievement tests the locus-of-control scale was administered to all of the students (LOC1). After three weeks, in one of these schools the general results (group-achievement feedback) regarding their achievement tests were given to them. Then, after the feedback, the locus-of-control questionnaire was administered again to the students (LOC2). In the second school, also after three weeks, the locus-of-control scale was administered again without reporting the general results of achievement tests to the students.

In Tables 7. 7, 7. 8 and 7. 9, the characteristics of both non-feedback and feedback groups in regard to academic achievement (in terms of mathematics and reading raw scores), LOC1 score (first administration of LOC), socioeconomic status and language background are presented respectively. As is shown in Table 7.7, there were no significant differences between the means of two groups in terms of academic achievement (either mathematics or reading raw scores). But in regard to LOC1, there was a significant difference between the means of the LOC1 score in the two groups. In other words, the feedback group, before the administration of group feedback, was more external than the non-feedback group ( $df=183$ ,  $F=10.665$ ,  $p<.05$ ).

Table 7. 7  
Means of raw scores (mathematics and reading) and LOC1 in  
feedback and non-feedback groups.

Groups	n	Mean math.	Mean read.	Mean LOC1	df	F test math.	F-test read.	F-test LOC1
Non-feedback	108	32.18	14.85	15.82	185	.442	1.726	10.665*
Feedback	78	31.30	13.81	17.83				

\*p<.05



Socioeconomic status of the subjects was measured in terms of father's occupation and it was coded according to the Australian National six-point scale of occupation (Broom, Jones, Jones & McDonnell, 1977). Then, this coding was condensed into three main categories as low (unskilled and semiskilled), middle (skilled and clerical) and high (managerial and professional) socioeconomic status. As shown in Table 7.8, there were no significant differences between the distribution of socioeconomic status of the students in two groups.

**Table 7.8**  
**Distribution of socioeconomic status of the students in non-feedback and feedback groups**

Groups	Low	SES Middle	High	Total
Non-feedback	36	33	37	106
Expected	35.72	34.57	35.72	
Feedback	26	27	25	78
Expected	26.28	25.43	26.28	
Total	62	60	62	184

$\chi^2=.281$        $df=1$     No significant difference

In addition, the language background of the students in terms of other languages, beside English, that they speak at home was measured and according to this variable the students were categorized into either English-speaking or non-English-speaking backgrounds. Comparison of the distributions of English speaking with non-English-speaking backgrounds in non-feedback and feedback groups, that is presented in Table 7.9, showed that there was a significant difference between these two groups ( $df=1$ ,  $\chi=24.03$ ,  $p<.0001$ ). In other words, there were significantly more non-

English-speaking students in the feedback group than in the non-feedback group. However, all of the students in both groups were proficient communicators in English.

**Table 7.9**  
**Distribution of language background of the students in non-feedback and feedback groups**

Groups	Language background		Total
	English speaking	Non-English speaking	
Non-feedback	96	12	108
Expected	81.87	26.13	
Feedback	45	33	78
Expected	59.13	18.87	
Total	141	45	186

$\chi^2=24.03$        $df=1$        $p<.0001$

In spite of some differences in regard to the LOC1 and the language background of the students, the two groups are relatively equal in regard to their academic achievement and socioeconomic status. It seems that these two groups are appropriate for the purpose of this study.

It should be noted that in the feedback group the general results in Years 3 and 5 were all above the means of the normative data, in Year 6 the general result of mathematics was above the mean of normative data and in reading was slightly below the mean of normative data, but in Year 4 the results in both reading and mathematics were below the means of the normative data. The raw-score means of the classes in both feedback and non-feedback groups by comparison with approximate means of normative data are presented in Table 7.10.

**Table 7.10**  
**Means of raw scores (reading and mathematics) in feedback and non-feedback group by comparison with approximate means of normative data**

Year	Feedback group		Non-feedback group		Norm	
	Mean math.	Mean read.	Mean math.	Mean read.	Mean math.	Mean read.
3	32.67 (n=15)	14.2 (n=15)	30.18 (n=28)	15.21 (n=28)	28	12
4	33.21 (n=19)	12.84 (n=19)	38.77 (n=26)	16.58 (n=26)	36	17
5	27.47 (n=30)	14.47 (n=30)	26.47 (n=19)	15.47 (n=19)	23	13
6	35.43 (n=14)	13.29 (n=14)	31.94 (n=34)	12.88 (n=34)	31	14

Subsequently, in order to find the interaction effect of LOC in the first administration (LOC1) and type of feedback on LOC2, all of the subjects in the feedback group were divided into external or internal LOC on the basis of the mean of LOC1. In other words, those students who were above the mean were classified as external LOC, and those who were below the mean were classified as internal LOC. Thus, the LOC1 scores and type of feedback were the independent variables and the LOC2 score was the dependent variable.

Table 7.11 shows that the correlation coefficient between the first administration of LOC and the second administration of LOC, in regard to the number of subjects in each grade, is higher in the non-feedback group across all classes than in the feedback

group, again across all of the classes. This attenuation of correlation coefficients in the feedback group may be the result of the feedback that was administered to this group.

**Table 7.11**  
**Correlation coefficient between LOC1 and LOC2 in non-feedback and feedback groups**

Group	Type of feedback	Year	n	r	p
Feedback	Math. Read. Encouraging/Encouraging	3	15	.583	.05
	discouraging/discouraging	4	19	.665	.01
	Encouraging/Encouraging	5	29	.634	.01
	Encouraging/discouraging	6	14	.783	.01
Non-feedback		3	29	.814	.01
		4	26	.886	.01
		5	19	.861	.01
		6	34	.771	.01

Further analysis, in Table 7.12, shows that the difference between means of LOCs (LOC1 and LOC2) in Years 3 and 5 in the feedback group, were significant ( $p<.007$  and  $p<.015$ , respectively). Both of these classes received encouraging feedback for both mathematics and reading comprehension tasks. The differences between means of LOC1 and LOC2 were not significant either for Year 4 or for Year 6 in the feedback group. The first class (Year 4) received discouraging feedback for both mathematics and reading comprehension tasks, and the second class (Year 6) received encouraging feedback for mathematics and discouraging feedback for reading comprehension. However, as expected, in the non-feedback group, none of the differences between means of LOC1 and LOC2 was significant across all of the

Table 7.12  
Mean of LOCs in feedback and non-feedback groups with type of information in feedback group

Year	n	Feedback group		Mean LOC2	t-value	p	n	Non-Feedback group		t-value	p
		Mean LOC1	Type of feedback mathematics reading task					Mean LOC1	Mean LOC2		
3	15	19.93	Encouraging	17.13	3.146	.007	29	15.72	16.20	-.483	No sig
4	19	19.16	Discouraging	19.26	-.105	No sig.	26	15.81	15.92	-.115	No sig
5	30	16.27	Encouraging	14.86	2.569	.015	19	16.21	16.05	.334	No sig
6	14	17.14	Encouraging	16.43	.714	No sig.	34	15.71	15.68	.059	No sig

classes. As a result, encouraging feedback on both tasks appeared to alter the LOC attitude, at least temporarily, while discouraging feedback, either on one task or on both tasks, did not influence the LOC attitude.

Table 7.13 shows, when a two-way analysis of variance was applied to the LOC1, in terms of internal and external, and type of feedback and its effect on LOC2 scores, in feedback group, no significant interaction was found in this regard.

**Table 7.13**  
**Two-way analysis of variance between internal-external LOC1 and type of feedback (independent variables) and LOC2 (dependent variable) in feedback groups**

Source	df	S.S.	M.S.	F-test	P
Int-Ext (LOC1)	1	470.425	470.425	40.05	.0001
Type of feedback	2	85.203	42.602	3.627	.0316
Interaction	2	24.784	12.329	1.055	.3536
Within group	71	833.963	11.746		

In order to determine the magnitude and significance of the shift of LOCs in each feedback group the Wilcoxon matched-pair signed-ranks test was used. The result of this test is indicated in Table 7.14, for each feedback group. As is shown in this Table the shift of LOC1 to LOC2 is only significant in the encouraging-encouraging group ( $p<.0007$ ). In other words, the LOC1 scores shifted toward more internality in LOC2 scores significantly, while in other groups (discouraging-discouraging, encouraging-discouraging and non-feedback) no significant shift was observed.

**Table 7.14**  
**Comparison of shifts of LOC1 and LOC2 in various feedback groups**

Groups	n	Rank +	Rank -	T	Z	p
Encour-Encour	44	30	9	5	-3.384	.0007
Discour-Discour	19	5	13	4	-.414	No sig.
Encour-Discour	14	8	5	3	-1.048	No sig.
Non-feedback	118	45	53	5	-.505	No sig.

## 7. Summary of results

In summary, the results of the regression analysis showed that, among the independent variables of the study, grade, sex, socioeconomic status and language background had significant effects on academic achievement, and grade, socioeconomic status and language background also had significant effects on locus of control. Furthermore, the results indicated that, when locus of control as an independent variable was added to the previous independent variables of the study, the academic-achievement variable was better predicted than before this addition. Stated differently, locus of control had a significant effect on academic achievement. On the other hand, it is shown that when academic achievement as an independent variable was added to the previous independent variables in order to predict locus of control, the locus of control variable was better predicted than before. In other words, academic achievement had a significant effect on locus of control.

The results of path analysis showed that, among independent or exogenous variables, grade, socioeconomic status and language background had significant direct effects on determination of locus of control, in that order according to the size of their effects. Regarding academic achievement, path analysis showed that locus of control,

socioeconomic status, grade, sex, and language background had significant direct effects on the determination of academic achievement, in that order according to the size of their effects. In other words, surprisingly, the direct effects of locus of control on academic achievement was greater than the other exogenous variables of the study, even more than socioeconomic status.

In relation to the effects of academic-achievement feedback on locus of control, the results of the experiment showed that the correlation coefficient between the first administration of locus of control and the second administration of the locus of control was greater in the non-feedback than in the feedback groups. Also, the results of the t-test indicated the difference between the first and second administrations of locus of control in the encouraging-encouraging feedback group was significant, while the differences in the encouraging-discouraging; discouraging-discouraging and non-feedback groups were not significant.

In other words, the results suggested that encouraging-encouraging feedback could enhance internality significantly, while the results did not show that encouraging-discouraging or discouraging-discouraging feedback would enhance externality.

The shifts of locus of control, from the first to second administrations, indicated that no substantial expectancy shifts occurred in the non-feedback group; but in the feedback group some externals who received encouraging-encouraging feedback shifted to a more internal locus of control.

In the next, final, chapter (Chapter 8), under the heading of "Discussion", the findings of the study presented in Chapters 5, 6 and 7 will be discussed.



## **Chapter 8**

### **Discussion**

In this chapter, the findings of the study that were presented in Chapters 5, 6 and 7 will be discussed in relation to the theoretical background of the study and previous relevant empirical researches. Some pedagogical implications will also be mentioned. The findings of the study will be discussed under the headings of academic achievement, locus of control, academic achievement in relation to locus of control, and academic achievement feedback and its effect on locus of control.

#### **1. Academic achievement**

One of the aims of this study is to compare a general or heterogeneous set of abilities, rather than a specific or homogeneous ability, of the students in relation to the independent variables of the study. Therefore, two kinds of specific test, one in reading and the other in mathematics, were selected in order to measure academic achievement, because it is proposed that a combination of these two different specific tests tends to measure a more general or heterogeneous set of abilities. Also, a combination of these two tests was considered more likely to show more variability among scores of the students than only one test would. However, in some sections of this study, in order to have a better understanding of academic achievement, the investigator has compared specific or homogeneous ability, in terms of the reading or the mathematics test, in relation to the independent variables of the study.

In the following section, academic achievement in relation to the independent variables of the study will be discussed.

### 1.1 Sex and academic achievement

The results of the study showed that there is a significant difference between academic achievement of boys and girls ( $p < .0001$ ). Several previous studies have supported the above finding. For example, Khayyer (1980) and Marsh (1989), revealed that girls' school achievement tends to be higher than boys' school achievement. The first study was carried out at elementary-school level and the difference between the GPA means of girls and boys was significant ( $p < .05$ ), and the second one, based on a meta-analysis, was carried out at high-school level. Regarding the second study, Marsh (1989) stated that the sex differences were smaller than in the findings reported before 1972.

On the other hand, the results of this study showed that there was no significant difference between sexes on the mathematics achievement test, while on the reading comprehension test, the girls' mean score was significantly higher than the boys' mean score ( $p < .0001$ ). In this regard, as stated in Chapter 3, Marsh (1989) pointed out that, although at the end of high school male students achieved better than female students on mathematics tests, particularly on tests that concentrate on problem solving, at elementary level and perhaps junior high school no significant differences were observed regarding mathematics achievement. He also stated that sometimes the girl students achieved better than boys on tests that emphasized only computation (Marsh, 1989).

Also, as pointed out in Chapter 3, Hilton and Berglud (1974) showed that there were no significant differences in mathematics achievement between male and female students in fifth grade, but the differences grew steadily larger, favouring males, during

high-school years. In this regard, the findings of this study were supported also by Chipman's and Thomas's study (1985) that indicated that no sex differences were found between mathematics scores that students received at high-school level, but the means of the girls, overall on all subjects, were higher than means of the boys.

Regarding reading comprehension, the findings of the present study showed that girls achieved better than boys in the reading comprehension test ( $p < .0001$ ). This finding is consistent with some of the previous researches. For example Hyde (1981) by means of a meta-analysis concluded that the verbal ability of female students is higher than the verbal ability of male students. Also, as mentioned in Chapter 3, Marsh (1989) cited Maccoby and Jacklin (1974) in their review, and concluded that sex differences favouring girls in verbal ability were smaller recently than studies published before 1973.

On the other hand, the results of the present study, regarding sex differences in academic achievement, are inconsistent with some previous researches. For example, Ainley, Foreman and Sheret (1991) did not find any significant differences in academic achievement between male and female high-school students. The sample of their study consisted of only Year 9 students, and the aim of the study was to investigate the factors which can influence students to remain in school beyond Year 10. Further, the results of some other studies are completely at variance with the results of the present study. For example, Adams (1985) reported a lower achievement rate for girls by comparison with boys, again at high-school level. In his study the ASAT (Australian Scholastic Aptitude Test) was used in order to measure students' achievement, and the data on this particular test from 1979 to 1983 showed a significant difference between girls and boys in favour of boys (Adams, 1985). In a similar vein, recently it was found that boys attained better achievement than girls on mathematical reasoning, including a task requiring the application of algebraic rules or algorithms and also on tasks requiring mathematical concepts and number relationships among students from

Year 2 through 6 (Mills, Ablard & Stumpf, 1993). Also, Randhawa (1991), found superiority of boys over girls consistently in standardized achievement tests among high-school students in Canada.

However, there are four main possible explanations that might account for the findings of the present study.

First, the previous studies were mostly carried out at high-school level whereas the present study concerned primary. For example, Hilton and Berglud (1974) indicated that there were no significant differences in mathematics-academic achievement between male and female students in fifth grade, but differences appeared and grew steadily larger, favouring males, during high-school years.

Secondly, previous studies showed some sex differences regarding attitudes towards school in Western or developed countries. For example, in a study among third- and fourth-grade primary students in England, it was found that girls tended to have more favourable attitudes towards school by comparison with boys (Barker-Lumm, 1972). This finding was supported by another study among primary-school students in the United States (Haladyna & Thomas, 1977). Also, in Australia the same result was found for Year 7 students in Canberra (Keeves, 1972). Therefore, it may be concluded that these more favourable attitudes among female students probably affect their performance on reading comprehension and also on their overall academic achievement. This might be associated with self confidence and internal locus of control, in relation to achievement, to be discussed later in this chapter.

Thirdly, in previous studies, regarding differentiation of subjects in terms of either masculine or feminine characteristics, mathematics was rated as masculine and English was rated as feminine by some students (Weinreich-Haste, 1978; 1981). A subsequent study showed that gender stereotyping of school subjects was reduced by comparison

with the previous studies (Archer & Macrae, 1991). Presumably, as a result, better achievement of girls, by comparison with boys, in reading comprehension might be related in some degree to changes over time.

Finally, the superiority of female students in reading comprehension tests might be partly explained by the differences of functional pattern between the sexes in the brain. Further information about this explanation, was presented in more detail in Chapter 3, the review of literature.

### 1.2 Grade and academic achievement

The results of the study indicated that there are significant correlations between grades of the students and all indices of achievement, even though measured in terms of scaled scores. In this regard, the correlations between mathematics scaled scores and academic-achievement scaled scores with grade of the students were more significant ( $p < .001$ ) than the correlation between reading comprehension scaled scores with grade of the students ( $p < .02$ ).

As well as showing the relationship of academic achievement with standardized achievement tests, these significant correlations appeared between the grade of the students and their scores on the achievement tests. From these findings, it may be concluded that cognitive development of the children is probably more correlated with mathematical concepts than verbal concepts.

### 1.3 Socioeconomic status and academic achievement

The results of the study showed that the means of mathematics, reading comprehension and academic-achievement scaled scores increase with socioeconomic status from low to high levels. In other words, significant differences were found between different

levels of socioeconomic status regarding all indices of achievement scaled scores ( $p < .0001$ ). Also, significant correlations were found between socioeconomic status and all indices of academic achievement in this study ( $p < .001$ ). These findings are consistent with various previous studies noted earlier (Fortheringham & Creal, 1980; Maqsud, 1983; Bank & Finlayson, 1973; Ainley, Foreman & Sheret, 1991; Carpenter & Hayden, 1985; Rosenthal & Baker, 1983; Steelman & Doby, 1983).

There are three possible explanations suggested here for the positive association between socioeconomic status and academic achievement.

First, usually higher-socioeconomic parents tend to pay more attention to their children's achievement because they are especially aware of the importance of education, and they tend to be more involved in the school activities than parents of lower socioeconomic status (Hoover-Dempsey, Bassler and Brissie, 1987).

Secondly, another possible explanation for significant differences in academic achievement between various socioeconomic groups is that students from higher-socioeconomic families tend to have more favourable attitudes towards education, school, and teachers (Ainley, Foreman & Sheret, 1991; Maqsud, 1983). In a similar vein, evidence was noted in Chapter 3 to support the hypothesis that working-class parents have lower educational aspirations than middle-class parents, and also middle-class parents tend to have higher occupational aspirations for their children (Bank & Finlayson, 1973).

Finally, as also noted earlier, socioeconomic status is a reflection of the economic or material circumstances of the family (Bank & Finlayson, 1973), and as a result both of these factors are highly related to the home environment. In other words, poverty might have a direct effect on the quality of family life, bad housing, malnutrition and higher rate of sickness. Also, it might have indirect effects on family relationships and patterns

of child-rearing (Bank & Finlayson, 1973). Therefore, all of these factors can influence the perception of individuals and develop a negative perception toward social activities including education. In this regard, Fortheringham and Creal (1980) stated that the influence of the home environment operates upon initial levels of ability of the children when they arrive at school at early childhood, and then affects attitudes towards education. In a similar vein, it has been shown that middle-class parents are more likely to use love-oriented or psychological methods of discipline, whereas working-class parents are more likely to use ridicule or physical punishment in rearing their children (Bank & Finlayson, 1973). It is thus likely that home environments might differ according to socioeconomic status, and as a result, children's achievement in these various environments might also differ from each other.

#### 1. 4 Language background and academic achievement

All of the mean scores of the achievement tests (mathematics, reading comprehension and academic achievement) of the English-speaking students were higher than the means of the non-English-speaking students. The differences between English-speaking students and non-English-speaking students were statistically significant in mathematics ( $p<.003$ ), reading comprehension ( $p<.0004$ ) and academic achievement ( $p<.0002$ ). Although all of the differences between English-speaking students and non-English-speaking students, in terms of their means of achievement scaled scores, were significant, the difference between means of the mathematics scores was smaller than the means for reading comprehension or academic achievement.

Also, the majority of previous studies indicated that non-English-speaking students tend to achieve comparatively lower performance or achievement scores than English-speaking students. For example, it is reported that students from a non-English speaking background have lower academic achievement by comparison with Australian-born or English-speaking-background students (Ainley, Foreman & Sheret,

1991). Also, several studies showed that minorities of non-English-speaking backgrounds tend to score lower in ability or achievement tests than people English-speaking background (de Lacey & Rich, 1979; Steelman & Doby, 1983; Jensen, 1980), probably owing to a confounding between socioeconomic and language problems in English, as indicated below.

However, in spite of these problems regarding non-English-speaking students, there are several indications that this group, though it is heterogeneous, might overall have more positive attitudes towards schooling than English-speaking students. It has been reported that this group tended to value school achievement more than other kinds of achievement, such as sports achievement, social achievement and work achievement (Farmer, Vispoel & Maehr, 1991). This group were more interested in school achievement than Australian students or students from an English-speaking background (Ainley, Foreman & Sheret, 1991; William, 1987; Marjoribanks, 1985).

Several reasons were given for the above achievement problems and for the positive attitudes toward school among non-English-speaking students.

First, one of the major problems that can be responsible for lower performance is language. In other words, it is likely that this group of students performs lower than English-speaking students because they do not adequately understand the language of instruction (Rosenthal, Baker & Ginsburg, 1983). In a similar vein, some researchers proposed that students' linguistic development in their home language other than English is another source of their lower academic achievement (Brown, 1980). In addition, it has been suggested that even children whose mother tongue was not English, but who speak English quite well, can be nevertheless impaired in learning English when their knowledge of their own home language is faulty (Lawton, 1968). Also, Rosenthal et al. (1983) mentioned that achievement levels were significantly related to language background, particularly for reading achievement.



Secondly, some researchers pointed out that many students from non-English-speaking backgrounds are from low-socioeconomic status families, which may also contribute to their lower performance (Rosenthal, Baker & Ginsburg, 1983; de Lacey & Rich, 1979).

Thirdly, Felice (1978) in a study, carried out in America, reported that discrimination toward students from a minority or non-English-speaking background may also affect their academic achievement in school.

Finally, as pointed out before, comparison of students who remain in school beyond Year 10, showed that non-English-speaking students tend to continue longer at school than English-speaking students proportionately. In this regard, Hayden (1982) proposed that there might be higher levels of aspiration among students of certain ethnic backgrounds and possibly stronger parental encouragement for pursuing formal education. Also, it has been suggested that this situation may be attributed to the higher motivation of immigrants, because immigrants need to succeed perhaps to justify their emigration from their home countries (Poole, 1985).

#### 1.5 Mother's work and academic achievement

The results of the study showed that there are no significant differences between means of all indices of achievement (mathematics, reading comprehension and academic achievement) of working-mother and non-working-mother students. Also, no statistically significant differences were found between the means of achievement-test results of students whose mother worked part-time or full-time.

The above findings, however, are inconsistent with some previous researches. For example, Milne, Myers, Rosenthal and Ginsburg (1986) consistently found that

mother's employment has a negative effect on both reading and mathematics achievement in both elementary- and high-school students among White students from two-parent families. However, they stated that this effect was positive and significant among Black elementary-school students from one-parent families. Also, Heyns and Catsambis (1986) pointed out that mother's employment during their children's high-school years is positively related to the academic achievement of their children. Regarding working mothers it has been found that the students whose mothers work full-time (40 hours per week) had a lower achievement than students whose mothers work part-time (Milne, Myers, Rosenthal & Ginsburg, 1986).

In this regard, Heyns and Catsambis (1986) stated that the effects of mothers' work are highly related to socioeconomic status of the families. In other words, they pointed out that, if students from lower-socioeconomic background are omitted from the sample, the positive effect of mothers' work on academic achievement will be omitted too.

However, there may be several explanations for the findings of the present study. For example, mothers' work may not have a positive or negative direct effect on students' academic achievement. In other words, the composition of socioeconomic status of the sample may reveal some differences between academic achievement of working-mother students and non-working-mother students. Stated differently, the income from the mother's employment might raise the socioeconomic status of the family. Further discussion about this point will be included later, when the size of the effect of each independent variable on academic achievement will be discussed. Although working mothers might not have enough time to help their children in their homework and also in other activities such as stimulating and fostering their children's intellectual development, other sources such as grandmother, older siblings and school programs might provide opportunities to stimulate and foster the intellectual development of the children. However, more research is needed to clarify this point.

## 1. 6 Family size and academic achievement

Although family size was negatively correlated with all indices of academic achievement (mathematics, reading comprehension and academic achievement), none of these correlations was statistically significant.

Some previous findings support these results. For example, in a study that was carried out in England no significant relationship was found between family size and academic achievement (Roodin, Broughton & Vaught, 1974). In another study, it was indicated that family size was not significantly related to block-design performance for both Black and White children (Steelman & Doby, 1983).

On the other hand, some researches found a negative effect of family size on academic achievement. For example, in a reanalysis of data from several studies in order to find any effect of family size on educational attainment, it was found that family size had a significant negative effect on educational attainment (Hauser & Sewell, 1985). Also, Iverson and Walberg (1982) stated that the typical correlation between family size and academic achievement was reported as  $-.25$ .

The finding of the present study, a non-significant relationship between family size and academic achievement, might be attributed to the relative homogeneity of the family size within the sample. Also, like the mother's-work variable, family size might not have a direct effect on students' academic achievement: its effect on academic achievement might be mediated through another variable, such as socioeconomic status.

## 2. Locus of control

In this section, locus of control in relation to the independent variables of the study will be discussed.

## 2.1 Sex and locus of control

Although the girls' locus-of-control mean was greater than boys' locus-of-control mean, the difference was not statistically significant.

Neither did some of the previous studies find any different pattern for locus-of-control scores for males or females (e.g. Bar-Tal & Dorom, 1979). Bar-Tal, Goldberg and Knaani (1984), reported that, between advantaged and disadvantaged students, on the basis of grade-point average, no differences were found between male and female students regarding causal attribution for success and failure in each socioeconomic status group. Also, among bright elementary-school children, no relationships were found between sex and either self-concept or locus of control, according to Johnson and Kanoy (1980). In addition, through a meta-analysis, these researchers concluded that there were no significant differences between the means of the correlations relating to males and females, regarding a relationship between self-measures and achievement (Hansford & Hattie, 1982).

On the other hand, Callaghan and Manstead (1983), have indicated that some sex differences have been found in locus-of-control and academic achievement. It should be noted that, in most of the previous studies, the sex variable was considered in relation to both locus of control and academic achievement. Therefore, in another section of this chapter, the sex variable in regard to locus of control and academic achievement will be discussed in more detail.

## 2. 2 Grade (age) and locus of control

The results of this study showed that the locus-of-control mean consistently decreases as the grade of student increases from Year 3 to Year 6. The correlation coefficient

found between grade and locus-of-control score was  $-.193$  ( $p < .001$ ). Stated differently, with increasing age, internality will increase.

The above results were consistent with various other studies. In this connection, Nowicki and Strickland (1973) stated that the trend of changes of locus of control showed that responses of the students tend to become more internal with increasing age.

However, again in most of the previous studies, the age or grade variable was considered in association with both locus of control and academic achievement. Hence, this variable (age or grade) will be discussed later in relation to both locus of control and academic achievement.

### 2.3 Socioeconomic status and locus of control

The results of the study indicated that the means of locus-of-control scores decrease with socioeconomic status from low to high levels of socioeconomic status. Stated differently, the internal locus-of-control attitude increases with socioeconomic status from low to high levels. A significant correlation was thus found between socioeconomic status and locus of control ( $r = -.18$ ,  $p < .001$ ). The results also showed significant differences between the several levels of socioeconomic status regarding the locus-of-control attitude ( $p < .0008$ ).

Many studies have presented similar findings to the above. For example, Ludwigsen and Rollins (1971) found that students of low-socioeconomic status were more external than those of high-socioeconomic status. The same finding was reported by other researchers (Ravin, Bar-Tal, Raviv & Bar-Tal, 1980; Crandall, Crandall & Katkovsky, 1965; Nowicki & Strickland, 1973).

On the other hand, some investigators did not find significant association between socioeconomic status and locus of control. For instance, Maqsd (1983) in a study carried out in Nigeria did not find any relationship between socioeconomic status and locus of control. Also, Gore and Rotter (1963) reported no significant correlation between socioeconomic status and locus of control among college students in the United States. It might be noted, however, that college students do not represent the total spectrum of socioeconomic status in the population.

However, different results from different studies in different societies are to be expected, for a variety of reasons, such as the following. First, it seems that the locus-of-control construct is related to some aspects of culture, like language, belief, and attitudes of people towards natural phenomena. Secondly, researchers use a variety of indicators for identifying socioeconomic status, and these indicators, although they might correlate with each other, when they are used with other variables separately, such as locus of control, they may produce different results. Finally, variations of culture and standards of living in different societies produce different perceptions, attitudes and expectations among individuals in the societies. Therefore, each society might have a unique set of characteristics for determining both self-perception measures and social class or socioeconomic status.

In spite of the points mentioned above, there are some explanations for the results of this study. According to Phares's (1976) statement, the individuals who come from classes that have few opportunities to attain significant power, social mobility or material advantages, feel they have no control over their behaviour, and as a result they manifest a higher external score on locus-of-control scales. Even if the children of these individuals develop internal attitudes on the basis of their limited experiences, their elders, parents, teachers, and peers may advise them not to manifest such beliefs about internal control (Phares, 1976). Also, in a similar vein, they learn that they are restricted in society in a variety of opportunities such as jobs, promotions, health,

housing and education (Phares, 1976). Therefore, these individuals learn that they have no control over their behaviour, and in a sense this learnt attitude could be a reflection of their recognition of reality.

#### 2. 4 Language background and locus of control

The results of the present study showed that the mean of locus of control in children of non-English-speaking background was higher than the mean of children of English-speaking background. In other words, the non-English-speaking group had a more external-locus-of-control attitudes than the English-speaking group, and the difference between these two means was statistically significant ( $p<.05$ ).

In spite of wide-spread studies regarding the internal-external locus-of-control dimension, few studies have been concerned with cross-cultural differences, even in a multicultural society like Australia. However, the findings of some previous researches, regarding comparisons of locus of control among students who come from different cultures with different language backgrounds, were in agreement with the finding of this study. For example, it has been found that Blacks did show more external attitudes than Whites in the United State (Gurin, Gurin, Lao & Beattie, 1969). In another cross-cultural study it was found that Anglo-Americans are more internal than American-born Chinese or Chinese born in Hong Kong (Hsieh, Shybut & Lotsof, 1969). Also, more recently, in another study, Black and White adolescents were compared regarding their internal control. The results of this study showed that Blacks had significantly lower perceptions than Whites regarding their own control over events (Tashakkori & Thompson, 1991).

On the other hand, when the Intellectual Achievement Responsibility (IAR) questionnaire was used, neither Katz (1967) nor Solomon, Houlihan and Parelius (1969) could find any significant difference regarding internal-control belief between

racess. In a similar vein, in another study carried out in Australia, no significant differences were found in locus-of-control attitudes between Aborigines and Whites (Twomey, 1981; Wright & Parker, 1978).

The explanations that can be presented for the findings of this study, regarding language background and locus of control, are very similar to explanations that were presented for socioeconomic status and locus of control. In this regard, usually non-English-speaking families have relatively little access to social mobility and opportunity for social activity, and therefore they might develop external locus-of-control attitudes regarding their own activities and cultural events.

## 2. 5 Mother's work and locus of control

The results of the study indicated that, although the mean of locus of control among students whose mothers were not working was greater (i.e. were more external) than for those students whose mothers were working, the difference was not statistically significant. Also, the difference between means of locus-of-control scores between students whose mothers were working on a part-time basis and students whose mothers were working on a full-time basis was not statistically significant.

However, it was shown that mother's work in this sample was associated only with socioeconomic status of the students' families ( $p < .05$ ). In other words, among high-socioeconomic status families the number of mothers who were working was greater than the number of mothers who were not working. Generally, it seems that the mother's-work variable may have indirect effects on locus of control and academic achievement. Heyns and Catsambis (1986) also mentioned that the effects of mother's employment are highly related to the socioeconomic status of the families. Further discussion about mother's work will be presented later, when the independent variables of the study in relation to locus of control and academic achievement will be discussed.



## **2. 6 Family size and locus of control**

In the present study, no significant correlation was found between family size and locus of control. This finding was consistent with that of Parnicky, Williams and Silva (1987) with subjects from small families compared with subjects from large families regarding their locus of control.

On the other hand, some studies indicated that more externality was associated with larger family size (Zajonc, 1988; Crandall, Crandall & Katkovsky, 1965; Rama & Natarajan, 1981).

The significant association between family size and socioeconomic status ( $p < .05$ ) in this study suggested that it might be possible that large family size is the correlate, if not the consequence, of low-socioeconomic status. In other words, it can be concluded that a true relationship may exist between socioeconomic status and locus of control.

## **3. Academic achievement and locus of control**

The results of the study showed that all indices of academic achievement are significantly correlated with locus-of-control scores ( $p < .001$ ). In other words, these significant correlations mean that higher achievement scores are associated with more internality on the locus-of-control measure.

Various researchers have agreed with the above findings (Johnson & Kanoy, 1980; Kennelly & Mount, 1985; Stipek & Weisz, 1981; Maqsud, 1983). All of these findings support Rotter's hypothesis that internals are more engaged in achievement-related behaviour than externals.

On the other hand, Wylie (1979) stated that the association between achievement indices and overall self-measures tends to be quite small, and that there is no evidence to support the commonly accepted idea that these two variables (achievement and self-measure) are strongly associated. In a similar vein, Hansford and Hattie (1982) suggested that certain gaps were observed in relation to self-measures in the literature. They stated that a few studies were concerned with very young children's self-measures, and the effect of home environment as an intermediate variable between self-measures and achievement.

Although, these kinds of reviews and meta-analyses, as mentioned in Chapter 3, have made a valuable contribution to understanding self-measures and achievement, the variety of self-measure questionnaires and also the variety of achievement tests create some limitations to these kinds of reviews or meta-analyses. In addition, as mentioned in Chapter 3, the association of locus of control and achievement behaviour among college students is very low, by comparison to other age levels. Therefore, it seems necessary, in these kinds of meta-analyses or review studies, to consider both the age of subjects and the instruments that were used for measuring self-regard and achievement behaviour.

Also, the results of this study showed that the association between all indices of achievement tests and locus of control among boys was higher than among girls. It has been shown that males and females presented different patterns of causal attributions for similar achievement outcomes. Nowicki and Strickland (1973), found that, in early grades, female achievement could not be predicted from the Nowicki-Strickland locus-of-control scale, but, in Grades 5 and 7, it has been shown that a significant association existed between locus of control and academic achievement. The same findings were reported by Chadwick, Bahr and Stauss (1977) between self-esteem and GPA.

In addition, when the subjects of the present study were divided into internal and external locus-of-control groups, on the basis of the total locus-of-control mean, the indices of achievements of internals were higher than the indices of achievements of externals ( $p < .0001$ ).

In a similar vein, when the students were divided into high and low achievers, on the basis of the mean of the total academic achievement, the locus-of-control mean among high achievers was lower than the locus-of-control mean among low achievers, and the difference was statistically significant ( $p < .0001$ ). Therefore, it can be concluded that the locus-of-control measure can probably differentiate high achievers from low achievers.

It seems, however, that this kind of analysis is not enough to clarify the association between locus of control and academic achievement. In other words, any causal link between locus of control and academic achievement is a complex phenomenon. As Stipek and Weisz (1981) stated, the association between locus of control and academic achievement is usually considered in terms of an internal locus of control affecting academic achievement; but studies producing this result are usually correlational and cross-sectional and the results of them cannot clearly justify assuming a causal relationship. Therefore, up to this point, according to the findings of the present study, we can conclude that high achievers (those students whose academic-achievement score was above the mean of academic achievement of the sample) usually attributed their achievement to internal sources or accepted the responsibility for their achievement, whereas low achievers usually attributed their low achievement to external sources or attributed responsibility to other sources.

In this regard, the correlation between locus of control and achievement behaviour might be suspect, because both of these variables might share their variance with another third variable (Stipek & Weisz, 1981). Therefore, the association of these two

variables should more appropriately be considered with other independent variables of the study such as grade, sex, socioeconomic status, family size, language background and mother's work. In the present study, this suggestion was followed.

#### **4. Academic achievement and locus of control in relation to independent variables.**

The size of the effect of each of the independent variables on academic achievement was determined by multiple regression analysis. Among the independent variables of the study, the size of the effect of socioeconomic status of the family, as expected, was higher than that for the other independent variables. After socioeconomic status, grade, language background, and sex of the students in that order had significant effects on academic achievement. In total, 18.4 percent of variation of academic achievement can be explained by the independent variables of the study.

On the other hand, when locus of control is regressed on the independent variables of the study, again the size of the effects of socioeconomic status of the family had the highest effect on locus of control by comparison with other independent variables. After socioeconomic status, grade and language background of the students had significant effects on locus of control, in that order. In total, 7.4 percent of variation of locus of control can be explained by the independent variables.

In both of the above regression analyses neither family-size nor mother's-work variables had significant effects on academic achievement or locus of control.

In addition, when the locus-of-control variable was added to the original independent variables, surprisingly, the results showed that the locus-of-control variable was the best predictor of the academic achievement by comparison with the other independent variables. After the locus-of-control variable, socioeconomic status, grade, sex and

language background had significant effects on academic achievement, in that order. Also, in total 22.3 percent of variation of academic achievement can be explained by locus of control and the original independent variables. The results of a study that was carried out in Australia partially agreed with the result of the present study, in which school achievement was predicted from intelligence, self-concept and locus of control among Aboriginal and non-Aboriginal children (Wright & Parker, 1978). In this study it was found that among Aboriginal students the best predictor for both English and mathematics achievement was locus of control (measured by IAR), and intellectual ability (IQ) was the second best predictor. By contrast, for non-Aboriginal students the best predictor for both English and mathematics achievement was intellectual ability (IQ) and locus of control was the second best predictor (Wright & Parker, 1978).

Also, in another regression analysis, the academic achievement variable was added to the original independent variables in order to predict locus of control. In this analysis it was shown that academic achievement is the best predictor of locus of control. After the academic-achievement variable, grade and socioeconomic status had significant effects on locus of control, in that order. In total, 11.3 percent of variation of locus of control can be explained by academic achievement and the original independent variables. However, it should be noted that, in this analysis, when the academic-achievement variable was entered as an independent variable to the analysis, the significant effect of language background on locus of control disappeared. This finding might suggest that the effect of language background on the academic achievement is greater than its effect on the locus of control. In other words, the association of language background with the academic achievement is greater than the association of language background with the locus of control. In this case, the disappearance of the effect of language background on locus of control might be due to the variance shared between language background and academic achievement, not to the effect of language background on academic achievement.

The above results indicated that both locus of control and academic achievement have been affected by some of the independent variables of the study. In other words, these results partially confirmed the suggestion of Stipek and Weisz (1981) that both academic achievement and locus of control may share their variance with another, third, variable. For example, in this study it has been shown that grade of the students, socioeconomic status and language background of the students had significant effects on both academic achievement and locus of control. In other words, all of these variables shared their variances with both academic achievement and locus of control. However, sex shared its variance only with academic achievement. In addition, neither family size nor mother's work had any shared variance with locus of control or academic achievement.

For further analysis, a path analysis was used for additional classification of the relation and effect of each variable on the other. In other words, the direct and indirect effects of each independent variable of the study on both locus of control and academic achievement were determined.

In regard to the grade of students, as shown before, grade had a positive direct effect on academic achievement and a negative direct effect on locus of control. Its positive effect on academic achievement showed that increasing grade was associated with increasing academic achievement. This association might be the effect of the development of cognitive ability of the students, or it might be the effect of using various parallel forms of standardized achievement tests in order to measure academic achievement. The negative effect of grade on locus of control was expected after reviewing previous researches (Nowicki & Strickland, 1973; Bartel, 1971). There are several explanations for this negative effect; for example, Bartel (1971) reported that a high correlation between locus of control and academic achievement, among older students rather than younger students, might be, at least in part, the result of superior reading ability among the older students. Also, Hansford and Hattie (1982) pointed out

that, as the grade increased from preschool to secondary school, the association between locus of control and academic achievement increased (.12 to .27). But this trend was not true for college students. The authors mentioned that this trend among college students might be the result of the selectivity of the sample (Hansford & Hattie, 1982): that those not proceeding to college tend to be of lower academic achievement, and were by definition omitted from the college-student population studies.

In regard to the sex of the students, this variable had a significant effect on academic achievement. As pointed out before, the girl subjects had higher performance on the academic achievement variable than boy subjects. Also, it was shown that the association between academic achievement and locus of control among boy students was higher ( $-.392, p<.001$ ) than girl students ( $-.283, p<.001$ ). In fact, some previous researches had indicated some sex differences in the relationship between academic achievement and locus of control. For example, Nowicki and Strickland (1973) mentioned that, in early grades, female achievement could not be predicted from the Nowicki-Strickland locus-of-control scale; but, in Fifth and Seventh Grades, it has been shown that a significant relationship existed between locus of control and academic achievement. Also, Chadwick, Bahr and Stauss (1977) found that self-esteem is more related to GPA among male students than among female students. In a similar vein, Stipek and Weisz (1981) in their review mentioned that there is a stronger association between internal locus of control and academic achievement for boys than for girls, particularly when the Children's Nowicki-Strickland Internal-External (CNS-IE) scale is used. Also, more recently Kennelly and Mount (1985) reported that externality of locus of control was negatively and significantly associated with both GPA and the Iowa Test of Basic Skills, while this relationship for girls was significant only for GPA.

However, it seems that one of the factors that might cause these differences between the sexes is related to the different sex roles that are expected from males and females in

different societies. In this regard, Nowicki and Walker (1973) found that the relationship between locus of control and academic achievement is significant only for females who are low in 'social desirability', not for females who are high in social desirability. In a similar vein, Stipek and Weisz (1981) concluded that females who were high in social desirability might have answered the items of the locus-of-control questionnaire in accordance with social acceptability in the society rather than in accordance with their true beliefs. Perhaps this could account for the relationship between academic achievement and locus of control for female students being lower than for male students.

In regard to socioeconomic status of the family, the results of this study showed that this variable had a positive, direct effect on academic achievement and a negative, direct effect on locus of control. It should be noted that the direct effect of socioeconomic status on academic achievement was greater than its direct effect on locus of control. Therefore, it can be concluded that both academic-achievement and locus-of-control variables had shared their variances with the socioeconomic-status variable. On the other hand, socioeconomic status also showed significant correlations with the other independent variables of the study (family size, sex, grade, and mother's work). In other words, it can be concluded that the effects of other variables of the study might be reflected through socioeconomic status on both academic achievement and locus of control. As a result, it might also be concluded that the socioeconomic status of the subjects affects the size of the correlation between academic achievement and locus of control.

In relation to the family-size and mother's work variables, none of these variables had significant direct effects either on academic achievement or on locus of control. However, both of these variables had significant correlations with each other, and also significant correlations with socioeconomic status. In other words, the effects of these



two variables seem to have been reflected indirectly on both academic achievement and locus of control through socioeconomic status.

The above findings were consistent with some previous studies. For example, Parnicky, Williams and Silva (1987) compared subjects from large families in terms of their locus of control. After employing regression analysis, they found neither birth order nor family size significantly increased the predicability of locus of control. Also, Roodin, Broughton and Vaught (1974) reported that no significant relationship was found between family size and academic achievement.

On the other hand, as mentioned before, some investigators found negative effects of family size on both academic achievement and locus of control (Steelman & Doby, 1983; Hauser & Sewell, 1985; Zajonc, 1986; Crandall, Crandall & Katkovsky, 1965).

In relation to mother's work, as mentioned before, it was shown that this variable had a negative effect on academic achievement among White students from two-parent families, while this effect was positive and significant among Black elementary-school students from one-parent families, because more black families are in poverty, and the mothers' income raised their socioeconomic status (Milne, Myer, Rosenthal & Ginsburg, 1986).

However, it seems that both of these variables (family size and mother's work) did not have significant direct effects on either academic achievement or locus of control. In other words, both of these variables had indirect effects on both academic achievement and locus of control through the socioeconomic status variable. In support of this conclusion, Roodin, Broughton and Vaught (1974) mentioned that the large-sized families, to some extent, related to the culture of poverty, and therefore one would expect to find a negative relationship between family size and socioeconomic status. Also, Heyns and Catsambis (1986) pointed out that the effect of mother's work is

highly related to socioeconomic status of the families. In other words, by omitting students from lower-socioeconomic backgrounds from the sample, one would also omit the effect of mother's employment on academic achievement.

In regard to the language background of the students, the results of the study showed that this variable had a positive direct effect on academic achievement and a negative direct effect on locus of control. In other words, like the grade and socioeconomic-status variables, both academic achievement and locus of control shared their variances with the language-background variable. Also, mother's work seemed to have an indirect effect on academic achievement and locus of control through language background. However, as pointed out before, the effect of language background on academic achievement is greater than its effect on locus of control.

Most of the previous studies agree with the above findings and showed that minorities had a more external locus-of-control attitude than non-minorities in various cultural backgrounds (Gurin, Gurin, Lao & Beattie, 1969; Hsieh, Shybut & Lotsof, 1969; Jessor, Graves, Hanson & Jessor, 1968; Lefcourt, 1976; Medinnus, Ford & Tack-  
Robinson, 1983; Tashakkori & Thompson, 1991). By contrast, a few studies did not find any significant differences between minorities and non-minorities regarding their locus-of-control patterns (Solomon, Houlihan & Parelius, 1969; Katz, 1967; Twomey, 1981). In all of these previous researches, the investigators compared the locus-of-control variable in various races. In other words, by minorities they meant races, for example, Black versus Whites or Aborigines (indigenous) versus Whites (non-Aborigines).

As regards academic achievement, as mentioned before, this variable (academic achievement) is more affected by language background than locus of control. A considerable amount of literature showed that children from non-English-speaking backgrounds obtain comparatively lower performance or achievement scores than those

from an English-speaking background (Farmer, Vispoel & Maehr, 1991; Ainley, Foreman & Sheret, 1991; Rosenthal, Baker & Ginsburg, 1983; de Lacey & Rich, 1979).

As mentioned before, there are several explanations for the above findings. For example, the external locus-of-control attitude among minorities might possibly be attributed to several factors, from social barriers to group mobility, little access to power, little opportunity for social activity, having directive parents, deficiency in understanding the English language or discrimination toward students from minorities or from non-English-speaking backgrounds.

Furthermore, in this regard biculturalism might affect academic achievement and particularly locus of control much more than bilingualism. Biculturalism refers to understanding and having the ability to act successfully in two different cultures (Jaramillo, 1972). Jaramillo (1972) pointed out that language reflects the feeling of people and also shows from what perspective the speaker perceives phenomena. Therefore, in different cultures, language meanings might differ because modes of feeling and perceiving are different. Jaramillo (1972) compared a few cultural differences revealed through language in English versus Spanish. For example, in the English-speaking world, when a passenger could not get to the airport in time for his scheduled flight and missed the aeroplane he would say "I missed the aeroplane" (Jaramillo, 1972). In other words, he or she appeared to accept the responsibility for his or her delay (internal locus of control). On the other hand, in Spanish the same idea is expressed by the comment "el avion me dejo" or "The aeroplane left me" (Jaramillo, 1972). Stated differently, he or she seemed to blame others for his or her missing the flight (external locus of control).

Of course, the above example does not mean that Spanish-speaking people are not responsible people, but it means people from two cultures might feel differently about destiny (Jaramillo, 1972).

In regard to the above example, it may be concluded that students from various cultures, particularly in a multicultural society like Australia, might feel differently about the items that were presented to them in the locus-of-control questionnaire, in ways perhaps consequent upon their cultural origins.

Generally, as shown in Figure 7. 1, the academic achievement of the students was affected by the majority of the independent variables of the study. Among these independent variables, the locus-of-control score had greater direct effect on academic achievement by comparison with other independent variables. In other words, in this study the best predictor of academic achievement was locus of control, and after locus of control, in order, socioeconomic status, grade, sex and language background were significant predictors of academic achievement.

As mentioned before, the result suggesting that 'locus of control is the best predictor of academic achievement' is unexpected. However, there are some explanations for this finding.

First, it should be noted that this result does not necessarily mean causation, because many variables were involved in the model and each of them may have shared their variances with another variable that was not included in the present model. In other words, there may be some other variables such as, students' attitudes towards school, students' adjustment to school environment, teachers' perceptions towards students, and teachers' experiences that can affect both students' academic achievement and students' locus of control; but these variables were not included in this study. Also, it should be noted that, although the correlation between variables of the study might be

true from a statistical point of view, these correlations might be suspected, because of the complexity of human nature.

Secondly, students' locus of control might be developed through school activities. In other words, effective interactions between teachers and students may help students to develop internal locus of control, and as a result internal locus of control might affect their academic achievement. In this regard, in a recent longitudinal study, it was found that the interaction between class and teacher had a more substantial effect than home background on student achievement (Rowe, Hill & Holmes-Smith, 1994). In Rowe's et al. (1994) study it was shown that the interaction of students and their teachers in the classroom accounted for between 28.1 and 45.6 percent of the variance in student achievement. Therefore, it may be concluded that effective interaction between students and their teachers might help students to perceive the consequences of their behaviours and, as a result, to develop a more internal locus of control.

Finally, students' locus of control might be developed by the contents of school curriculum. The contents of school curriculum, particularly the content of the English as a school subject, is usually influenced by new findings in psychology. Therefore, new content of the school curriculum might directly or indirectly help the students to perceive the relationship between their efforts and the consequences of their efforts. As a result, because of the development of this perception among students, the influence of the socioeconomic status of the family in predicting academic achievement might be relatively decreased by comparison with the findings of previous researches. Consequently, it may be concluded that the school curriculum and/or effective student-teacher interaction could compensate for the effect of socioeconomic status of the family on students' academic achievement.

## **5. Academic achievement feedback and its effects on locus of control**

From the social-learning theory point of view, a behaviour is influenced by both expectancy and reinforcement values; therefore any changes in these two variables can cause changes in the behaviour. In fact, changes in the reinforcement values, particularly in the case of adult subjects, are very difficult to bring about: although theoretically changes are not impossible, they are difficult in practice. Hence, in order to change behaviour, it is easier to change expectancies (Rotter, Chance & Phares, 1972). In other words, one of the aims of this study was to test the effects of feedback practices, regarding achievement behaviours and their influence on the self perception, in terms of locus of control, of elementary-school children.

The correlations between the first administration of locus-of-control scores (LOC1) and the second administration of locus of control scores (LOC2) in various classes of the feedback group were less than the correlations between LOC1 and LOC2 in the non-feedback classes. This attenuation of correlation in the feedback group might be the result of the different type of feedback that was administered to this group.

Further analysis of the feedback group showed that the difference between the first locus-of-control mean (LOC1) and the second locus of control mean (LOC2) for the encouraging-encouraging-feedback group was significant, while the difference between LOC1 and LOC2 in the discouraging-discouraging or the encouraging-discouraging feedback group was not significant. In other words, students who received encouraging feedback on both tasks tended toward internality to a statistically significant extent, while students who received any type of discouraging feedback did not change substantially in locus of control.

In a similar vein, it has been shown that some students who received encouraging feedback on both tasks shifted towards more internality significantly, while no significant locus of control shifts occurred either in the other feedback groups or in the non-feedback group.

The above findings partially agree with the view of social-learning theory that a behaviour is influenced by expectancy and any changes in expectancy can cause changes in behaviour (Rotter, Chance & Phares, 1972).

Several previous researches partially agreed with the above findings. For example, the results of a study that was carried out in the United States with Year 5 and Year 6 students showed that the individual feedback can affect the causal-explanation pattern of success and failure of the students. The direction of this effect showed that, when the feedback structure is rich, more specific, and individualized, the attributional patterns of low-achieving students are closer to those of high-achieving students (Oren, 1983). The result of another study showed that expressive instruction improved the performance of externals who received contingent feedback, but this improvement did not occur for those who received noncontingent feedback. Also, the subjects who received contingent feedback experienced more control over their performance than those who did not receive contingent feedback (Magnusson & Perry, 1989). This finding might also be the result of expressive instruction (Magnusson & Perry, 1989). The researchers of this study concluded, from the general pattern of their findings, that both internals and externals benefit from a classroom environment in which contingent feedback is offered to them. In other words, expressive instruction is an effective method for internals, though not for externals; but by changing external locus of control through contingent feedback, externals can benefit from expressive teaching (Magnusson & Perry, 1989).

While generalized feedback - reporting to each school class how its achievement mean compared with test norms - produced more internality among the above-average-achieving classes, it is possible that individual feedback could produce a greater effect, and perhaps also result in significantly more externality among lower-than-average achievers. It is also possible that frequent testing with tests for which norms are available could produce an even greater such bipolar effect.

An educational implication of this part of the study is the indication that a more internal locus of control, and thereby an enhanced self confidence, can likely be induced by encouraging feedback (perhaps especially by frequent feedback) for above-average achievers in reading and mathematics in the elementary school. The relative externality of below-average achievers, however, might reflect their often accurate assessment of their families' externally controlled, often low-socioeconomic, lifestyles, which in turn tend to be associated with their low achievement. These variables could, in part at least, account for the absence of a locus of control shift towards greater externality for the lower achievers after group achievement feedback, and thus for the rejection of the second part of the hypothesis in the present study. Inasmuch as a more internal locus of control is associated with greater self confidence and higher achievement, the continued search for strategies to induce a more internal locus of control for below-average achievers is indicated. Because strong external locus-of-control attitudes, like other attitudes, are likely to have originated in children's family situations, attention to working with families could productively figure in such strategies, rather than concentrating on the school alone. However, in light of the findings in this study, it is possible that any regression towards more externality after feedback for below-average achievers, might be mitigated by presenting feedback to them in as encouraging a manner as possible. Perhaps one could say that there is likely support here for the time-honoured pedagogical practice of praising children's successes; but one might usefully go further to seek out areas where children succeed, in order to enhance their internal-locus of control and self confidence.



## 6. Summary of Results and Conclusion

In summary, the results of the present study, in regard to the research questions that have presented in Chapter 3, showed that:

First, there was a significant difference between boys' and girls' academic achievement scaled scores in favour of girls ( $p<.0001$ ). This significant difference was the result of the significant difference between reading comprehension scaled score of boys and girls ( $p<.0001$ ), because no significant difference was found between the mathematics scaled scores of boys and girls. In regard to locus of control, although the girls' locus-of-control mean was greater than boys' locus-of-control mean, the difference was not statistically significant.

Second, it has been indicated that there are significant positive correlations between grade of students and all three indices of academic achievement measured in terms of scaled scores. However, the correlations between mathematics scaled scores and academic-achievement scaled scores were more significant ( $p<.001$ ) than the correlation between reading-comprehension scaled scores with grade of the students ( $p<.02$ ). In addition, it has been shown that there was a significant negative correlation between grade and locus-of-control score ( $p<.001$ ). In other words, with increasing age, externality will decrease.

Third, the results showed significant differences between means of all indices of achievement scaled scores and various level of socioeconomic status ( $p<.0001$ ). In other words, all indices of academic achievement increase with socioeconomic status from low to high levels. Also, in regard to locus of control, the means of locus of control decrease with socioeconomic status from low to high levels of socioeconomic

status. In other words, the internal locus-of-control attitude increases with socioeconomic status from low to high levels ( $p<.001$ ).

Fourth, all of the means of the indices of achievement scaled scores of the English-speaking students were significantly higher than the means of the non-English-speaking students ( $p<.003$ , for mathematics scaled scores;  $p<.0004$ , for reading-comprehension scaled scores; and  $p<.0002$ , for combination of mathematics and reading-comprehension scaled scores). In addition, the mean of locus of control of the students from non-English-speaking backgrounds was significantly more than the mean of locus of control of the students from English-speaking backgrounds ( $p<.05$ ). Stated differently, the non-English speaking students had a more external locus of control than English-speaking students.

Fifth, there were no significant differences either between the means of all indices of academic achievement or locus-of-control scores of working-mother and non-working-mother students.

Sixth, no significant correlations were found between all indices of academic achievement and family size, but a significant correlation was found between family size and locus of control ( $p<.05$ ).

Seventh, the results of the present study showed that all indices of academic achievement are significantly correlated with locus-of-control scores ( $p<.001$ ). Stated differently, these significant correlations show that higher achievement scores are associated with more internality on the locus-of-control measure.

Eight, the results of path analysis indicated that grade, socioeconomic status and language background had significant direct effects on determination of locus of control, respectively according to their size of effects. In regard to academic achievement, the

results showed that locus of control, socioeconomic status, grade, sex and language background had significant direct effects on the determination of academic achievement, respectively according to the sizes of their effects.

Finally, In regard to the effect of academic-achievement feedback on the locus-of-control attitude, it has been shown that, in the feedback group, encouraging-encouraging feedback could enhance internality, while encouraging-discouraging or discouraging-discouraging feedback could not enhance externality. In other words, some of the externals in the encouraging-encouraging-feedback group shifted to internal attitude ( $p < .0007$ ), while in the encouraging-discouraging or discouraging-discouraging-feedback group no significant change occurred.

Some parts of this inquiry appear to be the first studies of this kind to have been conducted in a somewhat ethnically diverse population. The ethnic mix of the present sample reflects closely the Australian national demography: approximately 75 percent of students, or their ancestors, British-Isles origin and about 25 percent, or their parents, originating from other English-speaking countries and non-English-speaking countries.

Also, this study has some contribution to offer in the study of academic achievement. It seems that it is the first time that the effects of various aspects of family background and locus of control, together, have been examined in relation to academic achievement, particularly at the elementary-school level. In addition, a study of the effects of academic-achievement feedback in a natural classroom setting has been another new aspect, and also a controversial issue, of this enquiry, particularly at elementary-school level, since previous researchers studied these effects in an experimental and rather artificial situation. Furthermore, it seems that none of the previous studies tried to compare the size of the effects of various aspects of family background and locus of control on academic achievement.

Although the results showed that locus of control is the best predictor of academic achievement, it cannot be concluded that locus of control is the cause of academic achievement. This is because both of these variables had shared their variances with other variables such as socioeconomic status, grade and language background of the students. Furthermore, both of these variables (locus of control and academic achievement) also might share their variances with other variables which were not included in this study. Further research is needed to clarify the total effects (sum of direct and indirect effects) of each variable on academic achievement. Furthermore, there might be a simultaneous relationship between locus of control and academic achievement that should be investigated by further analysis.

In addition, it was shown that locus of control is less affected by familial background than with academic achievement. Therefore, it can be concluded that locus of control might be more affected by school environment, than familial background.

## **7. Implications of the study**

This study has some implications at various levels of the society. It is recommended that policy makers in Australia might pay more attention to the various minority groups, such as people from non-English-speaking backgrounds and lower-socioeconomic-status families. This considerable proportion of the population can make a substantial contribution to the development of Australian society. Such attention could have various manifestations in terms of economical and psychological assistance. For example, in order to improve the economic situation of the families from non-English-speaking backgrounds, the policy makers might pay more attention to alleviating the unemployment rate among this particular group. Also, remedial programs could be designed not only to improve the English language of this particular group, but also to include activities in which they can develop various aspects of their personalities such

as their self-esteem and their locus of control. These kinds of training would directly affect and enrich the family background of this particular group.

In addition, those policy makers who are responsible for educational development could pay more attention to the teacher-training programs and include activities or subject(s) to help teachers better understand the importance of personality aspects of the students in their academic development. Also, these policy makers in education might consider reading ability, especially of boys, because not only the result of the present study, but also the results of other previous studies, as mentioned in Chapter 3, showed that boys' reading achievement is lower than girls' reading achievement. Therefore, in future, more research is needed to consider various aspects of this problem.

Furthermore, in general, the importance of the family in the various aspects of child development should not be neglected. The awareness of families of different factors that can enhance their children's achievement is very important. In other words, parents cannot maximize their influence on their children's achievement unless they know, first, the importance of their roles in their children's achievement, and secondly, how their behaviour, regarding to their children, can improve their children's self-esteem, self-concept, locus of control and other personality aspects. In this regard, mass media, like radio and television, could be a good medium to assist families effectively to extend their knowledge.

Also, this study may have some specific educational implications. It has been shown that locus of control has an important role in predicting academic achievement. Therefore, this variable could be considered by teachers, administrators and educational planners as an alternative variable that can influence the academic achievement of students. Also, the results showed that group academic-achievement feedback could affect locus of control. In other words, more internal locus of control, and thereby an

enhanced self confidence, can likely be induced by encouraging feedback (perhaps especially by frequent feedback) for above-average achievers in reading and mathematics in the elementary school. The relative externality of below-average achievers, however, might reflect their often accurate assessment of their abilities and their families' externally controlled, often low-socioeconomic, lifestyles, which in turn tend to be associated with their low achievement. On the other hand, perhaps there is reason to assume, from the present study, that internality, and thus more self confidence, might result for below-average achievers if feedback for them is made as encouraging as possible. It seems that not only by frequent achievement feedback but also by other procedures such as parents' attitude change, particularly among parents of lower socioeconomic status, and revision of the content of the curriculum, might also alter the students' locus of control toward internality.

Also, the results showed that socioeconomic status and language background have significant effects on both locus of control and academic achievement. These findings might suggest that by individualized instruction the deficiencies in academic achievement can be compensated among students from lower socioeconomic status and non-English-speaking backgrounds. Again, such individualized instruction might help the students to perceive the consequences of their behaviours, and as a result to develop a more internal locus-of-control attitude.

## **8. Suggestions for further studies**

Some research issues arise from the present study. These issues are listed as follows:

1. Is locus of control a temporary (state) or enduring (trait) attitude, and are these two characteristics related to socioeconomic status?

2. There are some variables which might affect both locus of control and academic achievement and which were not included in this study. For example, March (1989) mentioned that girls spend more time in doing their homework than boys; and by including the homework variable in predicting academic achievement, the direct effect of sex on school achievement was reduced substantially. In other words, would the present results have been changed, if variables such as students' attitude toward school, students' adjustment to school environment, teachers' perceptions towards students, teachers' experiences and interactions between teachers and students, were included in this study?
3. Does the initial level of ability on entering school or age of entering school affect the relationships between locus of control and academic achievement?
4. In relation to group academic achievement feedback, are there socioeconomic, sex or ethnic differences in locus-of-control shift patterns? Would such shift patterns change, if the locus-of-control questionnaire were first measured before the achievement tests? Could the present findings be generalized beyond the elementary-school level?
5. In regard to the mother's-work variable, kind of mothers' work was not considered in the present study. In other words, does kind of mothers' work affect the prediction of academic achievement or locus of control?
6. Content analysis of the school curriculum, particularly content analysis of English as a subject, might help to determine and to clarify the effect of curriculum on locus of control. In other words, does the school curriculum and the content of each subject have any role in shaping locus of control?
7. What are the particular effects of culture, particularly in terms of language, in manifestation of locus of control?

8. In order to investigate the effects of development and/or maturation in both locus of control and academic achievement, and to study the pattern of changes, particularly in relation to independent variables, longitudinal studies are needed rather than cross-sectional studies. Some of the research questions that are raised above could be answered better by longitudinal studies than by cross-sectional studies. A further question is, are there any differences between the findings of longitudinal studies and the findings of cross-sectional studies?

### **9. Limitations of the present study**

This study has some limitations that might affect the generalization of the results. These limitations, listed below, could be considered for future studies.

First, the investigator tried to select a sample which might allow the results to be generalized beyond the Illawarra region, but generalizability should be tested by further studies.

Secondly, as mentioned in Chapter 4, in spite of the effort of the principals whose schools were involved in this study, about 80 percent of the parents permitted their children to take part in this study. However, the question that may arise regarding the representativeness of the sample is 'What are the characteristics of those families who did not permit their children to participate in this survey?'

Thirdly, in regard to the study of academic-achievement feedback the sample size, particularly in the feedback group, was limited. Further research with more subjects is needed to clarify the effect of achievement feedback on locus of control.



Fourthly, although some of the important family background variables were studied in relation to academic achievement and locus of control, it would be advisable to consider additive 'home environment' variables in relation to both academic achievement and locus of control in future studies.

Finally, the investigator could not get the permission from the principal to administer individualized feedback to the students in the feedback group in order to study the effect of individualized feedback on locus of control. Perhaps this might be permitted in a future investigation.

It is hoped that future studies would address the limitations of the present study.

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**Appendix A**  
**(Permission)**



Fax: (042) 268234

Your reference:

Our reference:

For information  
contact:

Telephone: (042) 268

April 23, 1993

Mr M Khayyer  
Graduate School of Education  
University of Wollongong  
PO Box 1144  
WOLLONGONG NSW 2500

Dear Mr Khayyer

Permission is granted for you to carry out your research on Academic Achievement and its Relation to Family Background Socioeconomic Status and Locus of control providing the following conditions are met:-

- the principals of schools agree to the research being carried out;
- permission to survey the students is obtained from the parents prior to the surveys taking place; you should note that your letter to parents does not contain enough detail about you or the research you propose and should be amended;
- confidentiality of data is ensured;
- a short precis of the research finds which may be used in a regional publication with due acknowledgements is forwarded to:

Dr T R Burke  
Assistant Director-General  
Department of School Education  
PO Box 1232  
WOLLONGONG 2500

Please take a copy of this letter with you when you approach the Principal(s) involved. I trust that your research goes well and the results prove suitable to your needs.

Yours sincerely

(Dr) T R Burke  
Assistant Director-General  
South Coast Region



**UNIVERSITY OF WOLLONGONG**  
Office of the Vice-Principal (Administration)

Academic Services Branch  
**INITIAL CONDITIONAL**  
In reply please quote: WJL:KR HE93/186  
Further Information: Kim Roser (Ext 3079)

21 June 1993

Mr M Khayyer  
Postgraduate Room (21.105)  
Faculty of Education  
University of Wollongong  
Northfields Avenue  
WOLLONGONG NSW 2522

Dear Mr Khayyer

I am pleased to advise that the following Human Experimentation Ethics application has been conditionally approved:

Ethics Number:	HE93/186
Project Title:	Academic Achievement and its Relation to Family Background and Locus of Control
Name of Researchers:	Mohammad Khayyer
Approval Date:	18 June 1993
Duration of Clearance:	31 December 1993

This approval is granted subject to (i) amendment of the participant consent form to note that any concerns regarding the conduct of the research may be directed to the Secretary of the University of Wollongong Human Experimentation Ethics Committee and (ii) provision of a satisfactory participant information package.

Please provide written evidence that this condition has been satisfied to the Secretary of the Committee before the commencement of research approval will be withdrawn.

This certificate relates to the research protocol submitted in your application of 17 May 1993. It will be necessary to inform the Committee of any changes to the research protocol and seek clearance in such an event.

Please note that experiments of long duration must be reviewed annually by the Committee and it will be necessary for you to apply for renewal of this application if experimentation is to continue beyond one year.

Chairperson  
Human Experimentation Ethics Committee

cc. Head, Department of Education



# UNIVERSITY OF WOLLONGONG

FACULTY OF EDUCATION

21st June, 1993

JUN 29 1993

Permissions Office,  
American Psychological Association,  
750 First Street,  
NE, Washington DC 20002-424

Author address: Stephen Nowicki  
450 Burlington Rd.  
Atlanta, GA 30307-110

Dear Sir,

Not having been able to find a copy of the Nowicki and Strictland Locus of Control test commercially, Mohammed Khayyer, a Ph.D student in the Graduate School wishes to seek your permission to copy the test, as published in your journal, *Journal of Consulting and Clinical Psychology*, Vol.40, 1973 for the purposes of administering to children here in Wollongong in a research project. pp. 142-154

Thanking you,

Yours sincerely,

Assoc. Prof. P. de Lacey

\* PP 142-154.

If your earliest convenience would be much appreciated

Ph.D.

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Phone: 042 21 3333 Fax: 042 21 3333

APA will need  
to be recontacted  
for permission  
if scale is  
published.

# EMORY UNIVERSITY

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Department of Psychology

Atlanta, Georgia 30322  
404/727-7438  
FAX 404/727-0372

Professor P. de Lacey Ph.D.  
Graduate School of Education  
P.O. Box 1144 (Northfields Avenue)  
Wollongong, N.S.W. 2500  
Australia

Dear Professor de Lacey,

I am writing in response to your request to give permission to Mohammed Khayyer to copy and use the Children's Nowicki-Strickland Internal-External Control scale in a research project. He has my permission to do so.

I will send along, in the regular mail, copies of the manual and list of references for your information as well. Please let me know what you find using the scale. Good luck in your research.

Sincerely,

Stephen Nowicki Jr. Ph.D. ABPP  
Charles Howard Candler Professor of Psychology  
Emory University



918194

Australian Council for Educational Research  
Radford House  
Frederick Street, Hawthorn 3122

Mohammad Khayyer  
Postgraduate Room  
Graduate School of Education  
University of Wollongong  
Wollongong, NSW 2500

Dear Sir/Madam

I am a Ph.D. student in Education in the University of Wollongong. I have used some parts of TORCH and PATHMATHS tests for measuring academic achievement at primary school level. These tests were purchased by the Faculty of Education of The University of Wollongong for the above purpose. From TORCH set, passages A1, A2, A4 and A5 and from PATHMATHS set forms 1A, 1B, 2A and 2B have been used.

My question is: May I have permission to include a copy of the above items in the appendix of my thesis.

I would highly appreciate a response from you at your earliest convenience.

Sincerely Yours

Mohammad Khayyer



THE AUSTRALIAN COUNCIL  
FOR EDUCATIONAL RESEARCH LIMITED

---

Telephone: 277 5556  
e-mail: griffin@acer.edu.au

Ref: AG 32 200 6 Permissions

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16 September 1994

Mr Mohammad Khayyer  
Postgraduate Room  
Graduate School of Education  
University of Wollongong  
WOLLONGONG NSW 2500

Dear Mr Khayyer

RE: Your request of 9 September 1994 to reproduce:

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Amanda Griffin, Publishing Assistant  
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The Australian Council for Educational Research

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**Appendix B**

**(Insrtuments)**

1) Number

2) Grade:

3) Sex: Boy ☐ Girl ☐

4) How many brothers and sisters do you have?

5) Do you speak any other language, besides English, at home? Yes ☐ No ☐

6) What is your father's job?

7) Is your mother working? Yes ☐ No ☐

8) If yes, does she work: Part time ☐ or Full time ☐



## **Appendix C**

**Prediction of mathematics achievement and  
reading achievement from some demographic,  
familial and locus of control variables**

## **Prediction of mathematics achievement and reading achievement from some demographic, familial and locus of control variables**

In this part of the thesis the results of path-analyses regarding mathematics achievement and reading achievement in relation to other variables of the study will be presented. In this regard, grade, sex, socioeconomic status (SES), family size, mother's work and language background are independent variables; and locus of control (LOC) serves as either an independent or a dependent variable; while mathematics achievement and reading achievement are dependent variables.

### **Mathematics achievement**

In order to determine the effect of each independent variable (grade, sex, SES, family size, mother's work, language background and LOC) on mathematics achievement, the mathematics scaled scores were regressed on the independent variables of the study by multiple-regression analysis. As shown in Table 1.A, the standardized coefficient showed that the grade of the students has the most significant effect on prediction of mathematics achievement. After that, LOC score, SES and language background make significant contributions in predicting mathematics achievement, in that order. Other variables, sex, family size and mother's work, did not have any significant effect in predicting mathematics achievement. In total, about 24 percent of the variation of mathematics achievement can be explained by the above independent variables.

The result of the multiple-regression analysis, regarding the LOC variable on the independent variables of the study (grade, sex, SES, family size, mother's work and language background) was presented previously in Table 7.2 in the Chapter 7 of the thesis. Also, the results of intercorrelations among the independent variables of the study was presented in Table 7.6, again in the Chapter 7 of the thesis.

**Table 1.A: Regression coefficient, standard errors (in parentheses) of the independent predictors (including LOC) of the mathematics achievement**

Predictors	Mathematics achievement		
	Unstandardized coefficient	Standardized coefficient	Sig. level
Grade	1.583 (.21)	.317	.0001
Sex	.139 (.453)	.013	No sig.
SES	.576 (.133)	.185	.0001
Family size	-.084 (.197)	-.018	No sig.
Mother's work	-.432 (.47)	-.039	No sig.
Lang. back.	1.117 (.569)	.082	.05
LOC	-.229 (.051)	-.19	.0001
Intercept	44.851		
n	460		
R	.487		
R-Squared	.237		
p (Predictive equation)	.0001		

After all of these analyses, the above results are presented as a path-analysis in a model in Figure 1.A. As shown in this Figure, grade, LOC, SES, and language background each have significant direct effects on the prediction of mathematics achievement. Also, grade, SES, and language background have significant direct effects on the prediction of LOC, in that order.

Other variables of the study, family size, sex, or mother's work, did not have any significant direct effects in predicting LOC or mathematics achievement. However, these variables have significant indirect effects on LOC or mathematics achievement through their interrelationships with each other. For example, as shown in Figure 1.A, family size has negative indirect effects on both LOC and mathematics achievement through its negative correlation with SES.



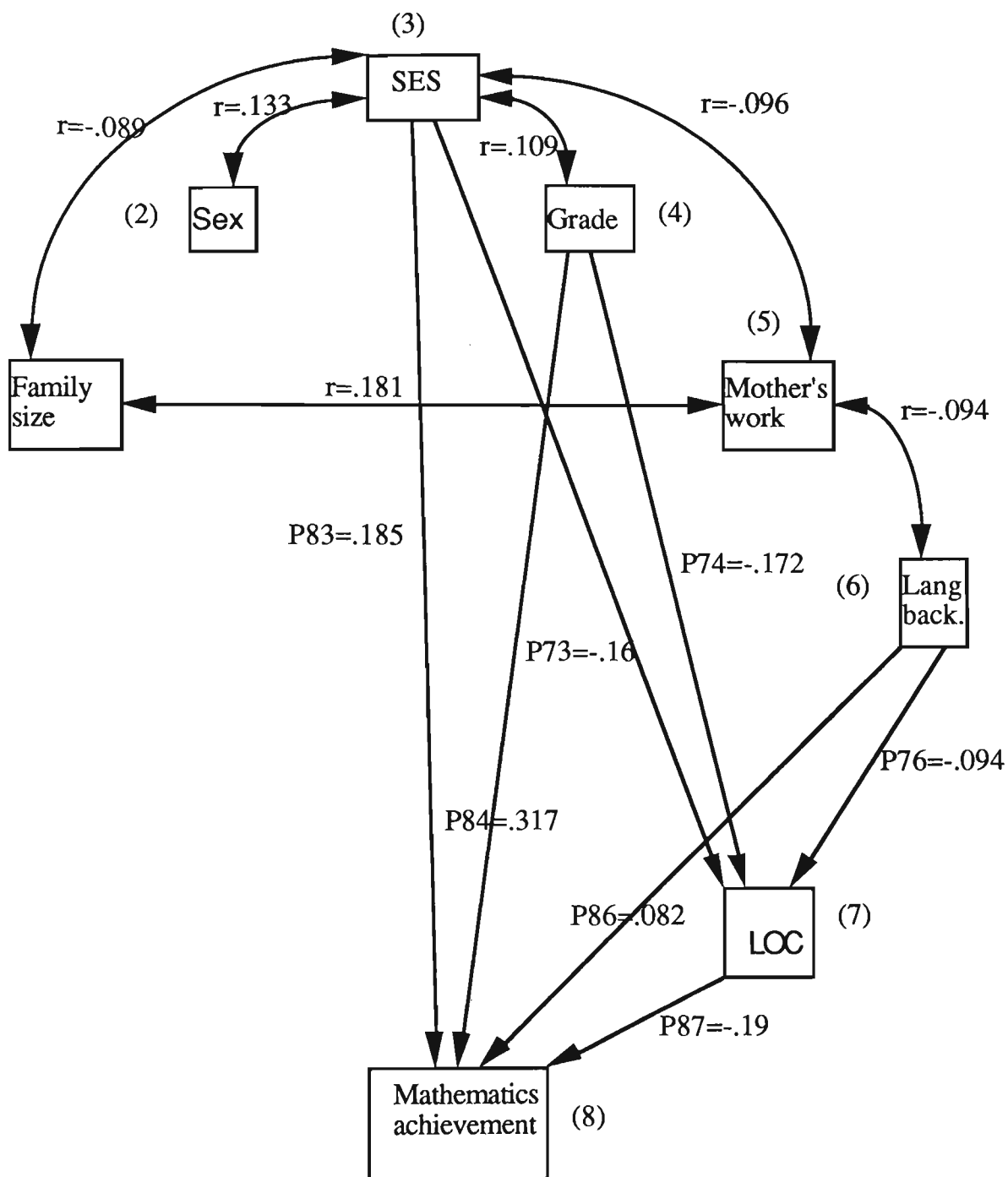


Figure 1.A: Causal model of mathematics achievement (modified)

Reading achievement

In regard to the analysis of the effect of each independent variable on reading achievement, the scaled reading scores were regressed on the the independent variables of the study by multiple-regression analysis. As shown in Table 2.A, the standardized coefficient showed that the sex of the students has the most significant effect on the prediction of reading achievement. After that, LOC score, SES, language background and grade of the students make a significant contribution to predicting reading achievement, in that order. The remaining variables, family size and mother's work did not have any significant effect in predicting reading achievement. In total, about 18 percent of variation of reading achievement can be explained by the above independent variables.

Table 2.A: Regression coefficient, standard errors (in parentheses) of the independent predictors (including LOC) of the reading achievement

-----			
Predictors	Reading achievement		
	Unstandardized coefficient	Standardized coefficient	Sig. level
Grade	1.082 (.523)	.09	.04
Sex	5.312 (1.128)	.204	.0001
SES	1.381 (.331)	.185	.0001
Family size	-.526 (.492)	-.047	No sig.
Mother's work	-.557 (1.17)	-.021	No sig.
Lang. back.	4.932 (1.417)	.151	.0005
LOC	-.55	-.19	.0001
-----			
Intercept	27.814		
n	460		
R	.424		
R-Squared	.18		
p (Predictive equation)	.0001		
-----			

Again, the result of multiple-regression analysis, regarding the LOC variable on the independent variables of the study, was presented previously in Table 7.2 in the Chapter 7 of the thesis. Also, the result of intercorrelation among the independent variables of the study was presented in the Table 7.6 in the same Chapter of the thesis.

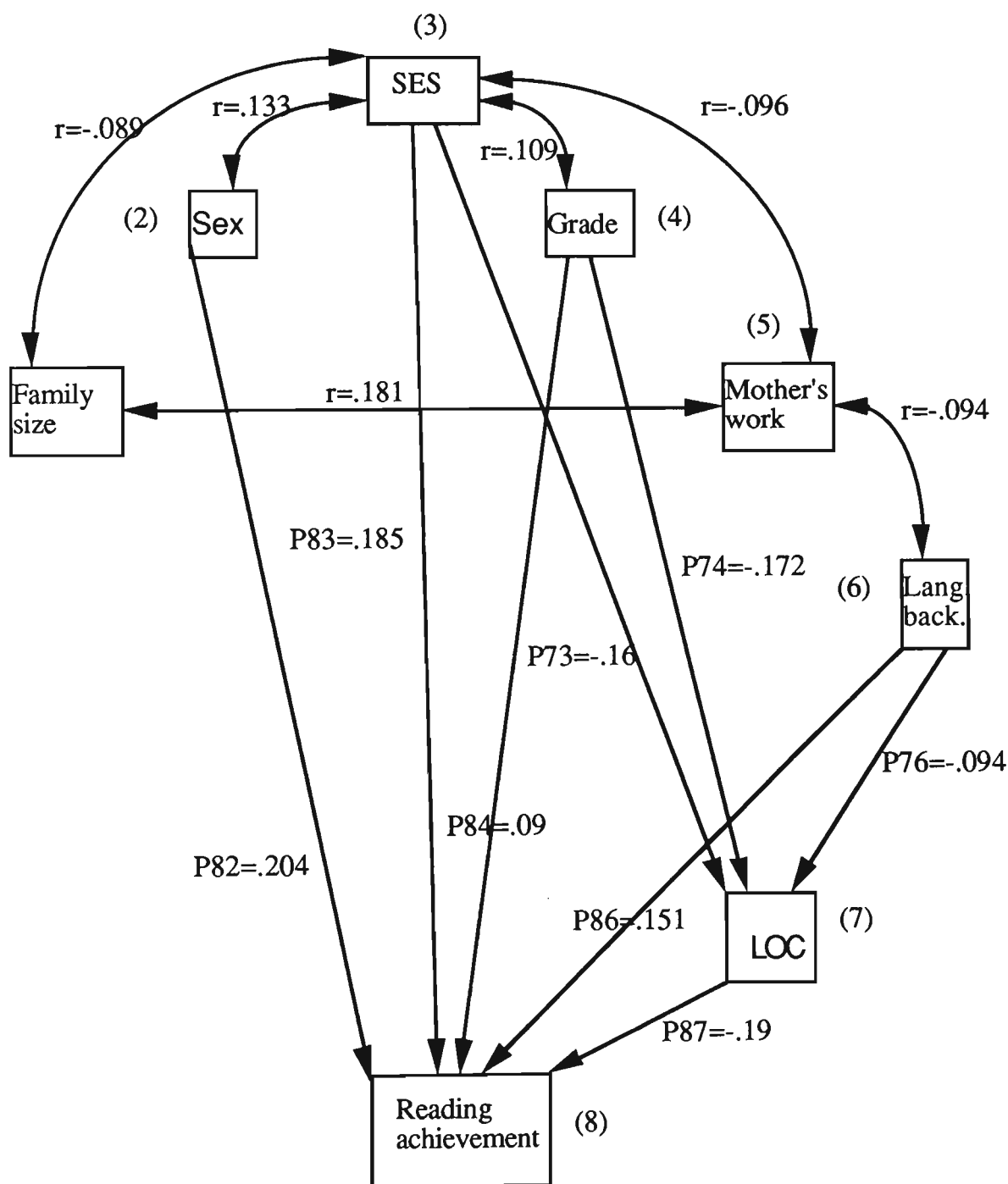


Figure 2.A: Causal model of reading achievement (modified)

The results of the above analysis are presented as a path-analysis in a model in Figure 2.A. As indicated in this Figure, sex, LOC, SES, language background and grade each have significant direct effects on predicting reading achievement. Also, grade, SES and language background have significant direct effects on the prediction of LOC, in that order.

Other variables of the study, family size and mother's work, did not have any significant direct effects in predicting LOC or reading achievement. However, these variables have significant indirect effects on both LOC and reading achievement through their interrelationships with each other. For example, as shown in the Figure 2.A, family size has a negative indirect effect on both LOC and mathematics achievement through its negative correlation with SES.

In conclusion, the results of the path-analyses showed that the pattern of the causal model for mathematics achievement is different from the pattern of the causal model for reading achievement. Stated differently, regarding mathematics achievement the grade or age of the students is the most important factor in their mathematics achievement; while, for reading achievement, the sex of the students is the best predictor (as shown previously, the girls are higher achievers than boys in reading achievement). Also, as expected, the language background of the students has a more highly significant effect on reading achievement than on mathematics achievement.

In spite of the above differences, in both of these models, after the grade or sex of the students, the LOC score is the second-best predictor, followed by SES and language background for either mathematics achievement or reading achievement. Also, in both of these models, neither family size nor mother's work has any significant direct effect on either mathematics achievement or reading achievement.