NATIVE AND NON-NATIVE

HIGH SCHOOL DROPOUT

A LONGITUDINAL INVESTIGATION OF DROPOUT AMONG NATIVE AND NON-NATIVE HIGH SCHOOL STUDENTS

By

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Abstract

Most research on secondary school dropout has been cross-sectional, and this has made it difficult to know whether the differences observed between dropouts and persisters are antecedents or consequences of attrition. Furthermore, little is known about the causes of dropout among non-majority students such as native Indians. Investigators also have neglected to consider the utility of using theoretical frameworks that have proved useful in understanding various behaviours.

This thesis was directed at learning which variables contribute to dropout among Native and non-Native students and at delineating combinations of variables that are useful predictors of enrollment status. The relative merits of the Ajzen-Fishbein model and a general expectancy-value approach also was of concern. To these ends, a longitudinal, multivariate investigation was undertaken. Information from school records and questionnaires was used to determine which factors distinguished students who had persisted from those who had discontinued 1 year and 3.7 years after the initial survey.

The results revealed that dropout can be predicted with considerable accuracy even over several years. Intentions, absenteeism, grade average, and perceived value of education were shown to be the most important predictors. Information in school records enabled good prediction. Of the two models, the Ajzen-Fishbein framework showed the most promise. Although the data were consistent with Fishbein's conceptualization of how intentions are formed, it was shown that the model needs refinement in accounting for actual behaviour.

On the basis of the findings from this and other research, suggestions are given for decreasing attrition.

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Chapter One
INTRODUCTION

This dissertation concerns dropout among Native ("Indian")[1] and non-Native high school students. In order to put the problem in perspective, the first sections of this chapter concern the history, demographics, aspects of present day life, and education of Native peoples, especially those on the Six Nations Reserve. Then, the magnitude of dropout and research on its causes and consequences is examined. After mentioning a few of the limitations of many previous investigations (discussed in detail in Chapter 2), it is contended that further research with better methodology and theory is needed for an adequate understanding of this problem.

1) Natives

i) Historical Background

Although many believe that Natives originated from Siberian stock, there is little consensus concerning when they arrived in North America (see Driver, 1975; Oswalt, 1978; Spence, 1986). The Norsemen described Eskimo-like people when they reached

North America about 1000 A.D. Some authorities believe that Natives have lived here for at least 10,000 and perhaps as long as 50,000 years. Regardless of the date of arrival, it is clear that Natives were on the continent long before Europeans. Natives helped the new arrivals survive in an unfamiliar environment by teaching, among other things, about new foods and dangers. Many Native groups eventually entered into treaties with the colonizers that set aside land as reserves and guaranteed various privileges.

ii) Demographics

Today, Natives comprise between 1.2 and 3 percent of the Canadian population depending on how "Indian" is defined (Frideres, 1983; Price, 1982). Apparently, about 50% of the Natives in Canada are not status or registered, meaning that they do not receive the privileges and benefits given to status Indians (e.g., health coverage). The Native population is very young, with two-thirds of all Natives younger than 25 (Frideres, 1983). There are 2,242 reservations, 573 bands (Bienvenue, 1985) and about 50 Native languages in Canada (Price, 1982). Price (1982) estimates that in Canada, 28% of treaty Indians and 69% of non-treaty Indians live off their reserve. Natives often choose

to live on reserves because these enclaves help them to maintain their culture, language, and customs. Moreover, moving off their reserve results in a loss of federal benefits. In addition to variation in place of residence (from extremely isolated to urban), there is great diversity in how Natives earn their living. While many still hunt and trap, or farm, others have vocations similar to their non-Native counterparts. Many Natives, including the Caughnawaga migrate to urban centers for work in "high steel" construction and industry.

iii) Living Conditions

Often Natives live in deplorable conditions that are not conducive to academic persistence. As Fuchs and Havighurst (1972) note, "The failure of Indian education must be examined in the context of the most severe poverty confronting any minority group in the Unites States (pp. 300-301)." Commenting on conditions in Canada, Bienvenue (1985) states that, "In many ways, the profile of Canadian Indians approaches the health conditions found in non-industrial countries (p. 211)." Table 1 provides information relevant to the quality of Native life in Canada.

Table 1: Native Conditions in Canada.

1. Infant mortality: 2 times the national average (Bienvenue, 1985; Frideres, 1988, p. 145); 2.8% in 1978 (Price, 1982)

2. Suicide: 3 times the national rate (Bienvenue, 1985)

3. Life expectancy: 10% lower than average (Indian Conditions: A Survey, 1980); 9-10 years less than the average Canadian (Bienvenue, 1985)

4. Percent receiving social assistance: 50-70 (Bienvenue, 1985)

5. Percent living in poverty: may be as high as 80% (Mifflen & Mifflen, 1982)

6. Crowding: In 1977, 65% of reserve homes in Canada contained two families (Frideres, 1988, p. 193)

7. Amenities: In 1985, 60% of houses did not have running water (Frideres, 1988)

Clearly, the Native standard of living is far below the national standard and this no doubt contributes to their low educational achievement, which in turn makes it difficult to break away from impoverished conditions.

iv) Education

The following material is presented to provide additional perspective for understanding the education of Native Canadians in modern times. Although Natives had an informal educational system that emphasized subsistence/survival skills prior to the European

arrival, it was viewed mostly with indifference or, at worst, with derision by the newcomers. They desired to educate the Natives about the new ways and in the process convert ("civilize") the indigenous people. As chronicled in such sources as Abate Wori Abate (1984), the Dutch, French, and British each contributed to educating Natives. This early education, until about 1850, was carried out by various religious groups and not surprisingly had considerable religious content. Frideres (1987) describes the education in this period as religious, segregationist, and oriented toward conversion.

From 1850 to 1945, religious groups still played a prominent role in the education of Natives. During these years, students typically were educated in residential schools. Apparently, it was thought that removing students from their homes would result in better learning. According to Abate Wori Abate (1984) and Frideres (1987), school attendance until at least age 14 or 15 became compulsory in the late 1800's. Nevertheless, education for Natives was not "free" in Canada until 1927 or 1928 (Abate Wori Abate, 1984; Frideres, 1987). The educators stressed farm work, housework, and similar topics prior to the introduction of provincial curricula, which in the case of the Six Nations occurred by 1919 (Abate Wori Abate, 1984).

In Frideres' typology, the period after 1945 represents the next phase in the education of Natives. In this era, the Church influence largely disappeared as did residential schools. The government policy can be described as encouraging integration of Natives and non-Natives. Today, the groups usually attend integrated high schools with a common curriculum. However, there are 80 schools on reserves in Canada that offer at least some secondary education (Frideres, 1987). Where Natives comprise more than 10% of the school population or number more than 100, by law there must be Native representation on the school boards (Maclean, 1973). Schools with sizeable Native populations usually offer material of interest to Natives including Native history, and sometimes instruction in Native languages. Aboriginal language instruction often is offered in primary schools, which are usually on a reserve. The Canadian Education Report (1984) gives the following breakdown by jurisdiction:

Band schools: 16%
Provincial and private: 54%
Federal: 28%

It has been noted by Abate Wori Abate (1984) and others that from 1972, Native groups have adopted an official policy of Native control of education, though it is apparent that there is considerable controversy

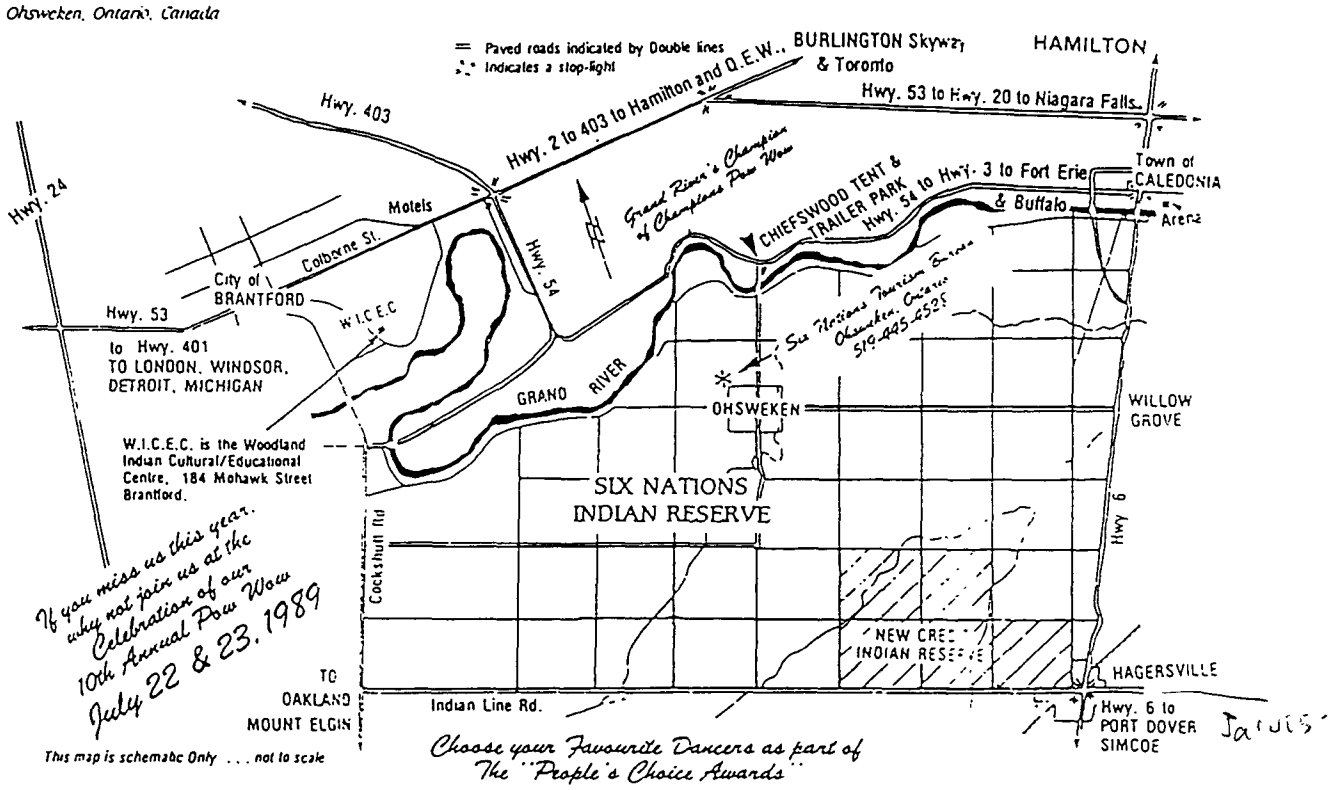
regarding the ramifications of this. Abate states that by 1981, there were 157 Indian "controlled" schools in Canada. From the perspective of this thesis, it is important to know that today, Natives are required by law (Indian Act) to attend school until they are 16. The government underwrites this education and at present also pays for the post-secondary education of the few Natives that reach this level.

II) Six Nation Natives

The Iroquois had sided with the Loyalists in the American War of Independence, and in 1784, after the defeat of the British, they were granted land along the bank of the Grand River. The Natives of the Six Nations -the Cayuga, Oneida, Mohawk, Seneca, Tuscarora, and Onondaga (Iroquois)- moved from New York to Canada, with many, but not all settling along the Grand. They already had established friendly relations with the Mississauga who were living in the area.

Today, the Six Nations and Mississauga live side by side, 23 miles south of Hamilton, on the Six Nation and New Credit Reserves (see Figure 1). The Six Nation's Reserve, with approximately 10,000 residents, has the largest Native population of any reserve in Canada and is one of the most economically developed.

Figure 1: Six Nation and New Credit Reserves



The New Credit population is much smaller than its sister reserve, being about 900. Apparently the reserves have some 150 businesses, but as many as 60% of the employed adults work off the reserve. Although the Six Nations are doing well economically compared to many Native groups, their standard of living is considerably lower than what most non-Natives experience. Most Natives on these reserves speak English, though there is a little use of traditional languages (e.g., Mohawk) on the Six Nation Reserve. There are two political systems at Six Nations; the dual systems are an hereditary, and an elected council imposed on the Natives by the RCMP in 1924. Today, most Native children attend primary school on the reserve, followed by secondary education off the reserve in integrated schools. The reader interested in more detail on Native life in Canada or on the Six Nation Reserve is referred to Abate Wori Abate (1984), Arden (1987), Bienvenue (1985), and Jennings (1985).

III) Dropout

i) Dropout Rates

More students than might be expected are discontinuing their education before receiving a grade twelve diploma. Indeed, it has been estimated that 25

to 30% of Americans fail to complete grade twelve (Hill, 1979; Powell Howard & Anderson, 1978; Steinberg, Lin Blinde & Chan, 1984). Although Hispanics, Blacks, and Natives drop out of school in greater numbers than Whites (Rumberger, 1983; Steinberg, Lin Blinde & Chan, 1984), it would be erroneous to consider these differences to be solely determined by race. Factors such as difficulty with English and low socioeconomic status may be largely responsible for the relations between race and dropout. The rate of attrition among Native Americans is estimated to be between 40 (Lee, 1972; Price, 1982) and 60 (Otis, 1981) percent. In addition, American Natives have been underrepresented in college and university and fewer than 0.4% hold graduate degrees (Churchill, 1981, p. 30).

Price (1982) estimates the overall dropout rate in Canada to be 12%, and the Native loss as 80%, but Census data (Census of Canada, 1981; 92-917) suggest that the non-Native figure is too low. These data indicate that 28% of Canadians between the ages of 25 and 34 (ages by which most people who graduate have done so) do not have a high school diploma, and that the rates are even higher for older cohorts.[2]

In Ontario, approximately 62% of Native students registered under the Indian Act compared with 24% of all students fail to progress from grade 9 to

grade 12 on schedule (A Demographic, Social and Economic Profile of Registered Indians in Ontario, 1979). It is unfortunate that these figures confound dropout and academic progress thereby making it impossible to know the actual dropout rates. Presumably, the figures mentioned are overestimates of the unconfounded data since some students who are held back will, nevertheless, eventually graduate. Data reported by Watson (1977) indicate that during the 1974-1975 school year in Ontario there was a 12.4% loss of secondary students. That is, 12.4% of all those students, irrespective of race, who were enrolled in September, 1974 discontinued sometime in that one school year. The percentage of students who fail to finish high school is not clear since the rate varies by grade, and because some of these students probably returned and finished their studies. However, Census data (Census of Canada, 1981; 92-917) show that 27% of Ontarians between the ages of 25 and 34 have not graduated from high school.

ii) Consequences of Dropout

Regardless of the exact figures, it is evident that in both Canada and the United States substantial numbers of non-Natives and even more Natives are not

completing a level of education that is becoming a minimal requirement for entering the work place.

By discontinuing their education, dropouts are foregoing what is often considered to be "the most important determinant of occupational success" (Felice & Richardson, 1977; Felice, 1981). Not only are these students reducing their likelihood of employment, they are, with a few notable exceptions, locking themselves into low paid, unskilled, and likely temporary employment. That education contributes to earnings is borne out by Census data (Census 1981; 13579) on 25 to 44 year old Canadians which show that the average annual income for workers with less than grade 9 was $11,785, compared to $14,281 for those educated between grade 11 and 13, and $15,958 for individuals having some post-secondary education.[3] Moreover, dropout results in higher social assistance payments and less tax revenue. Indeed, it is estimated that each dropout, over his or her lifetime, costs society as much as $500,000 U.S. (Borman & Hopkins, 1987). In addition to economic hardship, dropouts are often faced with a host of non-economic consequences including low self esteem (Patton & Noller, 1984; Tiggeman & Winefield, 1984), decreased ability to function in society, illiteracy, and possibly an increased likelihood of involvement in criminal activity.[4] The

fact that many dropouts have the ability required to complete high school (Elliott & Voss, 1974; Felice, 1981; Sewell, Palmo & Manni, 1981) makes the high rates of attrition especially unfortunate, and underscores the importance of determining the causes of this wastage.

iii) Research on Dropout

As yet, the determinants of dropout, especially for Natives, are not well understood. Although there is no shortage of speculation concerning possible antecedents of dropout among Natives, few empirical investigations have been conducted, and those that have been undertaken often contain methodological weaknesses which detract from their value.

In contrast, much useful descriptive research has been conducted on non-Native dropout, which has revealed that many factors such as home environment, characteristics of teachers and schools, and the personalities and beliefs of students are related to educational persistence. Notwithstanding these associations, however, our understanding of which variables cause dropout, and which of them are the most important is scant. The existing research, being predominantly cross-sectional and univariate, has not

been efficient in distinguishing true causal relationships from spurious ones. Some of the observed associations, as will be discussed in Chapter 2, likely have, at times, been interpreted to reflect causal influence when such an inference was unwarranted. Indeed, some of the presumed "causes" of dropout probably are consequences of the real determinants. As well, some of the observed relationships between predictors and the criterion of enrollment status (dropped versus persisted) likely reflect the influence of "third variables." Although such ambiguity is largely attributable to the use of cross-sectional univariate research strategies to the exclusion of multivariate longitudinal approaches, a lack of theory also is partly responsible. Without theory, researchers are provided with little guidance concerning which variables should be controlled or held constant, let alone how to measure them. The paucity of theory has, no doubt, had the additional effect that educational attrition research has not been particularly cumulative. Current research is not guided by, and does not build upon past work to the extent that would be possible with greater theoretical development.

Although research into the bases of high school attrition is quite atheoretical, work in some other

areas such as occupational turnover, effort expenditure, consumer purchasing behaviour, decision making, and educational persistence at the post-secondary level has been associated with considerable theoretical development. It is likely that these theories also could be useful to understanding attrition among high school students. The choice among the theories, however, is difficult since few previous investigators have employed competitive tests in which two or more formulations are compared in a single study. Nevertheless, it can be argued that the Ajzen-Fishbein (Ajzen & Fishbein, 1980) and the general expectancy-value models are most worthy of selection.[5] These models have proved useful in accounting for a wide range of behaviours, and unlike others, provide considerable guidance concerning how to measure the relevant constructs. Moreover, as will be discussed later, these frameworks probably enable a deeper level of understanding of the criterion variable, whatever it might be. In view of these considerations and one other, the potential to suggest ways of decreasing dropout, the Fishbein and the expectancy-value frameworks were used to guide the research reported in this thesis.

It is expected that the research presented here will improve understanding of the reasons underlying

Native and non-Native attrition. With the use of a methodologically rigorous multivariate longitudinal design, this investigation should better delineate which factors are true causes of the decision to drop, as well as provide greater insight into how they exert their influence. The use of two theoretical frameworks that have proven useful in other domains, but which have never been used to understand high school attrition, also is expected to prove instructive. Although the formal aspects of these models (to be discussed in chapter 2) are not the main focus of the current investigation, it is anticipated, nevertheless, that this study will contribute to improvement of the models. With this background, it is now appropriate to review the research strategies employed by previous researchers, and the results they have obtained.

Chapter 1 Notes:

[1] The term Native is used rather than Indian, which is both inaccurate (Driver, 1975) and less preferred by those people who inhabited North America prior to the arrival of Europeans (Abate Wori Abate, 1984).

[2] The difference between the Price (1982) and Census (1981) estimates of the overall Canadian attrition rate probably is, in large part, due to the use of different age cohorts. Although both works seem to be equally up to date, I suspect that the estimates are based on students who started their education at different times. The Census data pertain to individuals who were 25 to 34 in 1981 and who had started school between approximately 1952 and 1961. In other words, the estimate of 28% pertains to a 1952 to 1961 cohort. On the other hand, it is likely that the figure reported by Price (12%) refers to a newer age cohort, possibly one that started Kindergarten in the 1970's.

[3] Vincent and Black (1966), however, found little evidence that dropping has deleterious occupational or economic consequences, but this finding is the exception rather than the rule, and probably reflects the presence of a job market that was healthier than the current one.

[4] Although many have assumed that dropout contributes to delinquency on the basis that dropouts engage in more delinquency than persisters, the relation may be spurious. Consistent with this view, Elliott and Voss (1974) found that dropouts were less delinquent after discontinuing compared to when they were enrolled. The act of leaving, contrary to conventional wisdom, reduced the frequency of delinquent acts, showing that dropping out sometimes is associated with positive consequences.

[5] The Ajzen-Fishbein model, for ease of exposition, often will be referred to as the Fishbein model as is common in the literature.

CHAPTER TWO

Historical Review

This chapter consists of two parts, with the first devoted to a discussion of the research methodology used in past studies and a review of the results reported, and the second part to an outline of the Ajzen-Fishbein and the general expectancy-value models. It is contended that these models, or more likely modified versions of them, will help to provide a framework from which to organize conceptually the enormous body of findings reviewed in Part One concerning factors associated with dropout.

I) Research Designs

Previous studies differ in what sources of information are used, when the data are obtained in relation to dropout, whether univariate or multivariate analyses are undertaken, and in how the causes of dropout are determined.

Although the majority of investigators have used measures of statistical association between predictors and the criterion to determine which

variables contribute to dropout, a few have employed more "direct" approaches. For example, some researchers (e.g., Bartley, 1980; Coladarci, 1983; Hewitt & Johnson, 1978; Horton & Annalora, 1974; Obe, 1980; Watson, 1976) simply ask students to provide their reasons for leaving. In other studies (e.g., Rubin, 1974), teachers were asked to rate the importance of the presumed causes. The reasons that frequently are given in the two types of inquiries are not liking school, wanting to take a job, and failing grades, each of which do not appear to be satisfactory explanations of dropout. Such responses may be rationalizations rather than true causes (Garrison, 1987). Furthermore, factors such as low marks are conceivably symptoms of the underlying causes of dropout, rather than causes themselves (Beirn, Kinsey, & McGinn, 1972; Berry, 1966; Rumberger, 1983). For example, both low marks and dropout could be caused by a belief that education is not helpful in reaching one's goals. In addition, this approach presupposes that the respondents have a clear understanding of the reasons for dropping, and that they will state these reasons to the researcher. As Lee (1972) and Beirn and his colleagues have noted, there are grounds to doubt these assumptions. At best then, the results from these inquiries can be regarded as suggestive.

i) Cross-Sectional

By far, the most common design is cross-sectional with univariate statistical analysis. Questionnaires, interviews, school records, or some combination of these are used as sources of information. Students who have dropped out usually are compared with a group of persisters, but a few researchers have evaluated them against test norms (e.g., Sewell, Palmo, & Manni, 1981), a comparison which is misleading if the normative data were derived from individuals who differ from those under study. Potentially important factors are examined individually (i.e., univariate analyses), and their impact is gauged by the common t-test, or by correlations. Unfortunately, the cross-sectional univariate design is far from optimal in determining causally important factors. Not only is it weak in separating true causal relations from those which are spuriously caused by third variables (correlates of both the predictor and criterion variable), it may lead to a perception of the consequences of leaving as causes (Lee, 1972).

Misidentifying consequences as causes is especially likely where the time between the act of leaving and the administration of the survey is long,

because in these circumstances the dropouts have had time to face some harsh realities (e.g., unemployment, parental rejection etc.) which may produce changes in outlook and other characteristics. In fact, there is a growing body of literature that shows that dropouts are less likely to find employment (Beirn et al., 1972; Weidman & Friedmann, 1984), earn less, and are in occupations of lower status both when they enter the labour force and over the long term (Beirn et al., 1972; Blakemore & Low, 1984; Boyd, Goyder, Jones, McRoberts, & Pineo, 1981; Hathaway, Reynolds, & Monachesi, 1969; Jencks, 1979; Mifflen & Mifflen, 1982; Schiefelbein & Farrell, 1978, 1984; Weidman & Friedmann, 1984).[1] On the whole, the literature indicates that dropouts face bleak employment scenarios.[2] It is also quite well established that unemployment can have adverse effects on self esteem and depression (Patton & Noller, 1984; Tiggeman & Winefield, 1984), as well as on other psychological variables. Given the relationship of dropping to unemployment, and, in turn, its effects on psychological characteristics, it can be misleading to use cross-sectional designs to infer the causes of dropout.

Another drawback of cross-sectional approaches is that students are difficult to contact and to

recruit for research after they have discontinued. Many do not to participate (e.g., 59% in Watson's Ontario study despite multiple attempts to survey the students; 79% in Coladarci's investigation of Natives), and those who do agree may be less cooperative than they would have been had they been contacted earlier. In other words, it is reasonable to wonder about both the representativeness of the participants and the quality of the data they provide (see Coladarci, 1983). Several researchers have used "dropouts" who were enrolled in career awareness (e.g., Sewell, Palmo, & Manni, 1981) or youth corps (e.g., Tseng, 1972) programmes, presumably to ensure an adequate participation rate. However, such groups are likely atypical of dropouts in general (most dropouts do not participate in programmes like these), and therefore the results may be sample specific.

ii) Retrospective

In addition to the cross-sectional research (univariate and multivariate), a few retrospective studies exist. The two types of retrospective research require as a first step that the dropouts and a comparable group of persisters are identified. In the first variety, record-based retrospective work, records

then are examined (e.g., school or police) to determine how the dropouts and the persisters differed at an earlier date (e.g., LLoyd (1976), Stroup & Robins (1972), and Yudin, Ring, Nowakiwska & Heinemann (1973). The second kind of retrospective research supplements records with information recalled by respondents concerning, for example, participation in past activities, and attitudes as they existed some time, possibly years ago. In these designs, it is impossible to regard consequences of dropout mistakenly as causes if predictive information is derived from records predating withdrawal from school. Furthermore, the data from records probably are of better quality than typically is obtained in cross-sectional investigations. Respondent faking and bias is obviously not a problem where records serve as the sole source of information, but clerical error can be troublesome. The major shortcoming is that the types of predictor data that can be used are quite limited. Information about home background is often scant, and psychological characteristics usually are not mentioned. As such, this approach, although useful, does not lend itself well to a comprehensive analysis of the multiple determinants of attrition. The second type of retrospective research tries to redress the narrow scope forced by the exclusive use of records by

having respondents recollect. However, information "...can be seriously misreported, due to either simple memory loss or self-serving distortion."(Kerchoff, 1980, p. 258) Thus, both types of retrospective designs have shortcomings. Although in some cases well conducted retrospective research can be superior to cross-sectional work, it is not as useful as longitudinal approaches.

The frequent use of the cross-sectional approach and the occasional use of retrospective studies despite their serious limitations is probably largely due to the ease of conducting this type of study, and because in the early stages of attrition research it probably was considered better to err on the side of identifying too many factors than not enough. Few studies have used the more valid and informative longitudinal multivariate approach.

iii) Longitudinal

In longitudinal investigations, information on a large number of students attending school is used to determine their status (dropped/persisted) at a later time. Since the predictive information is gathered before the act of dropping, it is impossible for the predictors to be consequences of the behaviour. Along

with multivariate analyses in which several variables are examined simultaneously to ascertain their separate or independent effects, longitudinal designs are useful for identifying potential causes of dropout. However, there are several costs incurred when this approach is used, not the least of which include having to wait for data on enrollment status, the need to survey a larger number of students, and the increased complexity of file handling and data analysis. Not surprisingly, few previous researchers have employed this approach, the notable exceptions being Borus & Carpenter (1984), D'Amico(1984), Delaney & Tovian (1972), Elliott & Voss (1974), Greaney (1973), Hill (1979), Gottfredson (1982), Poole & Low (1982), Schiefelbein & Farrell (1978), Scott and Scott (1982), and Thomas (1954). Unfortunately, none of these studies included Natives, and several have methodological weaknesses which detract from their value. For example, the Schiefelbein and Farrell (1978) investigation, conducted in Chile, compares persisters with students who have either dropped or who have been held back, thereby confounding dropout with grade retention. Presumably, in Chile those who fail are not likely to graduate. Otherwise, Schiefelbein and Farrell's decision to combine these students is unjustified.

Other studies can be faulted for using too few subjects to develop stable predictive equations.

The attrition research also varies in a number of other ways including the quality of the measures used, whether dropouts, transferees, and stopouts are distinguished, and in the comparison group employed. Although most researchers compare dropouts with graduates or students still enrolled in high school, at least one (Yudin et al., 1973) contrasts dropouts with college attenders, a comparison which would be expected to accentuate the difference between dropouts and persisters. The inclusion of an unequal number of males and females in the two groups used in this study also limits its value. Whereas 30 males and 20 females comprised the dropout group, the corresponding numbers among the college bound were 14 and 36. With this imbalance, it is difficult to know to what extent the reported differences reflect dropout/persister rather than gender differences.

Having reviewed research methodology employed in the investigation of dropout, the results from attrition research are presented now. Because of the largely atheoretical nature of the research (see Elliott & Voss, 1974 and Saha, 1985 for notable exceptions), it is not possible to relate the work to a theoretical framework. Instead, it will be described

factor by factor, with the background factors discussed first, followed by the school factors, and then the personal determinants.[3] Although not all of this discussion is directly relevant to this dissertation, it provides a context for understanding the variables employed. Within each section, the results from the univariate analyses typically are presented first, followed by those from the generally stronger multivariate designs.

II) Research Findings

i) Background Factors

Family characteristics such as size, income, parental educational levels, social status, exposure to dropout, and academic encouragement might be expected to influence educational persistence. Thus, it is not surprising that these factors often have been investigated.

a) Parental Education

The results concerning parental education depend on the type of analysis employed. Whereas the univariate analyses generally show that students are less likely to drop if their parents are well educated

(Bledsoe, 1959; Tseng, 1972; Watson, 1976), the multivariate designs do not, though there are exceptions. For example, Stroup and Robins (1972) found maternal education among Blacks to be unimportant in both univariate and multivariate analyses, which used years of educational attainment rather than enrollment status (dropped or persisted) as a criterion. Unfortunately, the relevance of paternal education could not be assessed because much data was missing. In Lloyd's 1976 study, paternal but not maternal education yielded a significant correlation with the grade of withdrawal among White boys and girls. Neither maternal nor paternal education was important in a multivariate analysis.

Lloyd (1978), on the other hand, found both maternal and paternal education levels to correlate with persistence (persisted or dropped; $r = .23$, $p < .05$). However, neither parents' education was relevant in accounting for the educational persistence of males when factors such as academic performance, absenteeism and ability were controlled. In the case of females, maternal education was shown to be important, even with these controls.

Rumberger's research (1983), based on a national sample of American youth, also is relevant to the importance of education. For each of three ethnic

groups (Black, Hispanic, and White) and the two sexes, equations were developed accounting for the probability of dropping as a function of mother's earnings, mother's education, father's earnings, father's education, number of siblings, a literary index (based on the presence or absence of newspapers, magazines, and a library card), place of residence, and unemployment rate. Controlling the other background factors, the levels of both parents' education were important predictors under some circumstances. However, male dropout, except among Blacks, was not related to maternal education, and similarly, paternal education had no relevance to dropping among females regardless of their ethnicity. The effects for parental education were considerably smaller than those yielded by the literary index. No analyses were conducted in order to test for the effects of parental education controlling for (net of) such student factors as ability, motivation and academic performance. Hence, little insight was gained regarding how parental education exerted its effects.

However, Hill (1979), who used data from the National Longitudinal Survey of Young Men, found that with higher parental education the probability of dropping decreased, even when ability, as indexed by IQ, was held constant. This result suggests that well

educated parents impart to their children characteristics other than high IQ that make the children less likely to drop. Motivation is likely relevant, though financial resources might play a role too. As in two of the other studies (Lloyd, 1976; Rumberger, 1983), male dropout was influenced more by paternal than maternal education.

Little can be said about the role of parental education in high school dropout among Natives because none of the research investigated this factor. However, it is worth mentioning that parental education has been shown to influence college attendance (Thomas, Alexander, & Eckland, 1979), and level of postsecondary educational attainment (Sewell & Hauser, 1972; Wolfe, 1985) among non-Natives. In view of the influence of parental education on educational persistence in general, it is not unreasonable to expect parental education also to influence the decisions of Natives to persist or drop.

b) Family Size

It has been reported that dropouts come from larger families. Watson (1976), for example, in an Ontario attrition study, found that the families of dropouts contained an average of 4.3 children compared

to a provincial average of 3.6. Similarly, Greaney (1973), in his investigation concerning persistence to secondary school among Irish students, discovered dropouts to be from families with more children (6.49 versus 5.24). Lloyd (1978) found number of siblings to correlate with persistence ($r = -.26$), but in his earlier work which used grade of withdrawal as a criterion, number of siblings was barely significant, and only for males ($r = -.16$). Contrary to these findings, Stroup and Robins (1972) determined that number of siblings was inconsequential. However, their finding is the exception, and it may have been caused by collapsing the information on number of siblings into gross categories, or to the use of a select group --Black students with IQ's greater than 85.

The univariate data generally show family size to be relevant, but how this factor influences dropout is left unclear. Students from large families could be adversely affected by having fewer financial resources, or by having less interaction with their parents who would be expected to be busier than parents from smaller families. Less interaction could then result in lower IQ, worse academic performance or less interest in academia. The multivariate analyses provide some insight into the mechanism.

In a multivariate context that controlled for several background variables (parental education, earnings, availability of reading material in the home, place of residence, and unemployment rate), Rumberger (1983) found number of siblings to be important only for Whites. The factor was irrelevant among both Blacks and Hispanics, a finding which underscores the importance of conducting separate analyses for different ethnic groups.

Those analyses which control for ability and performance in addition to background factors yield discrepant results. Both Lloyd (1976) and Greaney (1973) found family size to be unimportant. Lloyd's (1978) data, on the other hand, revealed it to be relevant, but his ability and performance measures were obtained in the third grade. The results might have differed if ability and performance had been assessed in a later grade. Hill's data (1979) showed that for Whites, number of siblings had an effect independent of family income, parental education, IQ of students, and several other variables. For non-Whites, number of siblings had no direct effect on dropout but influenced IQ and knowledge about the workplace, two factors which were found highly relevant to persistence.

Clearly, family size influences the likelihood of dropout, but it may act in a different manner

depending on ethnicity. The effect, however, is quite small, and how it is mediated is not well understood. It appears that sibling number acts largely by influencing student IQ and academic performance but not solely so. Little can be said about the role of family size on Native attrition because none of the existing studies examined this factor.

c) Income

Watson (1976) reports that, in Ontario in 1974, dropouts who were interviewed had a median family income considerably lower than the provincial median ($11,500 versus $14,000), and when family size was taken into account, it was estimated that perhaps as many as 24% of the dropouts came from poor households. Interestingly though, the students who reported having left for economic rather than "personal" or "school" reasons were not "an economically select group" (Watson, 1976, p. 271), as would be expected if they were truly needy.

Others also have found income to be relevant. In terms both of its direct and indirect contributions (mediated by other variables), family income was shown by Hill (1979) to be one of the most important determinants of persistence among Whites. It was as

important as parental education, and of greater importance than IQ, and number of siblings. For non-Whites, the total (direct + indirect) effect of income was large compared to the other variables, but its direct effect, net of several background factors (school quality, IQ, knowledge of the work force, and a few other variables), was negligible. Thus for non-Whites, income seemingly reduced the probability of dropping through its influence on IQ and knowledge of the workplace.

Rumberger's results (1983) showed earnings to be important among Whites, but not Blacks or Hispanics when other background characteristics (listed in the discussion on family size) were controlled. Again, the process of influence seemed to vary by ethnicity. Unlike the previous study, this one indicated that earnings were of less direct importance than parental education. Earnings also were less relevant than the availability of reading material in the home. No research has considered the role of family income on dropout among Natives.

d) Social Class

Households often have been classified according to social class or socioeconomic status (SES) to understand such criteria as educational and occupational attainment. Generally, SES scores have been assigned on the basis of the head of the household's occupation, and the manner of obtaining these scores has varied considerably. Some researchers have classified occupations in terms of general skill levels (e.g., unskilled labour, skilled labour, sales or clerical, professional), whereas others have rated them in terms of prestige, a related yet somewhat distinct construct, which is determined largely by the educational requirements of the job and its salary (Blishen & McRoberts, 1976). The research also varies concerning whether "homemade" or established measures (e.g., Blishen, Duncan, Hollingshead, Pineo-Porter scales) are used.

At the univariate level, social class is found to be associated with dropout, though not strongly. Bledsoe (1959) found children of professionals, managers, salespeople, and clerical workers comprised a smaller percentage of the dropout population than would be expected given their frequencies in the general population. The offspring of unskilled labourers,

retirees, and the unemployed were overrepresented among dropouts. In Tseng's survey (1972), the fathers of persisters were reported to hold jobs of higher skill level and prestige than those held by the fathers of dropouts who were attending a youth corps programme. Similarly, Greaney (1973) found students who discontinued after the 8th grade came from homes where the father's occupation was, on the average, of a lower skill level. Stroup and Robins (1972), who used an index based on parental education, home and car ownership, employment in a skilled or unskilled job, and a few other factors, found higher social class to be associated with persistence ($r = .22$), but six other factors were related more strongly to the criterion. The correlation between SES and persistence was virtually identical to the one obtained by Lloyd (1978), who used a scheme with seven categories based on the Hollingshead Scale. Saha (1985) found social class, as indexed by the ANU 2 occupational status scale, to be associated with years of educational attainment ($r = .20$ to $.27$).

A few multivariate analyses show socioeconomic status to be an important predictor of persistence, with higher social class associated with an increased likelihood of persistence. Poole & Low (1982), in a discriminant analysis incorporating 22 variables, found

SES (operationalized by classifying families as low, middle, or upper class based on parental education and occupation) to be one of the most important variables discriminating persisters from dropouts. Greaney's data (1973) indicated that a five category SES scale (professional to unskilled) was one of the most important variables in a discriminant analysis which used 29 or more variables including academic ability and performance. However, it is likely that the importance of SES was overstated relative to the ability and performance measures. The simultaneous inclusion of several ability and performance measures placed these variables at a disadvantage because a factor (as indexed by measure 1) can exert little effect when it is controlled (measure 2).[4] Schiefelbein and Farrell's discriminant analysis showed social class to be an important predictor of "survival on time", only exceeded in importance by eighth grade mark. In this study, social class had been operationalized as a factor analytic composite of parental education, occupational prestige, and an index for consumption of goods in the home.

Other research has shown social class to be unimportant (e.g., Lloyd, 1976) or of lesser importance as a "predictor" than several other variables such as academic performance, ability, expected occupation, and

absenteeism (e.g., Lloyd, 1976; Richardson & Gerlach, 1980; Saha, 1985). On the whole, the literature indicates that SES often is relevant, but ability and performance are even more important. Despite the relation between SES and persistence, it seems appropriate to use a more differentiated conception. Parental education, and occupational characteristics are probably best treated as separate variables, rather than grouping them together and obscuring potential differences in the associations of the variables with persistence. This more fine grained approach is expected to reveal better the basis of the SES-persistence association.

e) Exposure to Dropout

Watson (1976) found that almost half of Ontario's dropouts had one or more siblings who had already dropped out, a proportion which is obviously much higher than would be found for persisters of comparable age. Elliott and Voss's (1974) univariate and multivariate analyses indicated exposure to dropout in school or at home contributed to dropout. Interpretation of the "exposure to dropout in the home"-persistence association, however, is somewhat unclear because their measure of the predictor assessed

not only exposure to siblings or parents who had dropped, but also perceived parental attitudes concerning educational attainment. This confounding makes it difficult to know whether attitude, exposure, or both variables were responsible for the relation observed.

That exposure to dropout may contribute to attrition is somewhat surprising, especially when one considers that dropouts often fare poorly in the job market. Given the difficulties faced by dropouts, one might expect that students who are contemplating leaving and who are aware of these problems might be more inclined to continue, all else being equal. Interestingly, Coladarci (1983) reported that 90% of a sample of Native dropouts claimed they would advise students thinking of dropping to stay in school or to reconsider their decision. Preston (1974) also reports that Native dropouts encourage their siblings to continue. Presumably, the majority of non-Native dropouts would give similar advice. If this is the case, why is exposure to dropout linked to an increased likelihood of dropping? One possibility is that it is not dropout but a correlate such as a family background not conducive to finishing that is responsible for the observed relation.

f) Parental Encouragement

Students with parents who stress the importance of education would be expected to be more likely to persist. Consistent with this expectation, Tseng (1972) found that dropouts who were attending a youth corps programme reported less familial encouragement concerning academia than did a group of age-matched persisters. However, Watson (1976) cited that 75% of the dropouts interviewed in an Ontario study claimed that their parents had stressed the importance of schooling. Together, these investigations suggest that the parents of dropouts do not discourage academic achievement, rather they encourage it to a lesser extent than do the parents of persisters.

Schiefelbein and Farrell (1978), in their research on "survival on time" to grade 12 among Chilean students, assessed the importance of "family value environment", and "direct stimulation by parents". Scores on family value environment were determined by the students' responses to items concerning how important their parents regarded intellectual interests and activities, education, economic success, and social prestige. Direct stimulation was measured by a series of questions about the interest, and help received from parents in

schoolwork. Neither construct was important in a discriminant analysis used to differentiate students who reached grade 12 on time from those who did not. Whether this anomalous result was due to the use of Chilean students, a criterion different from that employed in most attrition research, a longitudinal design, or to the inclusion of many variables (an unspecified number, but at least 25) in the discriminant analysis is unclear. Unfortunately, the researchers did not report the univariate relations between family value environment, direct stimulation and "persistence".

Two studies provide data that are indirectly relevant to the role of parental encouragement. Poole and Low (1982), who studied attrition in Australia, found frequency of job discussion with parents to be one of the most important factors separating dropouts from persisters in a multivariate context. It is likely that parents who frequently discussed occupational matters with their children stressed the importance of education in achieving occupational goals. Rumberger (1983) found a "cultural index" based on the presence or absence in the home of newspapers, magazines, and a library card to be the best predictor of persistence among the background factors he examined. The effect was net of several other

background characteristics including parental earnings and education. It is possible that the presence of reading material in the home is a proxy for interest in academic matters, and if this is so parental interest, rather than the mere presence of the items may be responsible for the association of the cultural index with persistence.

Studies with Native students provide evidence which suggests that they may receive insufficient parental support for education. Zentner (1972) reported that Natives were less likely than non-Natives to report that their parents would be very upset if they did not graduate. This might indicate that Natives provide less support for educational persistence. Some credibility is lent to this interpretation by Coladarci's (1983) finding that 40% of a sample of surveyed Native dropouts reported a lack of parental support for schooling. Further evidence can be found in a study conducted by Elliott (1970) in which Native students, as compared to non-Natives, were found to perceive less parental encouragement concerning academia. The parents of Natives also were thought to be less likely to want their children to pursue post secondary education. Lee (1972) concurs that Natives receive less parental encouragement. Preston (1974) noted that Cree parents sometimes give

mixed messages to their children (e.g., admonitions to do well and encouragement to drop to be with the family). In addition to the empirical support just reviewed, there also is considerable speculation that a lack of parental concern contributes to Native dropout (e.g., Fuchs & Havighurst, 1972; Kaegi, 1972).

It is conjectured that some Indians provide little encouragement regarding academics because education is thought to be antithetical to religion. Others have suggested that there is less encouragement because Natives fear that education will erode their culture, and might alienate children from their parents (Kaegi, 1972; Abate Wori Abate, 1984). Parents from the Six Nations Reserve, however, seem to regard education as very important, as indicated by the high turnout rate (82%) at the November 2, 1981 parent-teacher interviews at the primary school level (Abate Wori Abate, 1984).

g) Other Background Factors

A host of other potential influences, only a few of which are mentioned here, also have been examined. Tseng (1972) found that dropouts reported their fathers to be less accepting than did age matched persisters. Among Natives, there is evidence

suggesting that the parents of dropouts exert less parental control (Delk, Urbancik, Williams, Berg, & Kahn, 1974).

Use of a language other than English also has been implicated in contributing to both Native (Robinson, 1985) and non-Native attrition (Poole & Low, 1982; Steinberg, Lin Blinde, & Chan, 1984), but it has been noted that this relation may be spuriously caused by virtue of language minority students coming from disadvantaged backgrounds (Steinberg, Lin Blinde, & Chan, 1984). Poole and Low's data, showing that language exerted an effect even when social class was controlled, suggest that the relation is genuine, but more research is needed to discern the robustness of this influence.

Dropouts also have been reported to change schools more frequently than persisters (Stroup & Robins, 1972; Yudin, Ring, Nowakiwska, & Heinemann, 1973). Nevertheless, the increased mobility might not be a cause of dropout. Conceivably, the association between transfer and dropout could arise because they share common determinants. Not surprisingly, employment conditions have been found to influence persistence. Low unemployment rates are accompanied by an increased likelihood of dropout, but the relation

does not appear to be a strong one (Hill, 1979; Rumberger, 1983).

h) Summary - Background Factors

Prior research has shown that a number of family background characteristics influence the likelihood of dropout. Coming from a large family, having parents with little education and low paying jobs, exposure to dropout, and a lack of parental encouragement for academia all have been demonstrated to be conducive to dropout. A favourable job market also can draw prospective dropouts away from their studies. However, the importance of these factors among Natives is less clear due to a paucity of research.

Although many background factors contribute to dropout, little is known about which ones are the most important. Furthermore, the processes by which the background factors exert their effects have been largely unexplored, a state of affairs that is attributable to a tendency among investigators to examine only a few variables at a time, and to the overuse of univariate data analysis. The few existing multivariate studies have helped to fill these gaps in our understanding.

This research shows that background factors are important and that academic performance, ability, and variables such as absenteeism have an even greater influence. It also has shown that many of these background factors are related distally to dropout, with their effects transmitted through more proximal causes such as academic ability, motivation, and academic performance.

ii) Academic Factors - Aggregate Level

There is evidence at both the individual and the aggregate levels of analysis that academic factors, such as characteristics of individuals, classes and schools, are related to attrition, but some of the findings vary considerably between studies. Of the class and school factors, the most commonly investigated are class size, type of school (e.g., academic or technical), and quality of schools as well as of teachers.

a) Class Size

The literature indicates that class size, at least within the typical range, is not a major cause of dropout. Bledsoe (1959) reports that high school

dropouts, in comparison to persisters, come from larger classes in the early grades (Gr. 1 to 3), but have smaller classes thereafter. Greaney (1973) found class size to be irrelevant in his study of the decision to persist or discontinue after completing primary school. On the other hand, Biniaminov and Glasman (1982), counter to intuition, determined that large class size fostered persistence among Israeli students, but the effect was small and indirect.

b) School Quality

In Chile, Schiefelbein and Farrell (1978) showed that good facilities and qualified school personnel fostered persistence. The effects were sufficiently robust to be manifest in a multivariate discriminant analysis. On the other hand, Hill, in an American study, found school quality to be inconsequential (1979). The results of these two investigations likely differ because of the use of different dependent and independent measures, or possibly because quality varies more in Chile than in the United States.

c) School Type

There are several reports that dropout rates are higher in technical or vocational schools than in academic schools (Poole & Low, 1982; Schiefelbein & Farrell, 1978). Furthermore, the Poole and Low investigation showed the difference to persist even when verbal ability was controlled. Thus the higher rate of dropout for vocational schools was not likely to have been due to these schools having worse students. Saha (1985) found that private and government operated Australian secondary schools produced similar levels of educational attainment. There is also some evidence that the type of primary school attended can be relevant. For example, Greaney (1973) found private primary schools to be more conducive to persistence, even when a host of other variables were controlled. Schiefelbein & Farrell (1978) found that 8th graders who attended a grade eight class attached to a secondary school were more apt to survive than were students from regular grade eight classes, or students from classes with grade 8 attached to vocational institutions. Whether this result was caused by differences in the schools attended or other factors (e.g., ability might be related to school choice) is not entirely clear.

iii) Academic Variables: Individual Level

At the level of individual students, absenteeism, academic ability, academic performance, participation in extracurricular activities, and relations with others such as teachers and peers are the most commonly researched factors.

a) Academic Performance

Academic performance, as indicated either by grade average, scores on standardized tests, or grade retention, consistently has been shown to be one of the best discriminators of dropouts and persisters, with the former performing worse.

Descriptive information on performance is provided by Yudin, Ring, Nowakiwska and Heinemann (1973) who found that dropouts received an average mark of D+ in their last complete school year compared to B- for the college bound. Moreover, 74% of the dropouts had repeated a grade sometime before dropping. Greaney (1973) reports that those who discontinued did worse on every measure of academic performance examined (class rank, reading, oral and written work, mechanical and problem arithmetic). Black dropouts also are reported to achieve lower grade point averages (Felice, 1981).

Similarly, Watson's (1976) data show that dropouts in Ontario schools often have mediocre marks. Nevertheless, 72% of the dropouts had marks of D or better, and 39% had at least a C average, indicating that many dropouts are intellectually capable of finishing school as has been noted by many researchers (e.g., Beirn et al., 1972, Felice, 1981; Thomas, 1954; Voss & Elliott, 1974; Watson, 1976).

The univariate research in which bivariate correlations between academic performance and persistence are computed shows performance to be an important variable. For Black students, Stroup and Robins (1972) obtained a correlation of -.49 (the largest correlation they found) between the number of academic quarters repeated in elementary school and the number of high school years completed. Among Whites (Lloyd, 1976, 1978), the correlations between academic performance in primary school and years of high school completed ranged from .23 to .36, depending on the measure of performance, and grade retention yielded a correlation of -.30 with the criterion.

Multivariate analyses also indicate that performance is one of the variables most highly associated with persistence (Delaney & Tovian, 1972; Greaney, 1973; Schiefelbein & Farrell, 1978; Stroup & Robins, 1972; Voss & Elliott, 1974).

There is little research concerning the relation between academic performance and attrition among Natives. Delk et al. (1974), in a comparison of Papago Indian persisters and dropouts, apparently found that dropouts had lower marks, but the data were not reported. Patton and Edington's (1973) investigation of factors related to Native persistence at the college level is of tangential interest. In their discriminant analysis, college grade point average and high school rank were among the best predictors. Not surprisingly, academic performance is also one of the best predictors of the persistence of non-Natives at college or university (Alexander, Riordan, Fennessey, & Pallas, 1982; Lavin, 1965; Pantages & Creedon, 1978; Thomas, Alexander, & Eckland, 1979; Tinto, 1975).

Despite the considerable association between academic performance and attrition, it is likely that much of the relation does not represent causal influence. Poor performance in school, at least among those students with the requisite ability, could reflect poor attitudes and beliefs concerning the value of oneself or of education (Beirn et al., 1972; Rumberger, 1983; Stroup & Robins, 1972). The correlation between performance and attrition might largely be caused by such negativity. Research is needed to test this possibility.

b) Academic Ability

Academic ability, or the degree to which students have the skills necessary to perform well, is related to academic performance, but the two constructs are not redundant. Not all intellectually competent students perform well, especially those lacking motivation. Conversely, some students with low ability perform satisfactorily because of concerted effort. Although ability and performance are separable at the conceptual level, it is, no doubt, difficult to measure one without the other. Many researchers, however, regard IQ to be predominantly a measure of ability. Although a variety of measures of both domain-specific and general ability have been used in the investigation of attrition, the results nevertheless generally have been consistent. Students of high ability, however estimated, are more likely to persist.

Dropouts have been found to have lower linguistic ability than persisters (Bledsoe, 1959; Greaney, 1973; Thomas, 1954), and the difference was statistically significant in the two studies (Greaney, 1973; Thomas, 1954) wherein statistical tests were applied. Lloyd found that reading and language performance in the third and sixth grade correlated

with persistence/dropout (r = .27 to .37; Lloyd, 1978) as well as years of educational attainment (r = .22 to .36; Lloyd, 1976), and these associations were as large as those between arithmetic performance and persistence.

Researchers who used overall IQ, rather than separate measures of verbal and quantitative ability, also generally found dropouts to be of lower ability (Lloyd, 1976; Lloyd, 1978; Stroup & Robins, 1972; Yudin et al., 1973), with two exceptions. Felice (1981), in a study of persistence among Blacks, reported that dropouts had higher IQ's than persisters. Unfortunately, a statistical test of this difference was not applied. Also, Richardson and Gerlach (1980), who used the same measure of IQ, the California Test of Mental Maturity, discovered that Black dropouts had higher IQ's than persisters. Again, however, the statistical significance of the finding is not reported. Furthermore, their text and tables present a discrepant picture of the direction of the difference. Accordingly, little faith can be placed on this report. Nevertheless, the data from these two studies and others demonstrate that dropouts often have reasonable levels of ability.

Multivariate analyses also reveal that ability is a strong discriminator of dropouts from persisters

(Delaney & Tovian, 1972; Felice, 1981; Greaney, 1973; Hill, 1973; Lloyd, 1976; Lloyd, 1978; Poole & Low, 1982; Richardson & Gerlach, 1980) even though a few of these investigations underestimate the effect of the construct by simultaneously including several measures of the same construct in a single analysis.

It is unfortunate that none of the work with Natives has examined the relation between academic ability and persistence.

c) Participation in Extracurricular Activities

Dropouts are reported to be less likely than persisters to participate in athletics, student council, school newspapers, clubs, and other related activities (see Beirn et al., 1972, p. 43, p. 47). In this connection, Hewitt and Johnson (1978), in an American study of attrition, found that 61% of dropouts had not been involved in any school activities. Furthermore, 40% of the dropouts also reported no participation in organized community activities. They presented no data concerning the corresponding figures for non-dropouts. Greene (1966) also claimed that dropouts are less likely to take part in extracurricular activities, and Thomas (1954), in a Chicago based inquiry that concerned factors

differentiating dropouts from graduates, concluded that extracurricular participation was, "...the factor most related to whether or not the student finished high school... ."(p. 18)

Nevertheless, as has been noted by Stroup and Robins (1972), the importance of extracurricular involvement to persistence is largely illusory. Students who drop early have less opportunity to engage in school activities. Thus, if the number of high school years attended is controlled, the relation would probably disappear, or diminish considerably. Consistent with the view that the relation between participation in extracurricular activities and dropout is artifactual, Elliott (1984), who conducted a longitudinal investigation, found that participation did not predict dropout.

d) Absenteeism

It has been noted that almost all studies show that the attendance of dropouts is poor (Greene, 1966). In Greaney's (1973) investigation, those students who left after primary school were absent approximately 25 days per year in the eighth grade compared to 11 for those who pursued secondary education. Also, Horton and Annalora (1974) cited absenteeism as a significant

contributor to withdrawal among Navaho. Counter to these findings, Delaney and Tovian reported that among non-Natives, potential dropouts who left had only marginally worse attendance than potential dropouts who stayed. However, many of the factors in their investigation probably had restricted ranges because the two groups would be expected to be quite similar. Nevertheless, the dropouts skipped class significantly more often than the persisters, showing that the two groups differed in terms of illegitimate absence.

Lloyd (1978) found dropouts and persisters to have similar attendance in grade 3. However, Yudin, Ring, Nowakiwska and Heinemann's research (1973), which compared dropouts with students headed for college, found some differences between them at the primary level. The two groups differed in unexcused absences from grade one onwards, but had a comparable number of excused absences until grade 8.

Multivariate analyses also show absenteeism to be a good discriminator of dropouts from persisters, both among White (Greaney, 1973; Lloyd, 1976; Lloyd, 1978), and Black students (Richardson & Gerlach, 1980; Stroup & Robins, 1972). However, it is likely that with controls for variables such as attitudes and beliefs concerning education, absenteeism would be of little value in accounting for attrition. Attitudes

and beliefs probably contribute to both attendance and persistence, resulting in a spurious association between absenteeism and persistence.

e) Social Relations

Good relations with peers and teachers would be expected to help keep students in school. Consistent with this view, Greaney (1973) found that those students who continued their education beyond primary school were rated as more popular by their teachers than were those who discontinued. There also is evidence that suggests that Native dropouts are less successful socially than their peers who persist. Horton and Annalora (1974) report that, of a group of Navaho dropouts, 91% claimed to like their teachers, whereas only 69% liked their fellow students. A group of persisters was not used in this study, so there are no data for purposes of comparison. Nonetheless, it is reasonable to assume that persisters, compared to dropouts, liked their peers better. The Natives who participated in Coladarci's (1983) interview were less satisfied with their teachers than were the Navaho in the previous work. Over a third of the dropouts reported that teachers did not care about them, and that this lack of interest contributed to dropping out.

Similarly, 33% of the students cited having disagreements with teachers as contributing to their decision to drop. As indicated earlier, data of this sort does not constitute strong evidence, and it should be interpreted cautiously.

Felice's (1981) discriminant analysis revealed that the perception of racial discrimination in school was a factor important to differentiating Black dropouts from persisters. Those who continued reported less prejudice and discrimination among school staff and students. It also has been suggested that prejudice contributes to attrition among Natives in Canada (Frideres, 1983; Chief F. Laforme; personal communication).

f) Summary -- Academic Factors

Students from academic schools have been found to have higher rates of persistence than those from technical institutions, but whether this difference reflects a better learning environment, more capable students, or differences in personality between the two populations is not clear. Not surprisingly, schools with superior facilities and highly qualified teachers sometimes have higher rates of retention. Class size is less important.

Dropouts differ from persisters on several academic factors. They do not perform as well, have less satisfactory relations with teachers and peers, attend school less frequently, rarely participate in extracurricular activities, and have lower academic ability. Less research has been conducted with Native students, but that which is available indicates that Native dropouts also perform worse, are absent more often, and have poorer relations with teachers and peers.

It is likely that the low rates of participation among dropouts in extracurricular activities is largely artifactual, a result of attending school for fewer years. Similarly, the relationships of absenteeism and performance with attrition are not entirely causal. Beliefs and attitudes concerning education contribute to attendance, performance, and attrition, thereby yielding correlations that can provide misleading estimates of causal influence.

Although leavers typically have lower IQ's than persisters, many have sufficient ability to complete high school at one of the levels (e.g., advanced, general, basic). With this in mind, it is apparent that motivation is relevant to understanding attrition.

iv) Personal Factors

Past research has investigated the relationship of numerous personal factors to persistence. These include age, gender, ethnicity, and a plethora of psychological characteristics, such as attributional style, achievement motivation, fear of failure, self esteem, test anxiety, and intellectual consistency, that bear on levels of motivation. As has been noted by Lavin (1966), in his review of the literature on academic performance, many of these constructs overlap. For example, individuals with low self esteem, compared to those with high self esteem, might experience greater test anxiety. Nevertheless, researchers typically have studied the effects of only a few variables at a time, as though they operated in a vacuum. This practice, no doubt, is largely due to practical considerations such as limited time, and to a lack of theory. Again, because of the atheoretical nature of the research, this review, by necessity, proceeds variable by variable.

a) Gender

Males often have been found to be more likely than females to discontinue their high school education (Bledsoe, 1959; Rumberger, 1983; Thomas, 1954; Tinto, 1975), but the rates of dropout are not markedly different. For example, Thomas (1954), in a Chicago study, estimated that the rates were 30% for males and 23% for females. In Ireland, males have been reported as more likely than females to discontinue after primary school (Greaney, 1973). However, some international research has shown that females are more prone to drop (see Beirn et al., 1972). On the other hand, the rates of dropout for males and females were reported to be similar among Blacks (Felice, 1981), and Chilean students (Schiefelbein & Farrell, 1978). At the college level, females exhibit higher dropout rates than males (Tinto, 1975).

Dosman (1972) claims that among Natives, twice as many females as males reach grade 12. Tyler and Holsinger (1975) concur that Native females advance further in school than Native males. Contrary to these reports, Robinson (1985) found that gender was unimportant in a subsidiary multivariate analysis that had used language retention, age, sex, and place of

birth to distinguish Native high school graduates from dropouts.

Clearly, the data present a mixed picture concerning the influence of gender on attrition. It likely varies by race, level of education, country, and possibly over time as suggested by Saha (1985). Though gender has an effect, it is small, and probably is caused by factors such as a difference in beliefs regarding the importance of education to achieving desired goals. Although pregnancy often is associated with dropout (Polit & Kahn, 1987), many researchers (e.g., Kerchoff, 1980, p. 264; Rumberger, 1987) are reluctant to assume a causal relationship. One reason for this position is that some girls who dislike school use pregnancy to legitimize a decision to drop that was made prior to the pregnancy.

b) Age

Being overage is related to dropout. Thomas (1954) found that those students who eventually dropped were, on the average, 14.8 years old when they entered high school compared to 14.2 for eventual graduates. Age in the early grades also has been shown to be linked to attrition. In Lloyd's research, age at third and sixth grade was associated negatively with

persistence in high school. Also, Robinson (1985) found that age was a good discriminator of Native dropouts from persisters.

Though older students are more likely to drop, there are several possible reasons for this effect. First, being overage, to a large extent, reflects grade retention or failure. Those who are overage probably have failed in the past and possess less ability and motivation, but some students are older simply because they started late. Students who are overage also might be embarassed at being with younger classmates. Alternatively, older students may be more prone to dropping because they are in higher grade levels that are more difficult. This interpretation of the age-persistence relation, however, does not apply if age refers to how old students are upon entering school instead of when a study is conducted. It is likely that age, regardless of the reference point chosen (high school entry or concurrent with the study), would have little bearing on persistence with grade retention controlled.

c) Ethnicity

It is well known that Blacks, Hispanics, and Natives have higher rates of dropout than Whites

(Felice & Richardson, 1977; Richardson & Gerlach, 1980; Rumberger, 1983; Steinberg, Lin Blinde & Chan, 1984), but the estimated rates vary considerably. Locality, year, whether cycling in and out of the system is taken into account, and how ethnicity is defined (e.g., self report versus "percentage blood") are a few of the many factors that influence what rate is found. Rumberger (1983), in an American national study, reported that, among youths between the ages of 14 and 21 in 1979, 10% of Whites, 15% of Blacks, and 23% of Hispanics had dropped, but these figures likely underestimate the true rates because some young students probably dropped after the investigation had ended. Nevertheless, the relative frequencies are revealing: Blacks and Hispanics were more likely than Whites to drop.

Natives also have been found to have higher rates of dropout. It has been stated that in Ontario approximately 62% of Native students "drop" between grade 9 and grade 12, a rate that is almost double the non-Native rate (A Demographic, Social and Economic Profile of Registered Indians in Ontario, 1979). Again, however, there are grounds for questioning the accuracy of these figures. They probably overestimate the true rates because dropout and grade retention seem to have been confounded such that students who failed were grouped with the dropouts.[5] Price (1982)

estimated the dropout rates among Natives in Canada and the United States to be, respectively, 80% and 40%. The Hawthorn Report (1968) suggested that 98% of Canada's Natives did not reach grade 12 on time compared to a national non-Native rate of 12%. Unfortunately, this estimate confounds retention with dropout (Renaud, 1971, p. 17).

d) Aspirations

Not unexpectedly, students who desire a high level of education and those who want good jobs are academically more persistent. Elliott and Voss (1974), Rumberger (1983), Saha (1985), Schiefelbein and Farrell (1977), as well as Tseng (1972) found that students who aspired to occupations of high status were more apt than their peers with lower aspirations to stay in school. Interestingly, Elliott & Voss (1974) reported that dropouts had lower occupational and educational aspirations as early as grade 9. Therefore, not all of the difference between dropouts and persisters was due to the leavers lowering their aspirations in high school prior to dropping. If this had been the case, aspirations could not have been regarded as contributing to dropout. The link between occupational aspirations and educational persistence has been shown

to withstand controls for a number of background factors (Rumberger, 1983; Saha, 1985).

Students with high educational aspirations were found, in both univariate and multivariate analyses, to be more inclined to persist (Elliott & Voss, 1970; Rumberger, 1983; Schiefelbein & Farrell, 1977). Friends' educational aspirations also were shown to be relevant (Rumberger, 1983).

There is no research directly concerning the role of aspirations in Native attrition. However, it has been suggested that Natives have lower aspirations than Whites (Bartley, 1980; Elliott, 1970), and it is conceivable that this difference could be a factor contributing to their higher rates of attrition.

e) Expectancies

Saha (1985) found that those students who expected to obtain an occupation of high SES were more persistent. Indeed, expected occupation was one of the best predictors of years of educational attainment. It is therefore of interest that Natives have been reported to hold lower occupational and educational expectations than non-Natives (Elliott, 1970). Felice (1981) showed that for Blacks, teachers' expectancies, as perceived by the students, were important discriminators of persisters and dropouts. Dropouts,

in comparison to persisters, thought that teachers estimated their ability and effort expenditure to be lower, but it is difficult to know whether these beliefs were accurate. Regardless, these beliefs seemed to influence persistence independently of ability and grade point average, thereby suggesting that they had real consequences.

Expectancies concerning the importance, instrumentality, or utility of education also have been implicated in contributing to attrition. Felice (1981) reported that the perception of occupational openness (the extent to which schooling is thought to be linked to improving occupational standing) was the most important factor differentiating Black dropouts from persisters. Black dropouts rated education as less helpful to improving one's lot. Similarly, Richardson and Gerlach (1980) claimed that Black dropouts do not tend to think of "... education as a ladder for social mobility ... ," (p. 492) but they did not present data to support this assertion.

It is thought that Natives, like Blacks, do not view education as instrumental:

> School achievement as such -- school grades and positions in school -- is not especially important to many Indian students or their parents because they do not see clearly how it is related to future opportunity or success ... (Fuchs & Havighurst, 1972, p. 177).

Relatedly, Elliott (1970) reported that fewer Natives than non-Natives agreed with the statement that marks are very important. Conceivably, such beliefs could contribute to the higher rates of dropout among Natives.

Devolder and Lens (1982) conducted an investigation that provides further, albeit weak, support for the instrumentality-persistence linkage. Belgian high school students who believed that studying hard was useful were found, by self report, to be more persistent studiers.

Although both the research reported above and theories of effort expenditure and choice (e.g., Campbell & Pritchard, 1976; Vroom, 1964) accord utility or instrumentality a central role, it has not been conclusively demonstrated that these expectancies cause academic dropout. For instance, perceiving the occupational system as closed might be a consequence of failing to find a job after dropping out, rather than a cause of leaving. Longitudinal designs that assess perceived instrumentality prior to the act are needed to discern the direction of influence.

A related expectancy, the perceived expectancy of success, also is potentially relevant to persistence. Individuals who anticipate that their performance is likely to result in a desired end state

would be expected to be more likely to expend effort and to persist than individuals who hold pessimistic expectancies. Research conducted by Battle (1965) supports this assertion. Among students in grade 7,8,or 9, expectancy of success correlated substantially with persistence on a "magic square" math problem (r = .47). No other variables, including Henmon - Nelson IQ were related more strongly to the criterion. Additional support for the role of expectancy of success in persistence can be found in Feather's work (1974) concerning achievement motivation in which it was demonstrated that for some subjects, experimental manipulation of expectancy of success altered persistence on a line tracing task.

Moreover, several choice and effort expenditure theorists view the perceived probability of success as an important construct (e.g., Atkinson, 1974; Feather, 1982; Meece, Parsons, Kaczala, Goff, & Futterman, 1982). Motowidlo (1979) also believes that expectancy of success is important for understanding choice and motivation. However, his approach is more closely aligned with trait theorizing as is apparent from his definition of the construct: "... a person's <u>overall</u> [italics added] sense of task related efficacy and confidence of achieving levels of performance considered to be success." (p. 70) Situational

influences on expectancy of success are acknowledged, but the emphasis is on personal (trait) determinants.

Surprisingly, little research concerning the relation between expectancy of success and the decision to continue or discontinue in high school has been conducted. Poole and Low (1982), the only researchers who have investigated the role of the construct, found that students' self-rated estimate of success did not help to discriminate dropouts from persisters once academic performance, verbal ability, and other variables had been controlled. Unfortunately, the univariate relation between expectancy of success and persistence was not reported. Clearly, more research is needed to determine whether expectancy of success is important.

Locus of control (Rotter, 1966), the extent to which people believe that outcomes are caused by their own behaviour (internality) or by factors such as luck, fate, powerful others, and situations beyond one's control (externality), has proven useful in accounting for a wide variety of behaviour including political activism, use of contraceptives, smoking, and performance in school (Bar-Tal & Bar-Zohar, 1977; Dyal, 1984; Findley & Cooper, 1983; Lefcourt, 1976; Phares, 1976). Individuals with an external locus of control (LOC), believing that their efforts are largely futile,

are generally more passive, and perform less well than internals. In some instances, the construct also has been shown to be linked to persistence, with internals exhibiting more persistence.

Andrews and Debus (1978) discovered that academic LOC, as measured by the Intellectual Achievement Responsibility (IAR) Scale (Crandall, Katkovsky, & Crandall, 1965), was unrelated to persistence at an insoluble line tracing task. However, these anomalous results might have been caused because the subjects did not value success at the task, or because they recognized the futility of persisting at an impossible task. An investigation by Brissett and Nowicki (1973) also yielded surprising results. Students who had been identified as externals by the Rotter Scale worked longer than internals on an angle matching task after having been told that they failed on their previous attempt on the task. Brissett and Nowicki speculated that their unexpected results might have been caused because internals, but not externals, recognized the futility of the task. On the other hand, Gordon, Jones and Short (1977), who used the Nowicki-Strickland LOC Scale (a general measure sampling a variety of topics), found that internality was associated with greater persistence at word forming tasks. However, the relationship was reported to have

disappeared when initial differences in ability were statistically controlled (Gordon and Bolick, 1979). An experiment conducted by Altshuler and Kassinove (1975) wherein a manipulation conceptually similar to LOC was used bears indirectly on whether the construct is related to persistence. Fifth grade students who were told that performance on an anagram task depended on skill persisted significantly longer than those who were informed that the outcome was determined by chance. Unfortunately, however, interpreting this result is difficult because locus and stability are confounded. Whereas skill is an internal and relatively stable factor, luck usually is external and unstable (e.g., fate rather than a lucky person). Thus it is difficult to know whether locus or stability was responsible for the increased persistence of those students who had been given skill instructions.

Even more relevant to the topic of this dissertation, some research has examined the relationship of LOC to persistence in high school. Sewell, Palmo and Manni (1981) found that dropouts were more external on academic LOC, as measured by the IAR, than a reference group. Using an abbreviated version of the Rotter scale, a general as opposed to a domain-specific measure, Jayaratne, Chess, Norlin and Bryan (1980) reported that internality was associated with

higher levels of educational attainment among Blacks and Whites, but not Natives. Atchison (cited by Oviatt, Boyd, Griffiths, & Farley, 1973) found that in the case of Natives, dropouts were more likely than persisters to agree with the statement that, "What I do has little effect on what happens to me." (p. 20), a belief reflecting an external orientation. Tyler and Holsinger (1975) also reported data that suggest that external Natives were more prone to dropping.

Although these non-experimental investigations reveal that LOC often is related to persistence, they do not convincingly demonstrate that internality causes increased persistence, for two reasons. It is conceivable that internality is a consequence rather than a cause of educational attainment (e.g., Jayaratne, Chess, Norlin, & Bryan, 1980). Second, it is unclear whether the LOC - persistence relationship would hold with controls for academic ability and other potentially relevant variables.

A longitudinal study undertaken by Altmann and Arambasich (1982) is pertinent to both of these concerns. They found that those individuals who scored as internals on Rotter's Scale were more likely than externals to be enrolled five months later, even though internals and externals did not differ in age, intelligence, or the last grade completed. Thus, it

would appear that LOC can contribute to persistence, independent of ability. Saltzer's (1981) longitudinal investigation concerning completion of a weight reduction programme also found LOC (actually LOC for weight) to be associated with persistence. Again, the observed relationship suggests that internality contributes to persistence, rather the reverse. Using longitudinal data, Borus and Carpenter (1984) found that internality was associated with going to college. One final investigation (Otten, 1977) provides support for a causal relationship between LOC and persistence. At the university level, Otten found that more internal than external freshmen graduated within 5 years, and that among graduate students, internals were more likely to obtain a Ph.D. within five years. Locus of control was even a better predictor than SCAT and GRE ability scores.

In summary, some experimental and non-experimental investigations reveal that internality is associated with greater persistence, but more research with the appropriate controls is needed to test whether LOC causes persistence. Additional work is also required to identify if the construct would be more useful when used in conjunction with values, as would be predicted by Social Learning Theory (Rotter, 1972), and as has been found by some research (e.g., Naditch &

DeMaio, 1975; Yoch & Nowicki, 1977). This point is discussed shortly.

f) Attributions

People often try to determine the causes of the events that they experience. That is, on the basis of the information available, they make attributions concerning causality. For instance, a student who fails a math test might attribute the failure to a lack of math ability, the difficulty of the test, poor teaching, a lack of effort, or any number of other causes. Attribution theorists (e.g., Russell, 1982; Weiner, 1979) have classified such attributions along several dimensions, the most important of which are locus (internality/externality), stability (stable/unstable) and globality (global/specific), and they maintain that the effects of attributions on subsequent expectancies and behaviour depend on the perceived dimensionality (see Weiner, 1976). In the case of a student who fails a math test, several attributions ordered roughly from better to worse (with respect to their influence on motivation) are:

a) a lack of effort (internal, unstable)
b) a difficult test (external, unstable)
c) a lack of math ability (internal, stable)
d) a lack of ability in general (internal, stable, global).

The first two attributions are unstable, and as such offer grounds for optimistic expectancies. In other words, the student can reason that he or she will do better in the future when the test might be easier or when more effort is expended. On the other hand, attributions c) and d) would be expected to lead to dejection and worse performance because ability is generally thought to be quite stable. Attribution d) presumably is the worst of those listed because, in addition to being stable, it is global. A person attributing failure on a math test to a lack of ability would not only hold negative expectancies concerning future math performance, he or she would probably expect to do poorly in all subjects. Furthermore, attributing unfavourable outcomes to internal, stable, and global factors may contribute to depression (Peterson, Semmel, vonBaeyer, Abramson, Metalsky, and Seligman, 1982), though not all researchers agree that attributional style causes depression (see Harvey & Weary, 1984).

Attribution theory is more comprehensive than the LOC approach, and essentially subsumes it in the sense that locus is only one of several dimensions that attribution theorists consider to be important for understanding motivated behaviour such as persistence. However, as yet, the linkages between the various

dimensions and their effects have been only partially delineated. Although none of the existing research used an attributional approach to understand persistence in high school, there is evidence that attributions influence perseverance in a variety of other contexts.

Andrews and Debus (1978) found that sixth graders' attributional tendencies for "failure" on a task were related to their persistence on a second, different task. In the first task, a circle design exercise in which a number of circles had to be put together to assemble a two-dimensional target stimulus, the researchers covertly arranged for all students to experience equal frequencies of success and failure (i.e., p (success) = .5). The students then rated how important ability, effort, the task, and luck were to causing their failures, after which they were given another task, an insoluble line tracing exercise, to assess their persistence. Consistent with Andrews and Debus' expectations, attributions of failure to insufficient effort were associated with greater persistence. The correlations between the luck and task attributions with persistence indicated that these attributions had a detrimental effect on persistence. Consistent with the attributional approach, but counter to the LOC perspective, which essentially treats all

internal attributions as equivalent, ability and effort attributions had different effects. The second phase of Andrews and Debus' research lent further support to a causal relation between attributions and persistence. Students who used effort attributions infrequently in phase one were selected to participate in an experiment conducted in phase two. In brief, the experimental groups were given social reinforcement for using effort attributions, whereas the controls performed the same series of tasks without attributional retraining. The experimenters ensured that both groups experienced similar amounts of success, and any initial differences (i.e., prior to training) in the tendency to persist were statistically controlled. Not surprisingly, the experimental group eventually used effort attributions more frequently than the controls, and they exhibited greater persistence. In view of the precautions that were taken to ensure internal validity, their data constitute reasonably good evidence that effort attributions can contribute to persistence.

Chapin and Dyck (1976) provide data that lend further support, though it is indirect because attributions were not assessed, to the role of attributions in persistence. In this experiment, primary school children with reading problems were given a series of sentences that differed in difficulty

such that the sequence of success and failure could be controlled. In addition to manipulating the sequence of performance, the researchers varied the feedback. More specifically, some children were told that their success was caused by trying hard, and that failure meant that they should have tried harder, whereas others experienced similar patterns of performance without attributional feedback. Then the children were tested for their persistence on other difficult sentences. As expected, those children who had been given effort feedback became more persistent, and presumably the effect was caused by a shift to greater personal use of effort attributions.

Attributions also have been found related to occupational persistence. Parsons, Herold & Leatherwood (1985), in a longitudinal investigation that used attributions to effort, ability, task, and luck, among other variables to account for turnover among cleaning staff, found luck attributions to be one of the best predictors of turnover. Those workers who believed that their performance on the job largely was caused by luck were more likely to quit their jobs, but none of the other attributional variables were relevant. However, it is unclear whether even the luck - turnover association would have persisted if

controls for other potentially important variables had been used.

g) Intentions

An accumulating body of research reveals that intentions are the best predictors of behaviour such as occupational turnover (Arnold & Feldman, 1982; Bluedorn, 1982; Parasuraman, 1982; Steele & Ovalle, 1984; Waters & Roach, 1979) and attrition among university students (Bean, 1982; Pascarella, Duby, & Iverson, 1983), and thus it is not surprising that intentions are given a central role in the models that have been proposed to account for these phenomena (e.g., Ajzen & Fishbein, 1980; Arnold & Feldman, 1982; Bean, 1982; Bluedorn, 1982; Mobley, Griffeth, Hand, & Meglino, 1979). Moreover, these models incorporate the assumption that intentions are the proximal cause of behaviour such that all other factors exert any influence that they may have via intentions. That is, other variables are postulated to exert their effects on the criterion by influencing intentions.

Despite the importance accorded to intentions in the occupational turnover and college/university attrition literatures, few researchers have investigated their role at the high school level. This

neglect is probably because of the cross-sectional emphasis of the high school attrition research, which makes it somewhat absurd to use intent to "predict" dropout after it has already occurred. Scott and Scott (1982) seem to be the only researchers who have investigated whether intent to persist in high school is important. In this two year longitudinal study, it was found that intent had the highest association with persistence of any of the variables that were employed ($r = .50$). As noted by Scott and Scott, this is probably an underestimate because the criterion, persistence, was confounded with transfer (some "dropouts" probably had transferred). This finding also is impressive considering that two years had elapsed between the measurement of intentions and the assessment of the criterion.

h) Other Personal Variables

The relevance of a number of other factors to high school persistence has been assessed. Poole and Low (1982) obtained results that showed that dropouts had lower achievement motivation than persisters, and this factor differentiated the two groups even with controls for a host of other variables. It has been claimed that low self esteem might contribute to

dropout, but this factor has been shown to be of only minor importance. Although Sewell, Palmo & Manni (1981) report that dropouts had marginally lower self esteem than persisters, two other investigations showed the construct to be unimportant (Poole & Low, 1982; Tseng, 1972). A related factor, test-taking anxiety, also has been determined to be unassociated with persistence (Tseng, 1972). Finally, there is speculation that students who drop might do so because of either a limited time perspective (a present as opposed to a future orientation), or an inability to delay gratification (Greene, 1966; Kutsche, 1964; Mischel, 1974). An inability to delay gratification also has been implicated in contributing to occupational turnover (Mobley et al., 1979) and dropout in college (Maudal, Butcher, & Mauger, 1974).

III) Summary

Consistent with the view that complex behaviour such as academic persistence is multiply determined (e.g., Anderson, 1986; Scott and Scott, 1982; Wagenaar, 1987), research reveals a wide variety of factors to be related to attrition. Home conditions, the school environment, and characteristics of students all have been found to be important. Nevertheless, it is likely

that some of the relationships do not represent causal influence, at least not to the extent assumed by investigators. Moreover, little is known about the manner in which many of the variables that seem to have genuine relationships with attrition exert their effects. For example, the basis of how parental education influences attrition is not well delineated. Knowledge concerning the relative importance of various factors also is scant. Native attrition has been particularly ill-investigated and is not well understood.

Longitudinal research with multivariate analyses is needed to help fill in some of these gaps in knowledge. Rugg has eloquently made the same point concerning the college/university attrition literature:

> Too often in the past researchers have approached the problem of identifying factors related to student retention and attrition with overly simplistic research methods. They have frequently analyzed the multivariate problem of retention from a univariate perspective and in particular have often failed to properly account for the confounding influences of uncontrolled variables. As a result, many factors have been found to correlate individually with retention and

> attrition. However, separate interpretations of the degree of relationship between a single predictor variable and the criterion of retention may be exaggerated in light of the fact that many of the predictor variables are themselves correlated and thus account for a substantial amount of common variance in the criterion. (Rugg, 1983)

To this plea, could be added one for a greater use of theory to help unify the immense and chaotic body of research findings that is developing. A useful theory also would help to elucidate how the important variables operate, in addition to providing some guidance concerning how they should be measured. The two models to be discussed next, although never employed in the area of academic persistence, seem to hold promise in these respects.

IV) Theory

i) General Expectancy-Value Model

Expectancy-value (E-V) models have been adopted widely to understand a variety of motivated behaviours (Feather, 1982). A simple E-V model employing locus of control (E) in conjunction with value (V) has proved useful in understanding quitting smoking (Kaplan &

Cowles, 1978), and intentions to lose weight (Saltzer, 1978). Those individuals with an internal locus of control who value the outcome(s) in question are predicted to be more successful than those without such an orientation. In terms of the weight reduction example, those individuals who strongly value weight reduction would be expected to be more inclined to intend to lose weight and possibly to actually do so than their counterparts who have less desire to lose weight, provided that it is believed that weight loss is controllable. This belief in controllability is essential, for without it individuals, even those highly valuing weight loss, would exert little effort to achieve it. Similarly, an internal LOC is insufficient, by itself, to motivate the behaviour in question. Weight loss has to be valued. Despite the development of the LOC construct from Social Learning Theory (Rotter, 1972), a view of behaviour that stresses expectancies and values, few researchers have used LOC in conjunction with values. It is expected that this general E-V formulation should be useful to understanding attrition. Those students who value education and have an internal LOC for academia are predicted to be unlikely to drop.

ii) Ajzen-Fishbein Model

Ajzen and Fishbein have developed a Model of Reasoned Action that has proved useful to understanding such diverse behaviours as attending college (Carpenter & Fleishman, 1987), blood donation (Brinberg, 1980), television viewing (Loken, 1983), abortion (Smetana & Adler, 1980), and occupational turnover (Newman, 1974). As the name of the model implies, individuals are regarded as essentially rational decision makers. In choosing a course of action (behaviour), whether it be to continue or discontinue in school, or to buy an Oldsmobile instead of buying a Buick or taking the bus, individuals are assumed to consider their alternatives, and to evaluate each of these in terms of their advantages and disadvantages. This information is integrated such that overall attitudes and intentions concerning each course of action are formed. Finally, the individual is predicted to behave in accordance with his or her most favourable intention provided that there are few constraints to the contrary (Ajzen & Fishbein, 1980).

Intentions are thought of as the direct antecedents of behaviour, at least that subset of behaviour that is largely under volitional control (see Ajzen & Fishbein, 1980, p. 29). Accordingly,

intentions are expected to be strongly associated with behaviour. The research reported earlier that found that intentions were often the best predictor of occupational turnover, college attrition, and high school dropout clearly supports this expectation. In spite of the strong relationship between intentions and behaviour, intentions are in a sense "empty variables" (Bean, 1982) because they provide little insight into why behaviour occurs.

However, the Ajzen and Fishbein model, by tracing the antecedents of intentions, provides a deeper level of understanding. Behavioural intentions (BI) are thought to be determined both by attitudes, or affect toward engaging in the behaviour (A), and subjective norms, the individual's beliefs concerning what most "important others" (e.g., spouse, parents etc.) think he or she should do (SN). This relation can be expressed algebraically as:

$$BI = w_1 A + w_2 SN,$$

where w1 & w2 are theoretical weights that are commonly estimated by standard regression.

An even deeper level of explanation can be obtained by examining the antecedents of attitudes and subjective norms. Attitudes are conceived as determined by beliefs (numbering i) concerning the outcomes that might arise when a behaviour is performed

(b_i), and the evaluation of these outcomes in terms of their favorability (e_i). More specifically, the relation is held to be multiplicative and of the following form:

$$A = \sum b_i \times e_i$$

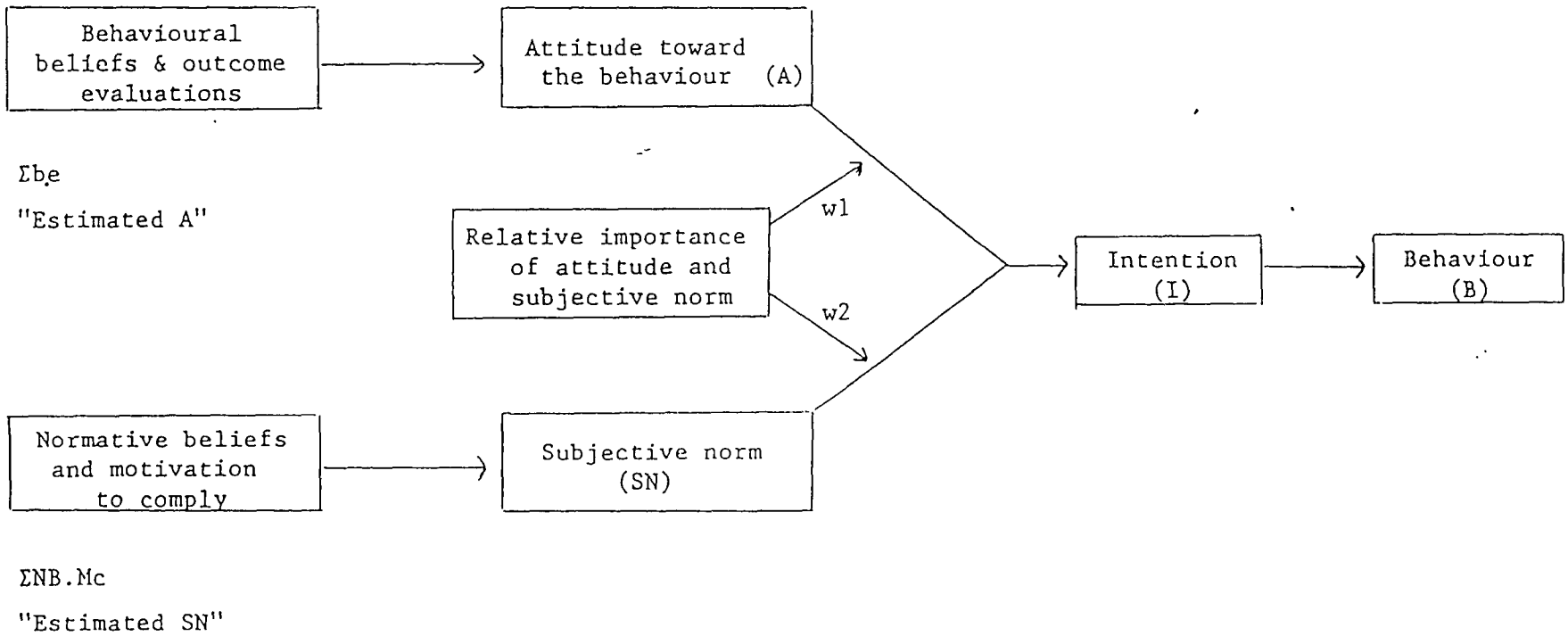
Similarly, the subjective norm (SN) is considered to be a function of beliefs (Nb) about what specific others or referents are thought to encourage, weighted by the motivation to comply (Mc) with these others:

$$SN = \sum Nb_r \times Mc_r$$

That is, the overall belief about what most important others are thought to encourage is determined by a number of appropriately weighted beliefs concerning individual referents.

The relations that have been discussed are depicted in Figure 1. As can be seen in the figure, only intentions are thought to directly influence behaviour. All other variables, both endogenous and exogenous to the model, are hypothesized to contribute to behaviour only insofar as they influence intentions. In other words, when the constructs are measured in accordance with Ajzen and Fishbein's recommendations, intentions are expected to mediate the effects of any other variables. For example, in the case of high school attrition, demographic variables, exposure to dropout, and the other variables in the model should

Figure 2: The Ajzen and Fishbein Model



not have any influence on dropout other than that channelled through intentions. If, in fact, the model could subsume most of the plethora of variables shown by past research to be related to attrition, it would certainly go a long way towards providing some structure and organization to the field. However, it is anticipated that reality is more complex than the Fishbein framework implies. More will be said about the models in later chapters. In the meantime, a discussion of the methodology and measures used in the current study is in order.

Chapter 2 Notes:

[1] Vincent and Black (1966), however, found little evidence that dropping has deleterious occupational or economic consequences, but this finding is the exception rather than the rule, and probably reflects the presence of a job market that was healthier than the current one.

[2] As has been noted in an astute paper by Griffin (1976), the estimated effects of education on occupational attainment likely are inflated since ability and motivation are typically not controlled when the effects of education are estimated.

[3] This categorization is not meant to imply that background, school, and personal factors are distinct. On the contrary, they are held to be interrelated, with school and background factors influencing dropout via their impact on personal characteristics such as beliefs.

[4] When several measures of the same construct are included in an equation, each variable can have little effect when the other variable is controlled. Both variables are likely to have non significant effects under these circumstances.

[5] The estimate might grossly overestimate the rate of attrition if grade retention and attrition were confounded, as may be the case. In the text on page 25 of the report, it would appear that the figure refers to the percentage of natives who dropped. However, their Table 4.2 (p. 27), which displays the percentage of grade nine students who were enrolled in grade twelve four years later, gives the impression that attrition and failure were combined. The estimated rates are also less than ideal since they do not take into account withdrawal at the primary level, a not uncommon occurrence among Natives.

Chapter Three

METHODOLOGY

This chapter describes a pilot study that provided information essential for the construction of the questionnaires used in the main investigation. The design, a longitudinal survey with two waves of data collection (1983 and 1984), and the rationale for using it also is outlined. Brief mention is made of the information that was collected, a topic that is dealt with in more detail in Chapter 4. In addition, the procedure used to survey the students from each of four schools is reviewed and the characteristics of the sample are listed. Finally, the ways in which the methodology of this investigation is unique among academic attrition studies, particularly those concerning high school students are discussed.

I) Pilot Study

In accordance with the Ajzen and Fishbein prescriptions (Ajzen & Fishbein, 1980), a pilot study was conducted to determine what consequences students think result from continuing or discontinuing their

education (beliefs), and to determine those individuals (referents) whom they thought might influence their educational decisions. All Native students in grades 9 to 11 at Brantford Collegiate Institute (BCI) and a similarly-sized random sample of non-Natives from the same school and grade levels were selected to participate.[1]

Ninety students came to the school cafeteria on Sept 29th, 1983 to complete a short questionnaire on "academic decision making." The students were not asked about their ethnicities at this stage of the research in case they were sensitized to the potentially contentious issue of Native/non-Native differences. As in all subsequent data collection sessions, an empty seat was kept between students to minimize communication. The students were told that they had not been chosen for any particular reason so that they would not be inclined to infer anything negative about themselves, and complete confidentiality was assured. They then were asked to respond to six statements, each of which employed the word "your" to ensure that <u>personal</u> beliefs were assessed. The six statements were:

1) List (point form) the advantages of your being in high school next fall.

2) List the disadvantages of your being in high school next fall.

3) List the advantages of your <u>not</u> being in high school next fall.

4) List the disadvantages of your <u>not</u> being in high school next fall.

5) List the people who would approve of your being in high school next fall.

6) List the people who would disapprove of your being in high school next fall.

The instructions (see appendix) encouraged the respondents to think of both short and long term consequences. They were allotted approximately 25 minutes to complete the task.

Not surprisingly, the perceived advantages of attending (item 1) corresponded to the disadvantages of not attending (item 4). Similarly, items two and three were found to yield parallel answers. Responses that were judged to convey similar content were grouped according to the Fishbein guidelines (Ajzen & Fishbein, 1980), thereby forming the 15 categories listed in Table 1. As can be seen from the table, the most frequently mentioned outcomes of being in school next fall were 1) becoming knowledgeable/intelligent, 2) having reduced spare/free time, and 3) being able to participate in higher education.

Table 1: Modal beliefs about attending high school next Fall

Belief (outcome)	Frequency of elicitation	Cumulative frequency
Becoming knowledgeable	79	23.2%
Reduced spare time	72	44.3%
Enables additional education	46	57.7%
Making new friends	30	66.6%
Participating in enjoyable activities	22	73.0%
Learn useful skills & habits	16	77.7%
Helps to get a job	13	81.5%
Helps to get career of choice	13	85.3%
Be with friends	10	88.3%
Reduced chances of holding a job during the school year	10	91.2%
Boredom	8	93.5%
Arguments & disagreements with teachers	7	95.6%
Arguments & disagreements with students	6	97.4%
Low marks	5	98.9%
Reduced social life	4	100.0%
	341	

Unusual outcomes, listed by fewer than three students, were excluded from further consideration.

The students' referents (important others), as determined by items five and six, were found to include their sisters, brothers, religious figures, friends, grandparents, parents, teachers, as well as aunts and uncles. This information along with that pertaining to the students' beliefs regarding potential outcomes was then employed in designing the Fishbein items to be used in the main study.

II) Main Study

As was noted in Chapter 2, cross-sectional attrition studies typically have difficulty differentiating factors that contribute to attrition from those which are consequences of dropping out. Moreover, if a survey is to be used in cross-sectional designs, it usually takes place after the dropouts leave, when they are likely difficult to contact and may tend to be uncooperative. In view of these weaknesses, the current research employs a more intricate but potentially more informative longitudinal design. At the beginning of two school years, 1983 and 1984, questionnaires assessing demographics, the constructs of the two models, and other information

were administered to large numbers of students.[2] This information was supplemented by data (e.g., absenteeism, grade average) from the school records pertaining to the 1982-1983 and 1983-1984 school years. The relationship of these data from the records and questionnaires to subsequent dropout was then assessed. Given this background, the methodology will now be presented in detail.

i) Subjects

In the Fall of 1983 and 1984, all grade 9 to 11 Native students in attendance at high schools in Brantford, Caledonia, Cayuga, and Hagersville, and a parallel, similar sized random sample (i.e, in the statistical sense) of non-Natives were selected to participate.[3] The sampling was essentially random except at Caledonia where it was necessary to use intact classes. In all, 581 students in grades 9 to 11 were surveyed in 1983, and 525 in 1984 (grade 12 students omitted). More than 90% of the students selected for the study were surveyed. The questionnaires from three students in the 1983 cohort were discarded due to frivolous responding, leaving 578. Of the 578 respondents, 101 were from Caledonia, 117 attended Cayuga, 82 went to BCI, and the remaining

278 were enrolled at Hagersville. Two hundred and eighty six were Natives and 292 were non-Natives, wi the sexes represented in almost equal numbers (285 males and 293 females). The distribution by grade was as follows: Gr.9: 228, Gr.10: 183, Gr.11: 167. The 1984 breakdown by school and ethnicity was similar.

To provide more insight into the nature of the sample, descriptive information based on the 578 useable questionnaires from 1983 is presented. As can be seen in Tables 2 and 3, Natives and non-Natives have home backgrounds or living conditions which are appreciably different. Natives have larger family sizes, lower income, and fewer reference books, and come from homes that are less modern (see Chapter 4 for a description of the measures). Moreover, as compared to non-Native parents, the Native parents are reported to have less education and to hold jobs of lower socioeconomic status. Natives are also more likely to have brothers and/or sisters who have dropped out of school. Table 3 shows that the parents of Native students are more likely than their non-Native counterparts to be unemployed. Among fathers, the unemployment rate is 30% for Natives compared to 10.6% for non-Natives. Although these figures may be marginally inflated due to the inclusion of a few

Table 2: Demographic characteristics of Native and non-Native students

Variables	Native		Non-Native		
	M	SD	M	SD	t
Family size	5.4	2.2	4.7	1.4	-4.5[a]
Family income[d]	3.8	2.1	5.0	2.0	7.1[a]
Income per person	0.8	0.6	1.1	0.5	7.0[a]
Number of siblings having dropped	1.2	1.8	0.2	0.6	-5.7[a]
Reference books	1.9	0.9	2.4	0.8	6.3[a]
Home modernity	4.4	0.8	4.9	0.2	10.8[a]
SES male parent[e]	4.1	1.3	3.6	1.5	-3.6[a]
Education male parent	10.3	2.4	12.4	2.4	6.4[a]
Education female parent	11.0	2.3	12.3	2.4	6.2[a]
Education house[f]	11.5	2.2	12.8	2.6	6.4[a]

[a] $p < .001$, [b] $p < .01$, [c] $p < .05$ (two-tailed).
[ns]: not statistically significant.

[d] income was coded 1 (<$8,000) to 8 (>$38,000)
[e] socio-economic status (SES) was coded 1 (professional) to 6 (unskilled)
[f] the higher of maternal & paternal education was used

Table 3: Parental employment among Natives and non-Natives

Variable	Native Frequency No	Native Frequency Yes	Non-Native Frequency No	Non-Native Frequency Yes	Chi-Square (corrected)
Both parents work	98	188	54	238	17.7[a]
Male parent works	60	139	25	231	29.3[a]
Female parent works	131	119	111	154	5.3[c]

[a] $p < .001$, [b] $p < .01$, [c] $p < .05$ (two-tailed).
[ns]: not statistically significant.

retirees, they show that Native families are exposed to more unemployment.

Overall, it is clear that the non-Native living conditions are advantaged in comparison to those of Native families.

Native students are older as would be expected given that they often start school a little later and are more likely to have to repeat grades (Berry, 1966). Natives also report lower grade averages (68% versus 73.6%).[4]

ii) Procedure

The procedure was essentially the same in both years of the survey and therefore will be described only once. At the outset, each of the selected students was given an opt-out form (see appendix) that could be used to be excluded from participating.

Those students who had been selected were instructed to come to their school cafeteria where they received a standard set of instructions (see appendix). After introducing myself as a member of a McMaster University research team investigating academic decision making, the students were informed that their selection had been determined by chance. It was emphasized that they had not been chosen for any

particular reason. Then the subjects were instructed to open their questionnaire packages, which had been placed at every second seat. A Contents and Order list in the package was described, and the students were instructed to use it to check that their packages were complete. Upon finishing this task, which provided some familiarity with the components of the questionnaire, the students were instructed on the response modes (e.g., true/false, Likert scaling etc.) to be used. They were asked to read the instructions carefully before responding and to answer the questions honestly.

In 1983, the components of the questionnaires were presented in two orders: 1) demographics, value of education (PVE), Ajzen-Fishbein constructs (A-F), social desirability (SDS), Motowidlo's Expectancy of Success Scale (ESC), and Lefcourt's MMCS or 2) demographics, MMCS, ESC, SDS, A-F,and PVE, with half of the respondents receiving each order. The packages had been dispersed such that adjacent students typically had different versions. It was felt that this would help minimize communication between students and foster accurate responding. Using two different orders also made it improbable that either the Ajzen-Fishbein or the general expectancy-value model were given a positional advantage. It is unlikely, for example,

that one of the models would be less successful at accounting for behaviour due to students becoming fatigued toward the latter part of the sessions. The students were informed that two different orders were being used and therefore their neighbours likely would be of little help in answering any questions they might have. They were encouraged to direct any questions to the administrator or to any teachers who were in attendance.

As has been mentioned, the questionnaires were distributed in such a way that students would be minimally influenced by their peers. Other steps that were taken to encourage accurate and honest responding were:

1) The students were informed that the responses of individuals were of no concern because the analyses involved group comparisons such as all males compared with all females.

2) Confidentiality was guaranteed.

3) The principals of the schools encouraged accurate responding.

4) Standardized scales developed to minimize respondent bias were used whenever possible.

As described in Chapter 4, a social desirability scale was included in case it became necessary to statistically control for this response set.

After the instructions had been completed, the students were asked if they had any questions, and when the problems had been clarified the participants were thanked for their cooperation, and were allowed to begin. An hour was usually sufficient time to complete the task, but the students were allowed to take as long as necessary. One or two additional sessions were provided at each school for those students who had missed the first administration. In this way, as many of the selected students as practicable were surveyed.

The instructions were similar from session to session and from one year to the next. However, the questionnaire used in 1984 contained some vocabulary and content changes. Inappropriate vocabulary was replaced (e.g., resent was changed to dislike), and information was collected on a number of additional topics including:

1) language use in the home by the students and their parents

2) the possession of such household items as radios, televisions, and library cards, and the presence of a quiet place in which to study

3) the respondent's ability to delay gratification

4) the educational progress of the respondent's siblings

5) parental (un)employment

6) the perceived distance between the respondent's home and his/her school.

iii) The Criterion: Dropout

Having described the pilot study and aspects of the main investigation, it is appropriate to comment on the dependent variable, dropout, and on data analysis. It should be emphasized that considerable care was taken to identify dropouts. School records, teachers, and office staff were used to identify students who had left anytime before completing grade 12. These lists were compared against lists of students who had graduated or transferred to other schools to ensure that the leavers were actually dropouts. In addition, students who had left temporarily, and then subsequently returned (stopouts) were distinguished from their peers who left, as far as could be determined, permanently (dropouts). More will be said in this regard later.

iv) Data Analyses

a) General Information

As mentioned, 581 students in grade 9 to 11 were surveyed in 1983 and 525 in 1984. To increase the sample size on which the analyses are conducted, the data from the two years were combined, producing a data set of 807 students (399 Natives & 408 non-Natives).

The sample size is not the sum of the n's for each year because many of the students (n = 296) who were surveyed in 1984 already had participated in 1983. Most analyses, unless otherwise indicated, use the sample of 807 students.

The SPSSx package was used for all analyses (Versions 2.1 and 2.2). Bivariate correlations and t-tests were typically employed as a first step in determining the variables relevant to understanding the various criteria under study, which include intentions, and enrollment status (persist/drop) one year and three to four years subsequent to the administration of the surveys. Separate analyses were conducted for Natives and non-Natives so as not to obscure any important differences that might exist. In some instances quite a few coefficients were calculated, thereby potentially producing alpha-inflation, which would make it possible that some truly unimportant variables reached statistical significance (see Abt, 1983). Nevertheless, this is not likely to be a serious problem given the exploratory nature of some aspects of the research.

Scatterplots, cross-tabulations, and coefficient eta were used to detect the presence of non-linear relationships between variables. Eta assumes no particular functional relation between the

predictor and criterion (Guilford & Frucher, 1973) and reflects linear and non-linear associations. Thus, comparing the magnitude of Pearson correlation coefficients, which only capture linearity, with eta provides a measure of the extent to which a relation may be non-linear. If there is considerable non-linearity, eta will be larger than r. An eta that is larger than r, however, can represent some capitalization on chance (overfitting). To avoid overfitting, the differences in the coefficients were only viewed as important when the relation was simple. That is cross-tabulation had to be shown to demonstrate a discernable and simple pattern with the criterion (e.g., an inverted U). Complicated relations such as zig-zags were deemed likely to be artifacts.

After the initial univariate analyses, multivariate techniques were employed to gain a better appreciation of the relative roles of the variables in a multivariate context; for example, whether a variable is important if certain other variables are controlled. Analyses of this sort were employed most often in testing theoretical propositions and in trying to determine how certain variables exert their influence. The SPSSX default options for tolerance, criteria of entry and removal etc. were used unless otherwise indicated. More detail about the specific hypotheses

and the statistical procedures used (standard, forward-stepping, and hierarchical regression, factor analysis, and discriminant analysis) is provided in subsequent chapters.

b) Missing Data

Fortunately, little of the data were missing and since there were few substantial differences between Natives and non-Natives on amount of incomplete data, the figures for the two groups are averaged for simplicity. For the criterion of students' enrollment status in June 1987, the information was unavailable on only seven percent of the sample. Most of these students transferred to non-local schools where their status could not be determined with certainty. Thus these data were excluded from analyses. Intentions to attend school the following Fall were missing for less than one percent of the sample and enrollment status one year after the survey (outyear1), similarly was missing for a few respondents (2.5%). Given the infrequency of incomplete data on intentions or outyear1, cases with missing values on these variables were dropped from analyses using these dependent variables.

Few of the predictors used to explain the various criteria had substantial amounts of missing data. In fact, of all the factors assessed in both survey years, only expected socioeconomic status (13%), reported grade average (11%), income (11%), and paternally based SES (25%) were missing among more than 10% of the students. Most variables were characterized by rates of less than three percent. Although few of these predictors had enough missing data to be a problem, some did. Number of failures, grade average, absenteeism, and level or stream in the previous high school year were not available for approximately 40% of the cases largely since these variables do not apply to those students in grade 9 at the time of the survey. Redefining these variables to reflect, for example, average in the previous year (grade 8 for some students and 9 or 10 for others) rather than high school average in the past year was considered but then rejected on two grounds. First, the primary school data were often missing thereby precluding their use. Second, it seemed unwise to assume equivalence of the elementary and secondary school data, an assumption implicit in combining the two sources to represent a single variable. Varying accounting practices across the school levels and the possiblity of different

determinants of the variables made an equivalence assumption untenable.

Since extant research has shown the aforementioned academic factors to be related to attrition, it clearly is the case that they should not be ignored because of missing data for to do so would result in misspecification and misleading results. On the other hand, including these variables in multivariate analyses with listwise deletion (excluding cases with missing information on any of the variables) seriously reduces sample size, possibly biasing the sample in unknown ways. Because dropouts have more missing data (McNally, 1979), listwise deletion would result in disproportional discarding of data from dropouts. In view of these considerations, it was decided to replace missing values by the mean of the variable. Mean substitution is more conservative than other techniques such as imputation based on multiple regression (Tabachnick & Fidell, 1983) and has been used by many researchers (Anderson, 1981; James, 1985; Maudal, Butcher, & Mauger, 1974; McNally, 1979; Rosenbaum, 1986; Tambe, 1984) who have experienced this all too common missing data problem. Furthermore, it has been shown to compare favourably with other, often more complicated, methods (Huberty, 1975; Pinches, 1980). Although, as noted, the non-academic variables

had an insignificant amount missing, mean substitution was used here also. Because little information was missing, the substitution has little effect on correlations involving these variables (e.g., the r between attitude & OutJune87 is -.21 both with & without substitution). Indeed, correlation coefficients rarely changed by more than .01. In addition, mean substitution has the advantage of ensuring that the same subjects are used in all analyses, regardless of which variables are employed. This is important because it guarantees that any differences in the results derived from separate analyses can not be due to a "shifting sample".

c) Cross-Validation

Equations usually perform worse (e.g., lower R^2) in samples that have not been used to derive the weights. The extent of "shrinkage" is important and it should be checked for whenever possible (Mosier, 1951; Wherry, 1975). To determine the robustness of the results in this research, cross-validation was used. Although some authorities recently have been advocating the use of formulae to correct for shrinkage (e.g., Murphy, 1983, 1984; Schmitt, Coyle, & Rauschenberger, 1977), an empirical approach was taken here. The data

were partitioned into two groups (development or derivation and replication). As noted by Klecka (1982, p. 52) there is little consensus among statisticians as to what proportion of cases should be assigned to each group. In this research, a 75% (derivation or validation)/ 25% (replication or cross-validation) split was decided upon largely because similar ratios have been used successfully by other researchers (e.g., Pascarella & Terenzini, 1980; Winchie & Carment, 1988). The derivation group was used to calculate equations indicating the importance of variables and their ability to account for the criterion while the replication group provided information concerning whether the obtained results generalized, or cross-validated, to a "new" sample. Findings that cross-validate are more robust, and hence more worthy of attention than those that do not. An empirical approach was chosen over formulae based correction for several reasons, the most important of which is described here. Equations that are based on variables included on theoretical grounds suffer less degradation on replication attempts (smaller decrease in R) than those that are atheoretical (Mitchell & Klimoski, 1986). Nevertheless, formulae approaches do not take this into account and calculate the same shrinkage regardless of the degree that theory is used. As such,

non-empirical techniques have a tendency to overestimate the drop in multiple correlation encountered in rational, theory based investigations, and to underestimate the actual shrinkage for atheoretical work.

d) Interactions

Most researchers (of academic persistence and other topics) have concentrated on main effects, virtually ignoring the possibility of interactions, in which the influence of one variable on the criterion is dependent on the levels of other variables. However, this might be a serious oversight. It seems plausible that interactions might be important in understanding academic persistence. For example, it might be naive to assume that students with higher grades necessarily are more persistent (a main effect). Whether students with high averages remain in school may be related to their families' resources (an interaction). Many other potential conditional relations also can be conceived.

With more than 40 focal variables and three dependent variables in the current research, there are too many possible interactions (even excluding third and higher-order interactions) to subject to empirical scrutiny. Not only would testing them all be time

consuming, there would be many spurious findings (Type 1 errors). Accordingly, only those interactions that satisfied any of the following criteria were examined: a) detected in previous research b) expected on theoretical grounds c) seem intuitively likely. Included among the set that resulted were maternal education by sex, paternal education by sex, perceived value of education by internality, intention by average, attitude by average, education expected by average, education desired by average, education expected by delay of gratification, and attitude by subjective norm. Only a few higher order interactions were examined (e.g., intention by average and income) primarily because these rarely have been shown to be useful in fields where testing interactions is more common than in research on dropout.

The most accepted way of testing for linear interactions is to multiply the predictors that are expected to interact (e.g.,intention (I) x grade average (Avg)) and determine whether the product is useful when the main effects are controlled or partialled (Allison, 1977; Cohen, 1968; Cohen, 1978; Lewis-Beck, 1980; Peters, O'Connor & Wise, 1984). Typically, the following types of regression equations are compared in terms of R^2 or the regression coefficient for $X_1.X_2$

a) $Y = w_1.X_1 + w_2.X_2$

b) $Y = w_3.X_1 + w_4.X_2 + w_5.(X_1.X_2)$

If W_5 is statistically significant or the multiple correlation is greater for b), then an interaction is shown to have occurred. An alternative way of checking for interactions which is easier to implement uses partial correlation. The correlation between the product term and the criterion, controlling for the components (e.g., X_1, X_2) is examined. In other words, for example, what is at issue is whether there is a correlation between the product and the criterion when they both are "residualized" for X_1 and X_2. The resulting correlation is a partial correlation. Semipartial correlation, unlike partial correlation, residualizes the predictor (e.g., X_1 x X_2) but not the criterion and reflects how much R^2 would decrease if the variable were omitted from the equation (Cohen & Cohen, 1975); Tabachnick & Fidell, 1983). As such, semipartial correlation is actually more appropriate to testing for interactions than partial correlational analyses.

SPSSx does not contain semipartial analyses so partial correlation was used. Since partial correlations are always at least as large as semipartial correlations (Cohen & Cohen, 1975; Norusis, 1985), the use of the former in this dissertation

ensured that interactions were given an adequate, if not marginally inflated, opportunity to be statistically significant.

Linear interactions were tried for two (intent, and status in June 1987) of the three dependent variables; there was an insufficient number of cases for analyses of enrollment status at the one year point. Separate analyses were conducted for Natives and non-Natives. Although, five interactions, as indexed by partial correlations, were statistically significant in the analysis for intent, each was less than .19, the value typically used as a criterion for entry in stepwise analyses. Furthermore, none were significant on cross-validation. Even fewer interactions reached significance in the analyses on enrollment in June 1987. Although the partial correlations for maternal education x sex of student; and education desired x average were statistically significant, they were of inconsequential magnitude (.12 & .13). Because interactions were found to be of little value in this research, as in many previous investigations (see Alexander, Riordan, Fennessey, & Pallas, 1982; Behling & Dillard, 1984; Pallas, 1984; Plomin & Daniels, 1984), they will not receive much further attention. However, it should be noted that all of the approaches to handling interactions that

have been discussed assume linearity (see Cohen, 1968; Champoux & Peters, 1980) and do not detect more complicated, but unlikely forms of interaction. It was decided that the probable payoff from examining non-linear types of interactions would be insufficient to justify the effort required to assess them. It also did not seem worth while to test for what Sharma, Durand and Gur-Arie (1981) call "homologizer variables".

Summary

The current chapter has outlined a pilot study that was used to design items to measure the Fishbein constructs. The questionnaires, the sample of students, and the procedure used in the surveys were described. Also mentioned were a number of aspects of the investigation which, when considered together, demonstrate that the current investigation is unique among attrition studies. These include:

1) The use of a wide range of predictor variables suspected of being relevant on the basis of past research and/or theory.

2) The use of large numbers of students (the n's for 1983 and 1984 were 581 and 525) who comprised an approximately random sample.

3) The use of a longitudinal design with 2 waves of data collection.

4) The use of several means to encourage accurate and honest responding including: a) pleas from the researcher and principals, b) a seating arrangement that was designed to minimize communication between students, c) guarantees of confidentiality, and d) explanations that the researchers were interested in group rather than individual comparisons.

5) The inclusion of a scale measuring social desirability.

6) The distinction between dropouts, stopouts, and transferees.

7) Efforts to ensure reliable and valid measurements.

8) The use of multivariate analyses with cross-validation.

9) Testing for potential linear interactions.

The next chapter presents findings from both this and previous research on the psychometric adequacy of the measures employed.

Chapter 3 Notes:

[1] The pilot study was conducted at Brantford Collegiate, the school with the fewest participants in the main study, to minimize any reactive effects (e.g., effects of pre-testing on subsequent survey responses) that might have occurred. Any such effects would have had a larger impact on the overall analyses (combining the data from each school) if the schools with more participants in the main study had been used in the pilot.

[2] Items were included to assess factors which might be expected to be relevant on the basis of past research, theory, or intuition. The field was delimited by such considerations as the use of theory, and the availability of good measures. Variables for which good measures were not available were excluded from further consideration. On the other hand, constructs embedded in a theoretical context were favoured compared to those that are used atheoretically. Of course, the role of some factors, particularly those at an aggregate level (e.g., school size), could not be examined in this investigation because of the level of analysis employed.

[3] In the next year, students currently in grade 12 have some options not available to the other students. They can continue in high school, go to college, enter the workforce, or possibly attend university. Thus, to understand grade 12 students choices, it would have been necessary to administer a separate questionnaire that assessed attitudes, intentions, and the other Fishbein constructs toward each of the various options. In view of the infrequency of dropout in grade 12, the development of a separate questionnaire did not seem to be warranted. Students in grade 12 were excluded on these grounds.

[4] Both Aboriginal North Americans and non-Natives come from heterogeneous groups, exhibiting tremendous within-group variation in characteristics. Thus, some of the inter-group differences reported already as well as others presented later are probably sample specific rather than universal.

Chapter Four

THE MEASURES

In view of the importance of good measurement to the valid testing of hypotheses (Andrews, 1984; Cooper & Richardson, 1986; Fiske & Pearson, 1970; Sonquist & Dunkelberg, 1977; Zeller & Carmines, 1980), this chapter describes the measures used in the current research, and presents data, where available, on their reliability and validity. The evidence offered is, admittedly, somewhat fragmentary, but this is unavoidable given the newness of some of the measures and the enormity of the task. Before embarking on a review of the measures, the different types of reliability and validity will be discussed, as will the principal means of assessing some of these; that is, factor analyses, validity coefficients, and Cronbach's coefficient alpha (see for example, Nunnally, 1970).

I) Psychometrics: Background

i) Reliability

Reliability refers to consistency of measurement, whether across raters (inter-rater), time

(test-retest), items (internal consistency), within raters across occasions (intra-rater), or some combination of the these. Although each type of reliability provides some unique information concerning potential sources of measurement error, internal consistency is the most relevant to this research. Inter-rater reliability is not of concern because the measures that are used have objective scoring schemes by which all raters would arrive almost invariably at exactly the same scores. Nor is test-retest reliability as important to the current enterprise as it would be, for example, in an investigation which measured an attribute both prior to and after a treatment. Obviously, in these circumstances a researcher would not want to use a measure that produced different results merely as a result of the passage of time. Internal consistency, or the tendency for all of the items designed to measure a single construct or attribute to actually do so, is considered to be essential and often is gauged by conducting factor analyses, computing Cronbach's coefficient alpha, or occasionally by using both.

Cronbach's alpha assesses the extent to which items from a scale measure a common construct, and as is apparent from the formula below, it is influenced by

both the number of items in a scale and the average of the inter-item correlations:

$$\alpha = \frac{N \times p}{1 + p(N-1)}$$

, where N = the number of items
p = the average inter-item correlation.

It often is suggested that alphas of .7 to .8 or greater be sought (Carmines & Zeller, 1982; Nunnally, 1970), and .6 can be considered good in some circumstances (Cohen & Cohen, 1975, p. 64), although it should be realized that high levels are more difficult to achieve with short scales. With 3 items (n = 3) and an average inter-item correlation of .3, α is .56. However, for the same degree of item interrelatedness, an n of 6 produces an alpha of .72, whereas with n = 40, α = .94. Clearly, given the influence of the number of items on alpha, the prescription that it should be at least .7 should be used only as a general guideline.

Factor analysis also can be useful in the assessment of internal consistency. In essence it refers to a series of techniques (e.g., principal components analysis, principal axis factoring etc.) which can account for the interrelationships among a set of items in terms of a group of basic categories

called factors, which are smaller in number than the original items (Zeller & Carmines, 1980). A series of items measuring a common construct would be expected to yield one factor, with the better items loading more highly. In addition to providing information about the overall scale quality via the number of factors, the technique enables one to determine the quality of individual items by examining the factor loadings. Items with low loadings [e.g., < .3 (Kim & Mueller, 1978, p. 70; Tabachnick & Fidell, 1983, p. 411)]; and those which load on several factors are considered to be poor ones. Factor analysis, as will be discussed later, is also useful in determining the cross-cultural equivalence of measures.

ii) Validity

Construct validity (Anastasi, 1982; Campbell & Fiske, 1959; Cronbach & Meehl, 1955; Loevinger, 1957; Peter & Churchill, 1986) refers to the extent to which a scale measures the intended construct. This judgement is bolstered by evidence of several types:

1) The measure produces scores which are substantially correlated with other measures of the same construct (concurrent validity).

2) The measure produces scores which have low or non significant correlations with

theoretically distinct variables (discriminant validity).

3) The measure produces scores which are useful in predicting theoretically relevant criteria (predictive validity).

4) The measure produces scores which are reliable.

As mentioned previously, knowing a measure's internal consistency is helpful in determining whether a single construct is being measured, and therefore as preliminary support regarding construct validity. Evidence of concurrent validity, given the requirement of a valid alternative measure, is of limited value. If a good measure already existed, one clearly would use it. Predictive and discriminant validity, on the other hand, are often of greater assistance, providing that theory is capable of specifying what variables should and should not be related. The absence of an association (negligible r or validity coefficient) with socially desirable responding, or other response sets (Cronbach, 1946), is almost always interpreted as evidence of discriminant validity. What constitutes evidence of predictive validity depends on the particular construct and the theoretical framework in which it is embedded.

Given this background, the psychometric adequacy of the measures will be discussed. The

demographic items will be dealt with first, followed by the psychological variables. Data from both this investigation and existing work will be presented. Previous research is relied on almost exclusively in the case of variables assessed by well established scales, whereas data from the current study are brought to bear on the adequacy of measures constructed especially for this project. All of the pschometric information obtained in this investigation is based on the 1983 data for approximately (pairwise deletion was used sometimes) 286 Natives and 292 non-Natives, unless otherwise indicated.

II) Psychometrics of the Measures

i) The Demographic Variables

The first section of the questionnaire assessed a variety of demographic information some of which has been implicated by previous research as being important to understanding attrition. Included among this information were the educational attainment of parents (or guardians) and siblings, family size and composition, parental employment and earnings, religious and racial background, number of siblings having quit school prematurely, the presence/absence of various items and books in the home, the distance

between the respondent's home and his or her school, and the respondent's grade average in the previous year. Also, there were items that assessed both the amount of education and the occupation desired. In addition, the corresponding expectations concerning what occupation likely would be achieved were determined. Socioeconomic status (SES) was determined by categorizing occupations on a six point scale (1=highest, 6=lowest) based on the Pineo, Porter, and McRoberts approach (1977):

1) Professionals and high level management (e.g., teacher, physician, vice president of company)
2) Semi-professionals, middle management, technicians, and supervisors (e.g., artist, computer programmer)
3) Foremen, skilled workers (e.g., machinist, appliance repair, real estate agent)
4) Farmers
5) Semi-skilled workers (e.g., bartender, hairdresser, machine operators)
6) Unskilled (e.g., farm labourer, cab driver, janitor).

Single items were used to gather all of these data, and they employed either of two types of format: a) fill in the designated space(s), or b) use of a check mark to indicate the best or most appropriate alternative. Important words were underlined to prevent misreading, and examples were provided. As is common in survey research, the items pertaining to potentially sensitive topics such as parental employment and family income were presented after a

series of innocuous ones. Similarly, if two or more items might be expected to influence one another, they were separated by a number of intervening items. For example, it seemed unwise to ask consecutively the amount of education desired and the amount expected, so these items were separated by 11 others. The reader is referred to the questionnaire provided in the appendix for the exact items used, and the order of presentation.

Because single items were used to assess demographics, it is not possible to present data on internal consistency. It also is not possible to present much validity data; however, given the steps that were taken to encourage accurate and honest responding, it seems that the quality of the demographic information should be at least as good as that typically achieved in survey research. The fact that only one of the demographic variables (reported grade average for Natives) correlated to a statistically significant degree with social desirability ($r = .11$) indicates that the demographic information is not contaminated by the tendency to give socially desirable answers.

ii) The Psychological Variables

a) Expectancy of Success

Motowidlo (1979) conceives of generalized expectancy of success as ".... a person's overall feeling of self-competence and expectancy of achieving that level of performance considered to be success in task situations [and] as an important individual difference variable contributing to an individual's level of expectancy of task success (p. 70)." The construct is distinguished from locus of control (LOC), which refers to the general tendency to consider outcomes as being largely under one's personal control (internal locus) or subject primarily to the control of outside influences (external locus). Motowidlo notes that an individual might believe that he/she determines the relevant outcome(s) (internal LOC), but because of a perceived lack of ability may consider himself/herself to be low on generalized expectancy of task success.

To measure expectancy of success, Motowidlo developed a 12 item scale (see the ESC scale in the appendix), with 10 of the items scored from 0 to 100, and 2 from 10 to 80. Two questions are reverse keyed (a low score indicates a high level of the construct), and therefore the scores from these two items need to

be reversed to achieve consistency with the others. With the reversal, the overall scores can range from 0 (low expectancy) to 1160 (high). Two representative items from the scale are:

1) When you are competing against someone, what per cent [sic] of the time do you win?

2) When you try to do something that none of your friends has been able to do, what per cent [sic] of the time do you manage to do it?

In the current research, the ESC was modified slightly for use with high school students. The words, <u>addressed</u> and <u>frankly</u> were changed to <u>mentioned</u> and <u>honestly</u>. Motowidlo's item - When your competence is being evaluated, what percent of the time is it evaluated as only "mediocre"? - was dropped because the vocabulary was deemed too difficult for some students, and because the item seems weak in the sense that if someone interpreted mediocre as meaning average, the individual would be given a low score supposedly indicative of a lack of self-competence. With the exclusion of this item, the scores on the scale used in this study could range from 0 to 1060. The standard instructions for the ESC and for all the other established scales were presented verbatim.

Motowidlo (1979) presents a variety of data attesting to the ESC's reliability and validity. The

test-retest reliability for a two week interval was found to be .86 and coefficient alpha was a respectable .78. Some evidence also was presented bearing on its concurrent, discriminant and predictive validity. Non-significant correlations with verbal and arithmetic ability, as measured by the verbal section of the Wesman PCT and the SET-N, were interpreted as supporting the scale's discriminant validity. Few data were gathered concerning the ESC's predictive validity. Overall, the Motowidlo Scale seems to have reasonable psychometric properties. Its construct validity also is supported by the current research which shows the scale to have alphas of .78 to .80, and to be minimally related to socially desirable responding ($r = .11$ to .21), as measured by an abbreviated version of the Marlowe-Crowne Scale (Strahan & Gerbasi, 1972).

b) Social Desirability

It has been suggested that respondents are influenced not only by the content, but also by the social desirability of items (e.g., Cronbach, 1946; Fiske & Pearson, 1970; Reynolds, 1982; Smith, 1967). It is further posited that some individuals are more prone to endorse the socially acceptable answer than are others. This tendency is generally viewed as a

nuisance or contaminant which should be controlled, but it should be noted that for various reasons not everyone agrees entirely with this approach (e.g., Ganster, Hennessey, & Luthans, 1983; Jackson & Messick, 1958; McCrae & Costa, 1983). Fiske and Pearson (1970) claim that the response set is not as pervasive as once assumed.

Strahan and Gerbasi (1972) developed two abbreviated versions of the popular Marlowe-Crowne Social Desirability Scale, each consisting of 10 items. This research used the M-C 1 version which, like its counterpart the M-C 2, consists of 5 items keyed in the true direction (true = 1, false = 0) and 5 in the opposite direction (false = 1, true = 0). Thus, scores on the scales can potentially range from 0 to 10, with high scores reflecting a greater tendency to endorse the socially desirable alternative. Two typical items followed in brackets by the direction of keying are presented below:

1) I'm always willing to admit it when I make a mistake (T).

2) There have been occasions when I took advantage of someone (F).

Presumably, item 1 is false for everyone, and item 2 is always true. Another implicit assumption is that the tendency is being measured without the influence of content other than social desirability, an assumption

which is incongruous with the tenable view that the two are likely inextricably bound to some degree. The scale was presented in its original form except that the word resent was changed to dislike in the 1984 survey.

The MC-1 Scale's construct validity is supported by several lines of evidence. It correlates substantially with the 33-item parent Marlowe-Crowne Scale (r = .8 to .9; Strahan & Gerbasi, 1972), but this is weak evidence, at best, because the scales possess items in common. The internal consistency, as gauged by the Kuder-Richardson formula 20 (KR-20; an analogue of alpha for dichotomously scored items; Nunnally, 1970) was reported to range from .59 to .70 (Reynolds, 1982; Strahan & Gerbasi, 1972). In this research the KR-20 was only .43. No evidence of the predictive or discriminant variety were presented by either Reynolds or Strahan and Gerbasi. However, the literature contains a few reports wherein correcting for social desirability has improved prediction of criteria such as participation in formal voluntary organizations (Smith, 1967), and satisfaction with promotions (Ganster, Hennessey, & Luthans, 1983; see Ganster et al. for other examples), though these effects typically have been small. Nevertheless, the present research

assessed social desirability so that it could be statistically corrected for when it seemed advisable.

In summary, the evidence concerning the scale's construct validity is modest. The low internal consistency estimate found in the current work may be, somewhat paradoxically, good news; that is, it might indicate that the students' responses to the MC-1 were primarily determined by the heterogeneous content of the scale, rather than the response set. If this interpretation is correct, it is likely that the responses to the other scales were influenced only minimally by the tendency to try to look good. The average social desirability scores achieved in this research (3.9 to 4.4), which are somewhat lower than those reported by Reynolds (1982) and Strahan and Gerbasi (1972), lend support to the contention that social desirability is less problematic in this investigation than often is the case.

c) Attributional Tendencies and Locus of Control

The general expectancy-value approach described in Chapter 2 uses expectancies and values to understand behaviour. The achievement part of Lefcourt's Multidimensional-Multiattributional Causality Scale (MMCS; Lefcourt, Von Baeyer, Ware, & Cox, 1979) and a

"homemade" value of education scale (PVE) were used to measure these constructs. The MMCS is a domain specific scale as opposed to a general one in that all of its items pertain to academia. The choice of a domain specific scale is supported by an accumulating body of research showing that specific measures are more useful in understanding specific behavioural acts (e.g., re anxiety: (McReynolds, 1968), re LOC: Findley & Cooper, 1983; Buckman Saltzer, 1978; Wallston, Maides, & Wallston, 1976; re self concept: Marsh, 1986; re attitudes: Ajzen & Fishbein, 1977). Lefcourt's measure, in addition to assessing locus of control for academia, also assesses the tendencies to endorse ability, effort, context, and luck explanations for both positive and negative outcomes. This differentiated approach is consistent with the views of attribution theorists (e.g., Dweck, 1975; Weiner, 1985), who stress that not all internal or external attributions are equivalent in terms of their antecedents and consequences. In passing, it is worth mentioning that the MMCS provides separate scores for both internality and externality; that is, internality and externality are not assumed, a priori, to correspond to opposite poles of a single continuum (see Collins, 1974; Levenson, 1974; Wong & Sproule, 1983 on this issue).

The MMCS scale contains 24 items with the ability effort, context and luck subscales each comprised of six items. Internality is computed by summing the scores for the ability and effort subscales, and externality is determined by adding the luck and context scores. These relationships are shown in Figure 1. Since each item is scored from 0 (disagree) to 4 (agree), the potential ranges for the attributional constructs are as follows: internality (0 - 48), externality (0 - 48); ability, effort, context, and luck (0 - 24); ability - success, effort - success, luck - success, context - success, and their counterparts for failure (0 - 12). Only minor changes were made to the MMCS for use in this research. The words competence, reflect, professor and the phrase a function of were replaced respectively with ability, demonstrate, teacher, and due to. Several items from the MMCS and the subscales (e.g., ability) they represent are listed below:

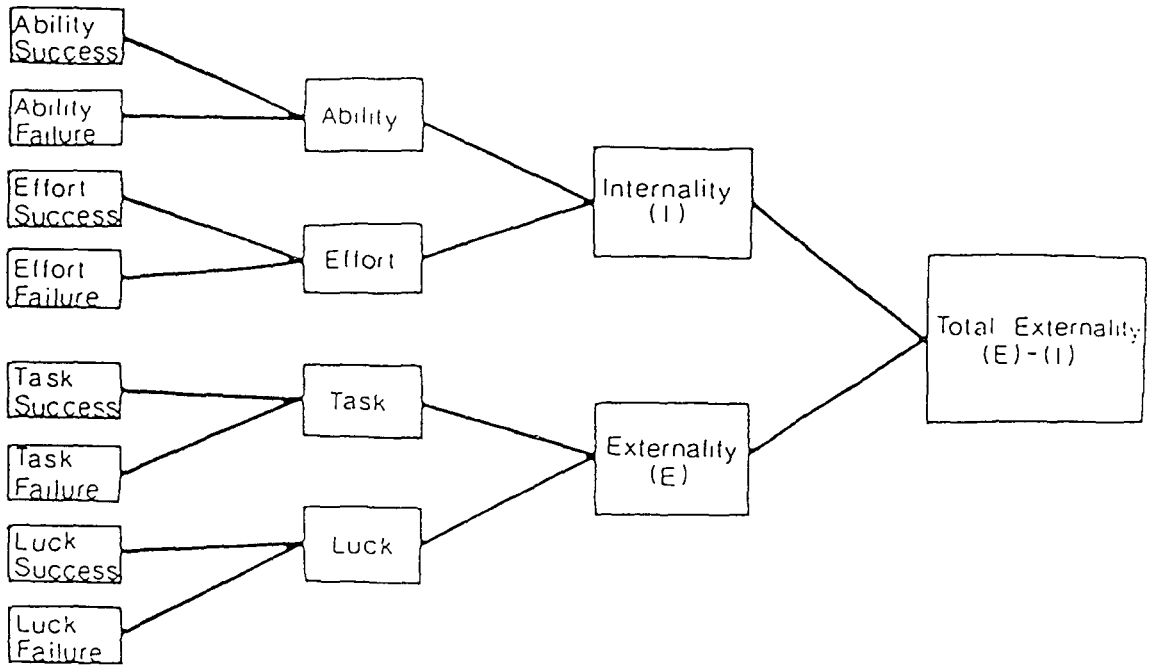
1) If I were to receive low marks, it would cause me to question my academic ability. (ability)[1]

2) Sometimes my success on exams depends on some luck. (luck)

3) Some of my good grades may simply demonstrate that these were easier courses than most. (context)

4) Whenever I receive good grades it is always

Figure 4: The scales of Lefcourt's Multidimensional-Multiattributional Causality Scale (MMCS)



because I have studied hard for that course. (effort)

Several researchers (Lefcourt et al., 1979; Powers, Douglas, & Choroszy, 1983; Powers & Rossman, 1983) have presented data supporting the scale's reliability. The ability and effort subscales have been found to have alphas of .50 to .77 (Lefcourt et al., 1979) and KR-20's of .64 to .66 (Powers & Rossman, 1983). The context and luck scales are reported to have produced alphas of .66 to .88 (Lefcourt et al., 1979) and KR-20's of .53 to .71 (Powers & Rossman, 1983).[2] At the more general level of internality and externality, KR-20's of .70 and .75 have been found (Powers & Rossman, 1983). The current research yielded alphas similar in magnitude to these. Principal component analyses at both the high school (Powers et al., 1983) and university (Powers & Rossman, 1983) levels lend some support to the factorial structure postulated by Lefcourt.

Other data presented by Lefcourt in support of the MMCS's construct validity include:

1) The scales produce correlations ranging in size from .23 to .62 with the classic Rotter I-E scale.

2) The achievement <u>items</u> have an average correlation with the overall achievement locus of control scale of .31, compared to an average correlation of .10 with the affiliation scale.

3) Some expected sex differences in the attributional tendencies were obtained.

4) In an anagrams task, internals as compared to externals were found to exhibit more posture shifts and more adaptors.

5) The subscales had negligible to modest intercorrelations, the single exception being the context-luck association

As can be seen in Table 1, the subscales were found to intercorrelate to a similar degree in the current work. On a more somber note, Lefcourt obtained results showing that the MMCS subscales correlated to a statistically significant degree with the Marlowe-Crowne Social Desirability Scale, the highest correlation involving externality ($r = -.3$). Overall, the MMCS seems to be a reasonably good scale with the possible exception that it is influenced by social desirability. This should not to be a major problem, however, due to the inclusion of a social desirability scale in the current research. In fact, the attributional tendencies were found to have non significant or, at most, modest correlations with social desirability. Only effort-success and TACH yielded correlations in excess of $|.2|$, these variables correlating .21 and -.23, respectively with social desirability in the Native analysis. Accordingly, none of the attributional variables shared more than 6% of their variance with social desirability.

Table 1: Intercorrelations between the MMCS Subscales: Data from Lefcourt (1979) and from this research

	A	E	C	L
Ability (A)		.06	.04	.30
Effort (E)	.27(.27)		-.06	-.24
Context (C)	.13(.03)	-.20(-.15)		.48
Luck (L)	.02(.11)	-.20(-.26)	.59(.56)	

Note. The correlations above the main diagonal were reported by Lefcourt et al., 1979 and were based on n = 68. Those below the diagonal are from this research with the first values representing the Native correlations (n = 283) and the second (bracketed) the non-Native findings (n = 285)

d) Value of Education

Because there do not seem to be any existing measures appropriate to measuring this value construct, one was developed (PVE; Pat's Value of Education Scale). The original scale (prior to the psychometric analyses) consisted of 13 items designed to reflect the evaluative dimension of the semantic differential (Snider & Osgood, 1972), each being of the form:

Education is:

good __ __ __ __ __ __ __ bad , except that the seven intermediate points were appropriately labelled. Seven of the items were cast such that the positive anchor was on the left: good - bad, necessary - unnecessary, interesting - boring, beneficial - harmful, pleasant - unpleasant, helpful - beneficial, easy - difficult. The other six items - useless - useful, unimportant - important, undesirable - desirable, worthless - valuable, feminine - masculine, and awful - nice - were presented in the opposite direction. In passing, two points are worthy of mention. First, the split in the direction of wording was employed to overcome any positional preferences (e.g., choosing the left side of the scale regardless of content) that the subjects might have had. The second point is that the item

feminine -masculine was included primarily out of curiosity.

To gain some insight into the scale's internal consistency, factor analyses and Cronbach's alpha were used. The factor analyses also were useful with regard to the important issue of cross-cultural equivalence of measurement (Garza, 1977; Hui & Triandis, 1983, 1985; Miller, Slomczynski, & Schoenberg, 1981) as will be described shortly.

Separate analyses were conducted for Natives (n = 286) and non-Natives (n = 292) using the SPSS reliability and factor analytic programmes. To determine the influence, if any, of the factoring technique on the results obtained, several analyses were conducted, these being 1) principal components analysis (PCA) with varimax rotation, 2) PCA with oblique rotation, and 3) principal axes factoring (PFA) with varimax rotation. Only factors producing eigenvalues greater than one (see Kim & Mueller, 1978a, 1978b; Tabachnick & Fidell, 1983; Zeller & Carmines, 1980; cf. Comrey, 1978) were retained for interpretation. Following Comrey (1973) who states that .4 constitutes a "very good" factor loading, only loadings equal to or greater than this level were used to interpret the factors obtained. Listwise deletion,

the default option, was used for both the factor analyses and alpha estimation.

The Native analyses yielded three interpretable factors compared to two for the non-Natives, and the loading patterns were only minimally influenced by the type of factor analysis. In view of the small effect of factor analytic technique, and for economy of presentation, only the PCA - varimax results are provided. The Native results are presented first, followed by those pertaining to the non-Natives.

As was mentioned, three factors (or components) were derived in the Native analysis, and these accounted for approximately 59% of the total item variance. The factor loadings, which can be thought of as correlations between the items and the underlying factors if varimax rotation is used (Tabachnick & Fidell, 1983), prove useful in interpreting the factors obtained. The first factor, as can be seen from the loadings in Table 2, is defined by the items: useless - useful; unimportant - important; undesirable - desirable; worthless - valuable; and awful - nice, each of which contains the negative descriptor on the left. All of these items, with the possible exception of awful - nice, seem to gauge something like utility or value of education, the construct the items were designed to measure. However, two of the five items

Table 2: Factors among the value of education items - Native analysis:

Factor	Eigenvalue	% Variance	Loading	Loading items and direction of keying	
1	5.1	39.2	.75	useless	useful
			.85	unimportant	important
			.59	undesirable	desirable
			.81	worthless	valuable
			.40	awful	nice
2	1.4	10.8	.72	good	bad
			.76	necessary	unnecessary
			.70	beneficial	harmful
			.76	helpful	unhelpful
3	1.1	8.7	.69	interesting	uninteresting
			.57	undesirable [b]	desirable
			.80	pleasant	unpleasant
			.63	awful [b]	nice
			.52	easy	difficult

Note. n = 264. All items were prefaced with "Education is." The fourth factor was defined by a single item (masculinity - femininity) and therefore is not listed.

[a] Two items contributing to this value were not listed because they had loadings less than |.4|.

[b] These items loaded on more than one factor.

undesirable - desirable and awful - nice also load substantially on the third factor, thereby casting some doubt on the purity of these items.

The second factor, like the first, can be interpreted as the perceived value of education. In this case, the items with loadings in excess of .4 are: good - bad; necessary - unnecessary; beneficial - harmful; and helpful - unhelpful, each having the positive descriptor on the left side. It is proposed that the difference in the direction of wording was responsible for factor one and two emerging as separate factors despite their similar content. In other words, the split seems to be an artifact of the type described by Carmines and Zeller (1974, 1982), Schmitt & Stults (1985), and Zeller and Carmines (1980). A replication analysis using the 1984 data lends support to the artifact interpretation. In 1984, all of the items were presented with the positive or favourable anchor on the left. Under these circumstances, the split noted above did not occur; that is, the items defining factor 1 and 2 in the 1983 analysis now loaded on a single factor. Otherwise, the results from the second analysis were very similar to those from the initial one, and therefore they will not be discussed further. Now let us return to the 1983 findings. Although the first two factors reflect similar content, there are at

least two reasons for suspecting that the second one is a more appropriate measure of value. Some Natives requested help when working on the items written with the negative descriptors on the left, and it is likely that other students also found these items to be a little difficult. These items might have been confusing because in the example the positive descriptor was on the left. Second, as was mentioned above, two of the items defining factor one also loaded substantially on factor three, thereby indicating their lack of purity.

The third factor comprised the items - interesting - uninteresting; undesirable - desirable; pleasant - unpleasant; awful - nice, and easy - difficult, measures of a hedonic or affective quality rather than perceived value. As such, it is of less interest than the other two factors which come closer to measuring the intended construct. In passing, it seems worth mentioning that the perceived utility - affect distinction found in this research parallels the cognitive - affective split commonly found and/or endorsed by attitudinal researchers (e.g., Bagozzi, 1981; Breckler, 1984; Liska, 1984; Reddy & LaBarbera, 1985; Triandis, 1979; cf., Burnkrant & Page, 1982; Fishbein, 1967; Motowidlo & Lawton, 1984).

The non-Native analysis resulted in two interpretable factors instead of three, and together the factors accounted for 52% of the total variance. Examination of Table 3 reveals that a utility (factor 1) - affect (factor 2) split occurred once again. But in this case, the items representing utility did not separate. The items loading on factor one (utility) in this analysis are the same ones that defined factors one and two in the Native analysis. Similarly, factor three for Natives corresponds to the non-Native factor two, with both gauging affect. Other than the difference in the number of factors, the Native and non-Native results were virtually identical, the single exception being that the item undesirable - desirable had substantial loadings on more than one factor only for Natives. The marked similarity between the Native and non-Native results was heartening in terms of cross-cultural equivalence of measurement.

It will be recalled that two reasons were presented for suspecting that the second Native factor, consisting of four items (good - bad, necessary - unnecessary, beneficial - harmful, and helpful - unhelpful), is a better measure than the first factor of the perceived value of education. Moreover, the items defining the second factor in the Native analysis appear to possess greater cross-cultural equivalence

Table 3: Factors among the value of education items -
Non-Native analysis: Using PCA with Varimax

Factor	Eigenvalue	% Variance	Loading	Loading items and direction of keying	
			.68	good	bad
			.80	useless	useful
			.57	necessary	unnecessary
1	5.0	38.8[a]	.54	beneficial	harmful
			.84	unimportant	important
			.79	worthless	valuable
			.41	awful[b]	nice
			.69	helpful	unhelpful
			.76	interesting	uninteresting
			.73	undesirable	desirable
2	1.7	13.2	.83	pleasant	unpleasant
			.70	awful[b]	nice
			.53	easy	difficult

Note. n = 276. All items were prefaced with "Education is." The third factor was defined by a single item (masculinity - femininity) and therefore is not listed.

[a] Two items contributing to this value were not listed because they had loadings less than |.4|.

[b] This item loaded on two factors.

than those pertaining to the first factor. Only the items from the second factor (Native analysis) load on the value (utility) dimension for both ethnic groups. Therefore, from the perspective that items must load on analogous factors to be cross-culturally equivalent (Cavusgil, 1985; Drasgow & Kanfer, 1985; Reynolds & Harding, 1983), only those from the second Native factor are good ones. In consideration of all of the foregoing, the items good - bad, necessary - unnecessary; beneficial - harmful, and helpful - unhelpful were adopted to measure the value construct. The characteristics of the scale based on these four items are described now.

The four items are scored from 1 (unfavourable response) to 7 (favourable), so that the scores on the scale range from 4 to a maximum of 28. The scale was found to possess extremely good internal consistency (α: .71 to .79) for a scale of its length. Also, in view of how it was developed, it has a high degree of cross-cultural equivalence. A statistically non-significant association with social desirability lends further support to the construct validity of the four-item PVE.

e) The Fishbein Constructs

The constructs of this model were measured in the manner successfully employed by Ajzen and Fishbein (1980; see their appendix). The phrasing of the items, the order in which they were assessed, and the coding all followed their recommendations. Seven point item(s) were used to measure each construct. Because of time considerations, it often was necessary to use single rather than multiple indicators. Consequently, estimates of internal consistency could rarely be made. Nevertheless, given the success of this type of measurement in past research, there is reason to expect it to be adequate for the current purposes.

1) Intent

Intent is measured by two 7 point items anchored by the words strongly agree and strongly disagree:

1) I intend to be in high school next Fall
2) I do not intend to be in high school next Fall.

Both items were found to have non significant correlations with social desirability.

2) Attitude

Attitude toward attending was derived from the responses to the following items:

My being in high school next Fall would be:

good _ _ _ _ _ _ _ _ _ _ bad

wise _ _ _ _ _ _ _ _ _ _ foolish

harmful_ _ _ _ _ _ _ _ _ _ beneficial

Each item was scored from -3 (unfavourable) to +3 (favourable), and attitude was computed as the average of the responses (1,2,or 3). An averaging approach, as opposed to a summative one, was used because of missing data. The attitude scores so derived can take on any value between -3 and +3 (e.g., 1.7). Attitude toward not attending was derived in an analogous manner. Neither attitude correlated to a statistically significant degree with social desirability. The items comprising each attitude scale were shown to have excellent internal consistency. The summative scales for attitude toward attending and its converse had coefficient alphas of .78 to .82, and .78 to .84 respectively.

3) Evaluations

The students' evaluations (e) of the 15 outcomes potentially arising as a consequence of being in school were assessed using items of the following format:

My eventually getting a job is:

good __ __ __ __ __ __ __ bad.

The items were coded from -3 (unfavourable response) to +3 (favourable), and can be seen in the appendix.

4) Beliefs

The beliefs (b) regarding the likelihood of each of the potential outcomes were assessed similarly. A typical item is:

My being in high school next Fall would help me to eventually get a job.

The sets of evaluation and belief items each were presented in a single, random order.

5) Social Influence Constructs

The perceived subjective norm (SN) was determined by the item:

Most people who are important to me think I should be in high school next fall:

strongly agree __ __ __ __ __ __ __ strongly disagree.

A parallel item assessed the subjective norm toward toward not attending. Both items were coded from +3 (strongly agree) to -3 (strongly disagree). A variant of these Fishbein items also was incorporated into the 1984 questionnaire. This item was designed to determine the perceived pressure to continue, and was of the following form:

Most people who are important to me exert pressure on me to be in high school next fall:

strongly agree __ __ __ __ __ __ __ strongly. disagree

None of these constructs was found to correlate to a statistically significant degree with social desirability.

The normative beliefs (Nb) were measured by eight items similar to this one:

My sister thinks I should be in high school next fall:

strongly agree __ __ __ __ __ __ __ strongly. disagree

The coding was from +3 to -3.

The general motivation to comply with these individuals (MC) was assessed by items such as:

I usually want to do what my sister(s) think I should do:

strongly agree __ __ __ __ __ __ __ strongly. disagree

A not applicable category was available for items that would not apply to all respondents.

6) The Computed Constructs

The indirect measures were derived from beliefs (b), and evaluations (e), normative beliefs (Nb), and motivation to comply (MC) as follows:

1) Estimated Attitude $=\sum(b \times e)/n$

2) Estimated Subjective Norm $=\sum(Nb \times Mc)/n$

, where n is the number of completed items.
If the number of incomplete items was greater than or equal to 3 (out of 15) in 1), estimated attitude was designated as missing. For estimated subjective norm, the missing value was used if 5 or more items (out of 8) were incomplete. An averaging approach seemed best in view of the fact that not all items were appropriate

for every respondent, and because some subjects completed all but one or two of the items. The potential ranges for estimated attitude and subjective norm scores are respectively -9 to +9 and -21 to +21. The two constructs were unrelated to socially desirable responding in the non-Native analysis. Estimated attitude, however, yielded a statistically significant correlation, albeit a small one ($r = .16$), in the Native analysis.

Summary

This chapter has described the predictor measures, and presented several lines of evidence relevant to their adequacy. Factor analysis, coefficient alpha, and correlations with external variables such as social desirability, from both this, and other research were employed.

The measures, for the most part, were shown to have acceptable levels of internal consistency. Social desirability was deemed not to be a problem in that none of the scales correlated substantially with the MC-1, and because the set can be statistically controlled for if this is necessary. Taken together, the steps to foster accurate responding described in

the previous chapter, and the data presented here indicate that the measures are of reasonable quality.

Chapter 4: Notes

[1] The bracketed words did not appear in the questionnaires.

[2] It would have been more appropriate for Powers and Rossman to have used coefficient alpha rather than the KR-20 formula which is meant to be used with dichotomous items.

Chapter Five

INTENT TO CONTINUE OR DISCONTINUE

As a first step in understanding attrition, analyses were conducted on intent to be in high school the following Fall. The general goals underlying these analyses were a) to gain insight into the bases of students' intentions to remain in school, and b) to learn about the relevance of the models for understanding these intentions.

Introduction

Previous research has shown that many background, academic, and personal factors are associated with dropout. It also indicates that progress is being made on the difficult task of distinguishing causal relations from spurious ones (see Chapter 2). On the other hand, little is known about the factors influencing intentions to drop or remain in school. This state of affairs is surprising from the perspective of the Model of Reasoned Behaviour which regards intentions as the direct antecedents of much behaviour (Ajzen & Fishbein, 1980). Furthermore, as

reviewed in Chapter 2, there is a considerable body of research showing that intentions are often excellent predictors of actual behaviour, including dropout. Indeed, Scott and Scott (1982) found that intentions were the best predictors of whether students were enrolled two years later
(r = .50). In view of the theoretical and empirical relationship between intentions and behaviour, it is important that the determinants of intentions are identified. Improved understanding of intentions about discontinuing in school should provide insight into dropout behaviour.

From the Fishbein perspective, intentions are determined by attitude (affective reactions) and subjective norms, that is what most important other people are thought to encourage. Attitudes about a course of action (behaviour) are viewed as a function of the outcomes (beliefs;b) that may result from engaging in the behaviour, and evaluation (e) of these potential outcomes. In algebraic terms the relation between these constructs can be represented as:

$$A = \sum^{n} b.e$$

, where n represents the number of outcomes that contribute to formation of the attitude. In a similar fashion, subjective norms (SN) are thought to represent an overall or aggregate impression of what a number of

specific individuals are thought to encourage (Nb), weighted by the motivation to comply with these people (Mc):

$$SN = \sum^{r} Nb.Mc.$$

The r over the summation sign indicates the number of people whose views are influential. If teachers, parents, siblings etc. are perceived to encourage attending school, and if there is a desire to comply with these peoples' wishes, there will be a subjective norm (social pressure) to continue. The relations between these constructs of the Fishbein Model were summarized in Figure 1 (Chapter 2).

Unlike the Fishbein Model which accounts for intentions using attitudes and subjective norms, the Social Learning framework (described in Chapter 2) uses the constructs locus of control and value. Students with an internal orientation, compared to "externals", perceive more contingency between actions (e.g., studying) and outcomes (e.g., marks). Believing that what they do is instrumental, internals typically are more persistent and exert more effort than externals when attempting to reach valued goals. Hence, students are expected to have favourable intentions to the extent that they value education and have an internal locus of control for academic matters.

Issues

The analyses of intentions were conducted with four major concerns in mind. The first question was "What variables are associated with intentions concerning academic persistence?" It was expected that many of the variables shown by previous research to be associated with persistence also would be related to intentions, though some differences in correlates were expected since students are not likely to consider all the factors (in forming their intentions) that influence their academic persistence.

A second issue addressed by the analyses was whether the Ajzen-Fishbein or the general expectancy-value approach is better at explaining students' intentions. In this regard, it was anticipated that the Fishbein model would be more effective because of the superior correspondence of its predictors with the criterion (see Ajzen and Fishbein, 1980). The Fishbein approach employs attitudes and subjective norms toward being in high school next Fall to predict and explain intentions to be in high school next Fall, whereas the Social Learning framework uses perceived value of education and academic locus of control as predictors. Value of education and locus of control have less similarity than attitudes and subjective norms with the

criterion, and thereby, according to Fishbein's correspondence rule as well as a considerable body of research supporting the importance of correspondence (e.g., Ajzen & Fishbein, 1977; Bagozzi, 1981; Schlegel, Crawford, & Sanborn, 1977), it was expected that the Social Learning predictors would not be as effective.

A third matter of interest concerns how well the models can account for intentions; that is, are the models capable of explaining most of the variance in intentions without recourse to "external variables?" If so, the models would be extremely useful in simplifying a complicated state of affairs to manageable proportions. The Fishbein Model was expected to prove promising in this regard. Ajzen and Fishbein (1980) examined 35 multiple correlations produced by regressing intentions on attitudes and subjective norms and found an average value of .63. Clearly, attitudes and subjective norms have been useful in explaining intentions for many behaviours, excluding dropout. In fact, there is little evidence that other variables can improve the prediction afforded by attitudes and subjective norms when measured in accordance with the model's specifications. Only a few investigators (e.g., Ajzen & Madden, 1986; Fredericks & Dossett, 1983; Schifter & Ajzen, 1985) have reported results contrary to this assertion.

A final issue was whether attitudes and subjective norms could mediate the influence of the other variables in the model, b.e and Nb.Mc (estimated attitudes and estimated subjective norms; see Figure 1, Chapter 2). Although from the perspective of the model, $\sum$b.e and $\sum$Nb.Mc will not supplement attitudes and subjective norms in accounting for intentions, some research suggests that these calculated constructs can make an independent contribution to intent (Fishbein, 1979; Manstead, Proffit, & Smart, 1983; Miniard & Cohen, 1981). The issue of <u>internal mediational capability</u> seemed worthy of investigation in the current research because, like some other concerns, it is relevant to whether the Model of Reasoned Behaviour needs modification.

Results

<u>I) Natives: Correlations with Intentions</u>

It will be recalled that with the data pooled across both years of the survey (1983 & 1984) there were 399 Natives in the sample. For the analyses on intent (Native and non-Native), the 1983 data were used if they were available. Otherwise, the 1984 data were employed. Thus, if a student had been surveyed in both

years, the analyses were based on the data collected first (1983).

The correlations to be presented here are based on a random sample of 75% of these students (n = 302). Twenty-five percent of the cases were put aside so that the multivariate analyses could be cross-validated. The univariate correlations and the multivariate calibration analyses (runs prior to replication) are based on the same students. That the same individuals are used helps to make comparison of the results from the various analyses easier since any differences can not be due to sample characteristics. Because theory and past research have not always been useful for predicting the direction (+/-) of the relationship between predictors and intent, two-tailed rather than one-tailed levels of significance are reported.

Attitude and subjective norm correlated among the highest with intent to be in high school the following Fall ($r = .56$; $r = .33$, $p < .001$, respectively; Table 1). Students with favourable attitudes and those who perceived that important others encouraged them to continue were more likely to intend to persist. Important, non-Fishbein, correlates (see Tables 1 & 2) were years of education desired ($r = .36$, $p < .001$), years of education expected ($r = .43$, $p < .001$), perceived value of education ($r = .42$,

Table 1: Model-based variables:
Summary statistics and correlations with intent for Natives (n=302)

Variables		M	SD	r
Value of education		25.0	3.6	.42[a]
Expectancy of success (Motowidlo)		688.9	101.9	.13[c]
Attributions to:	ability	15.2	3.7	.12[c]
	effort	19.1	3.7	.33[a]
	context	13.2	4.3	-.13[c]
	luck	11.4	4.6	-.15[b]
	internality	34.3	5.8	.28[a]
	externality	24.6	7.8	-.17[b]
Intent		2.5	1.1	1.0
Attitude		2.4	1.1	.56[a]
Subjective norm (SN)		2.1	1.4	.33[a]
Estimated attitude $\sum(b.e)/n$		3.4	2.2	.40[a]
Estimated subjective norm $\sum(Nb.Mc)/n$		8.6	5.4	.37[a]

[a] $p < .001$, [b] $p < .01$, [c] $p < .05$ (two-tailed).
[ns]: not statistically significant.

Table 2: Personal and academic factors:
Summary statistics and correlations with
intent for Natives (n=302)

Variables	M	SD	r
Age	15.7	1.3	-.12[c]
Sex (female=1; male=0)	0.5	0.5	.16[b]
Birth order	3.3	2.4	-.02[ns]
Aspired socio-economic status (SES)	2.6	1.4	-.29[a]
Expected SES	2.9	1.5	-.20[a]
Level of education desired	15.0	2.4	.36[a]
Level of education expected	14.1	2.1	.43[a]
Average (self report)	69.5	8.0	.21[a]
Absences	15.4	9.3	-.20[a]
Average (records)	60.0	7.1	.11[c]
Number of courses failed	1.8	1.4	-.04[ns]
Level (academic stream)	4.1	0.4	.27[a]

[a] $p < .001$, [b] $p < .01$, [c] $p < .05$ (two-tailed).
[ns]: not statistically significant.

[d] Reported average is based on students in grades 8 to 10, whereas average from the records is for students in grades 9 and 10.

$p < .001$), and academic stream or level ($r = .27$, $p < .001$).

It also was the case that females, students who desired occupations of high socioeconomic status, and students who expected to obtain such jobs had more favourable intentions ($r = .16$, $p < .01$; $r = .29$, $p < .001$; $r = .20$, $p < .001$). Absenteeism in the previous high school year was negatively related to intent ($r = -.20$, $p < .001$), indicating that those with more days off were less likely to intend to persist. Surprisingly, number of courses failed in the previous year was unrelated to students' intentions ($r = -.04$, n.s.), though another related academic predictor, grade average, was correlated with intent ($r = .11$, $p < .05$). Students with more reading materials in the home also had more favourable intentions ($r = .13$, $p < .05$). Internality and externality were related (in the anticipated direction) to intent ($r = .28$, $p < .001$; $r = -.17$, $p < .01$). At a more differentiated level, attributions to ability, and effort were positive predictors ($r = .12$, $p < .05$; $r = .33$, $p < .001$), whereas attributions to context and luck were related negatively to intent ($r = -.13$, $p < .05$; $r = -.15$, $p < .05$). That internality, compared to externality, was more strongly related to intentions lends some support to Lefcourt, von Baeyer, Ware, and Cox's (1979)

Table 3: Background factors:
Summary statistics and correlations with intent for Natives (n=302)

Variables	M	SD	r
Family size	5.5	2.2	-.12[c]
Living with both biological parents	0.6	0.5	.01[ns]
Father employed (yes/no)	0.7	0.5	-.05[ns]
Paternal SES[d]	4.2	1.1	-.05[ns]
Maternal SES	4.7	1.3	-.02[ns]
Total annual household income[e]	3.8	1.9	-.01[ns]
Home modernity	4.3	0.8	.04[ns]
Household reading material	2.0	0.9	.13[c]
Mother's education	11.2	2.3	.08[ns]
Father's education	10.6	2.6	.04[ns]
Number of siblings having dropped	1.2	1.1	.02[ns]

[a] $p < .001$, [b] $p < .01$, [c] $p < .05$ (two-tailed).
[ns]: not statistically significant.

[d] socio-economic status (SES) was coded 1 (professional) to 6 (unskilled).
[e] income was coded 1 (<$8,000) to 8 (>$38,000).

treatment of internality and externality as separate but related dimensions, rather than bipolar opposites. The absence of a significant correlation between internality and externality ($r = -.06$, n.s.) also supports this separation while the difference in the magnitudes of the correlations for effort and ability show that an approach that distinguishes between different types of internal attributions seems advisable. The difference in the magnitude of the correlations for ability and effort indicates that investigators who use locus of control, a construct that combines effort and ability attributions as if they are equivalent, are ignoring useful information. Not unexpectedly, those students who valued education highly thought they would be more likely to attend school the next Fall ($r = .42$, $p < .001$)

Interestingly, family size, presence of both parents, socioeconomic status, reported family income, parental education, modernity of the home, and whether the male or female parent worked were unrelated to intentions. These findings are encouraging in that students from less advantaged backgrounds do not have unfavourable intentions. However, it is possible that these factors may have an influence on dropout, even though they are not relevant to intentions. This possibility is examined in Chapters 6 and 7. Counter

to expectation, number of siblings who had dropped also was unimportant. This result is surprising since it has been reported that dropouts claim they would encourage others to remain in school (Coladarci, 1983). Perhaps such encouragement does occur, but it is offset by whatever factors cause the siblings to drop, thereby resulting in no net effect. Birth order, expectancy of success (Motowidlo, 1979), social desirability, religion (Longhouse versus other) and language used in the home (a) whether a non-English language was used; b) percent of time that languages other than English were used) also were not associated with intentions. Of the 8 items employed in 1984 to assess time perspective and ability to delay gratification, only one was a statistically significant, though not very useful, predictor of intent: individuals who reported that they would not be delayed for long when a friend arrives while studying for a test were more apt to intend to remain in school ($r = .14$, $p < .05$).

In summary, the bivariate correlational results revealed that the most important variables to understanding intentions are attitudes, subjective norms, value of education, attribution to effort, academic level, expected and desired level of education, and expected as well as desired occupational level. Having presented the univariate results, it is

now appropriate to examine the usefulness of the most promising variables in a multivariate context.

II) Native: Multivariate Results

The analyses to follow employed multiple regression, a statistical technique that uses several predictor variables to explain or account for variance in a criterion variable that is measured at a quasi-interval level or higher (Cohen & Cohen, 1983; Darlington, 1968; Pedhazur, 1982; Tabachnick & Fidell, 1983). Standard, stepwise, and hierarchical regression techniques were employed. In standard regression, all of the predictors are entered simultaneously with the result that a regression weight reflects the relation of a variable with the criterion, controlling for the effects of all other variables in the equation. On the other hand, in stepwise regression the variables enter sequentially. The predictor with the highest univariate correlation with the criterion enters first, and then the variable that is most strongly associated with the criterion when the first variable in the equation is statistically controlled may enter. At the third step, the variable with the highest partial correlation with the criterion controlling for the first two variables is allowed to enter. This process

continues and eventually some variables that have entered into the equation may be removed. The stepping stops when entering variables no longer improve prediction or cause statistical constraints to entry to be reached. For all of the stepwise results reported in the text, the ordering of the variables conveys their order of entry. For example, if the following equation resulted: $I = {}_a X_3 + {}_b X_1$, the fact that X_3 is listed first indicates that it entered before X_1. The hierarchical version, unlike stepwise or standard regression, allows the researcher to determine the order of entry. Hierarchical regression often is useful in answering theory based questions of the form: Can variable set B supplement variable set A? If so, set B, when added on step 2, should improve the prediction based solely on set A.

For all analyses, both standardized and unstandardized regression coefficients are presented. The standardized coefficient indicates the amount of change (in standard deviation units) on the criterion that would be expected for a one standard deviation change on the predictor (with the other variables in the equation controlled). For example, a coefficient of .5 for variable x means that a one standard deviation change on the predictor is associated with half a standard deviation fluctuation on the criterion.

As such, these standardized coefficients are useful for determining the relative importance of variables even when they have different metrics because the units of measurement cancel. Nevertheless, unstandardized coefficients are informative too, and they are actually preferred to standardized coefficients when comparisons are made across different groups (e.g., the importance of variable x for Natives compared to non-Natives) that may differ in variability on the variables (Berk, 1983, p. 505; Lewis-Beck, 1980, p. 66).

Expectancy-Value Approaches

Researchers who use the locus of control construct, with a few exceptions (e.g., Lewis, Morisky, & Flynn, 1978; Naditch & DeMaio, 1975; Yoch & Nowicki, 1977), ignore value, the other important predictor emphasized by general expectancy-value formulations. To test the supposition that value of education can supplement locus of control in explaining students' intentions, hierarchical regression was employed. Internality and externality were entered on step 1 and value of education was entered on step 2. The multiple correlation based on internality and externality increased from .30 to .46 when value was entered (the increment was statistically significant: $p < .001$). The

equation (Eq) with all of these variables included is:

$$\text{Intent} = -.10\text{Ext}_c + .15\text{Int}_b + .36\text{Val}_a;\ R = .46_a \quad \text{(Table 4a)} \qquad \text{Eq 2}$$

, where the coefficients are beta or standardized regression weights, and a, b, and c represent $p < .001$, $p < .01$, and $p < .05$, respectively. It is noteworthy that value of education supplemented internality and externality. The replication analysis based on the hold-out sample of 84 Natives produced an R of .39 for the three variables.

The next concern was whether a more differentiated approach employing ability, effort, context, and luck jointly with value would be yet more useful. To test this and to determine whether value would supplement the four "expectancies", the attributional tendencies were entered on step 1 and value of education was inserted on step 2. Again, value of education improved the prediction of intent. The equation with all of the variables entered was:

$$\text{Intent} = -.02\ \text{Luck} + .00\ \text{Ability} + .20\text{Effort}_a - .06\ \text{Context} + .35\text{Val}_a;\ R = .47_a. \qquad \text{Eq 4}$$

Although the multiple correlation was no higher than previously obtained, the differentiated approach is revealing. Both ability and effort are internal

Table 4a: Regression of intent on the expectancy-value variables for Natives: Standardized regression coefficients

Variables	Eq1	Eq2	Eq3	Eq4
Externality (Ext)	$-.14^{b}$	$-.10^{c}$		
Internality (Int)	$.26^{a}$	$.15^{b}$		
Value of education		$.36^{a}$		$.35^{a}$
Ability			$.05^{ns}$	$.00^{ns}$
Effort			$.29^{a}$	$.20^{a}$
Context			$-.08^{ns}$	$-.06^{ns}$
Luck			$-.04^{ns}$	$-.02^{ns}$
Multiple correlation (R) (n=302)	$.30^{a}$	$.46^{a}$	$.34^{a}$	$.47^{a}$
Cross-validated R (n=84)		$.39^{a}$		$.43^{a}$

^{a} $p < .001$, ^{b} $p < .01$, ^{c} $p < .05$ (two-tailed).
^{ns}: not statistically significant.

Table 4b: Regression of intent on the expectancy-value variables for Natives: Unstandardized regression coefficients

Variables	Eq1	Eq2	Eq3	Eq4
Externality (Ext)	$-.02^{b}$	$-.01^{c}$		
Internality (Int)	$.05^{a}$	$.03^{b}$		
Value of education		$.11^{a}$		$.10^{a}$
Ability			$.01^{ns}$	$.00^{ns}$
Effort			$.08^{a}$	$.06^{a}$
Context			$-.02^{ns}$	$-.02^{ns}$
Luck			$-.01^{ns}$	$-.00^{ns}$
Multiple correlation (R) (n=302)	$.30^{a}$	$.46^{a}$	$.34^{a}$	$.47^{a}$
Cross-validated R (n=84)		$.39^{a}$		$.43^{a}$

^{a} $p < .001$, ^{b} $p < .01$, ^{c} $p < .05$ (two-tailed).
^{ns}: not statistically significant.

attributions and yet only effort was important to understanding intentions. Clearly, it is important not to treat ability and effort attributions as if they are equivalent. The results held up well upon cross-validation ($R = .43$, $p < .001$). Considering both the original and replication results, it is apparent that the expectancy-value approach is quite useful in predicting academic persistence intentions.

ii) Ajzen-Fishbein Model

The next analyses were based on the Ajzen-Fishbein framework which regards attitudes and subjective norms as the direct antecedents of intentions. In fact, when intent was regressed on the two constructs the following equation resulted:

$$\text{Intent} = .15SN_b + .51A_a; \quad R = .58_a. \qquad \text{Eq 5}$$

(Table 5)

The replication multiple correlation was even higher than the coefficient for the derivation analysis ($R = .74$ versus $.58$). Consistent with expectation based on the correspondence principle, the Ajzen-Fishbein model was more effective than the expectancy-value approach ($R = .58$ versus $.47$ for the derivation

Table 5a: Regression of intent on the Fishbein and other predictors for Natives: Standardized regression coefficients

Variables	Eq5	Eq6	Eq7	Eq8
Externality (Ext)				
Internality (Int)				
Value of education			.14[b]	.15[b]
Ability				
Effort			dne[d]	dne
Context				
Luck				
Subjective norm (SN)	.15[b]	.08[ns]	.06[ns]	dne
Attitude (A)	.51[a]	.44[a]	.39[a]	.40[a]
Estimated attitude ($\sum$(b.e)/n)		.09[ns]		
Estimated SN ($\sum$(Nb.Mc)/n)		.13[c]		
Education expected			.22[a]	.23[a]
Level/stream			.10[c]	.10[c]
Absenteeism			dne	dne
Age				
Multiple correlation (R) (n=302)	.58[a]	.60[a]	.65[a]	.64[a]
Cross-validated R (n=84)	.74[a]		.73[a]	.72[a]

[a] $p < .001$, [b] $p < .01$, [c] $p < .05$ (two-tailed).
[ns]: not statistically significant.

[d] dne: the variable did not enter in the stepwise analysis.

Table 5b: Regression of intent on the Fishbein and other predictors for Natives: Unstandardized regression coefficients

Variables	Eq5	Eq6	Eq7	Eq8
Externality (Ext)				
Internality (Int)				
Value of education			.04[b]	.05[b]
Ability				
Effort			dne[d]	dne
Context				
Luck				
Subjective norm (SN)	.12[b]	.06[ns]	.05[ns]	dne
Attitude (A)	.49[a]	.43[a]	.38[a]	.39[a]
Estimated attitude ($\sum$(b.e)/n)		.04[ns]		
Estimated SN ($\sum$(Nb.Mc)/n)		.03[c]		
Education expected			.11[a]	.12[a]
Level/stream			.26[c]	.26[c]
Absenteeism			dne	dne
Age				
Multiple correlation (R) (n=302)	.58[a]	.60[a]	.65[a]	.64[a]
Cross-validated R (n=84)	.74[a]		.73[a]	.72[a]

[a] $p < .001$, [b] $p < .01$, [c] $p < .05$ (two-tailed).
[ns]: not statistically significant

[d] dne: the variable did not enter in the stepwise analysis

analysis), and this superiority was yet more marked in the validation phase (R = .74 & .41). As in much previous research using criteria other than dropout, attitudes and subjective norms were useful for understanding intentions.

In view of the importance of attitude and subjective norm, it is appropriate to try to understand them. According to the model of reasoned behaviour, attitudes are determined by perceived outcomes and their evaluation ($\sum$b.e), while subjective norms are the result of what significant others are thought to encourage (Nb) weighted by the motivation to comply (Mc) with these individuals ($\sum$Nb.Mc). The ($\sum$b.e)---A and the ($\sum$Nb.Mc)---SN correlations were .47 and .44, respectively. These correlations, though not insubstantial, show that much of the variance of attitude and subjective norm remains to be accounted for. Although the results are not reported here because to do so would take the discussion too far afield, the current research, like a few previous investigations (Bagozzi, 1981; Burnkrant & Page, 1988; Oliver & Bearden, 1985; Shimp & Kavas, 1984), demonstrates that disaggregating $\sum$b.e can be useful. The prediction of attitude was improved (R = .52 versus .47) when attitude was regressed on two factors (affect and utility) obtained from a factor analysis of the 15

b.e items. Furthermore, that only utility had a significant beta weight shows the merit of partitioning $\sum$b.e. It seems likely that the b.e items often will be multidimensional in research where a substantial number of items are used. Thus researchers trying to predict and understand attitudes should verify that the products are unidimensional.

From the perspective of the model, the use of the calculated constructs, $\sum$b.e and $\sum$Nb.Mc should not improve the prediction of intent based solely on attitude and subjective norm. In the present research, when the estimated constructs were entered after attitude and subjective norm, the multiple correlation increased from .58 to .60 ($p < .01$), a statistically significant, yet small improvement. The incremental effect did not replicate. The failure of $\sum$b.e and $\sum$Nb.Mc to supplement A and SN in cross-validation suggests that the finding is not robust and that the assumptions of the Fishbein model concerning internal mediation were tenable for these data.

Although provisional support was found for the internal mediational capabilities of the model, it was anticipated that A and SN would not be able to mediate the influence of all <u>external</u> variables on intentions. To test for supplementation, attitude and subjective norm were entered on the first step of a hierarchical-

stepwise analysis and then variables having bivariate correlations with intent greater than or equal to .20 (regardless of sign) were allowed to enter in a stepwise fashion. The choice of a .20 cutoff was somewhat arbitrary but seemed preferable to allowing all variables with statistically significant correlations with intent, regardless of how small, a chance to enter. Unlike the approach based on statistical significance, that chosen ensures a favourable case to variable ratio, which is important to the quality and robustness of results from multivariate analyses. The variables allowed to enter on the second step were expected education, value of education, desired socioeconomic status, effort, absenteeism, and academic level (stream).

When the variables with correlations meeting the criterion were allowed entry, the equation that resulted at step 5 was:

$$\text{Intent} = .06SN + .39A_a + .22Edexp_a + .14Val_b + .10Lev_c; \quad R = .65_a. \qquad \text{Eq 7}$$

The order of entry for the stepwise portion of the analysis was education expected, value of education, and then level. The multiple correlation from cross-validation was an impressive .73. As mentioned

previously, intent regressed on attitude and subjective norm produced a multiple correlation of .58 and a cross-validated R of .74. Considering both the original and holdout analyses, the evidence that attitude and subjective norm can be improved upon is equivocal.

iii) Atheoretical Approach

Another interest concerned which variables would prove useful in a stepwise analysis in which variables with a .20 or higher correlation with intent were allowed entry (Eq 8). Unlike the previous analysis, subjective norm and attitude were not given priority by being entered on step 1 before the other predictors. Rather, the order of entry was strictly stepwise. Estimated attitude, estimated subjective norm, expected socioeconomic status, education desired, and internality, though having correlations meeting the criterion, were excluded because these variables were judged to have too much overlap with attitude, subjective norm, desired socioeconomic status, education expected, and effort. This decision was made in view of the problems associated with excessive multicollinearity (Studenmund & Cassidy, 1987; Tabachnick & Fidell, 1983). Thus, the variables

considered were attitude, subjective norm, desired socioeconomic status, education expected, value of education, effort, absenteeism, and level. The variables that entered are presented in the order in which they were included: attitude (.40, $p < .001$), expected education (.23, $p < .001$), value of education (.15, $p < .01$), and level (.10, $p < .05$) and the numbers in brackets are the standardized regression weights at step 4 with their statistical significance. Using these four predictors, an R of .64 resulted. In the replication analysis, the multiple correlation was larger (.72), but as mentioned the Fishbein predictors (A & SN) alone did equally well on cross-validation (R = .74). From the Fishbein perspective, these results and the fact that attitude was the first variable to enter is heartening.

III) Non-Native: Correlations with Intentions

The correlations (two-tailed) to be reported are based on a random sample of 311 of the 408 non-Native students (approximately 75%).

Tables 6 and 7 show that the best predictors of intent were attitude, education expected, perceived value of education, and absenteeism (r = .63, .37, .38, -.37, $p < .001$). Other variables with substantial

Table 6: Model-based variables:
Summary statistics and correlations with intent for non-Natives (n=311)

Variables		M	SD	r
Value of education		25.8	3.1	.38[a]
Expectancy of success (Motowidlo)		722.1	99.0	.02[ns]
Attributions to:	ability	15.2	3.7	.05[ns]
	effort	19.0	3.9	.19[a]
	context	13.6	4.6	-.03[ns]
	luck	11.5	5.0	-.10[ns]
	internality	34.3	6.0	.15[b]
	externality	25.1	8.6	-.07[ns]
Intent		2.6	1.1	1.0
Attitude		2.6	0.8	.63[a]
Subjective norm (SN)		2.6	0.9	.27[a]
Estimated attitude $\sum(b.e)/n$		4.2	2.0	.32[a]
Estimated subjective norm $\sum(Nb.Mc)/n$		10.9	4.9	.30[a]

[a] $p < .001$, [b] $p < .01$, [c] $p < .05$ (two-tailed).
[ns]: not statistically significant.

Table 7: Personal and academic factors:
Summary statistics and correlations with
intent for non-Natives (n=311)

Variables	M	SD	r
Age	15.2	1.8	-.27[a]
Sex (female=1; male=0)	0.5	0.5	.04[ns]
Birth order	2.4	1.6	.02[ns]
Aspired socio-economic status (SES)	2.5	1.4	-.22[a]
Expected SES	2.9	1.6	-.18[b]
Level of education desired	15.4	2.4	.26[a]
Level of education expected	14.7	2.2	.37[a]
Average (self report)	77.6	52.8	.07[ns]
Absences	7.6	4.8	-.37[a]
Average (records)	68.9	5.6	.26[a]
Number of courses failed	0.8	0.8	-.18[a]
Level (academic stream)	4.5	0.3	.23[a]

[a] $p < .001$, [b] $p < .01$, [c] $p < .05$ (two-tailed).
[ns]: not statistically significant.

[d] Reported average is based on students in grades 8 to 10, whereas average from the records is for students in grades 9 and 10.

correlations with intentions were subjective norm ($r = .27$, $p < .001$), desired education ($r = .26$, $p < .001$), desired socioeconomic status ($r = -.22$, $p < .001$), grade average ($r = .26$, $P < .001$), age ($r = -.27$, $p < .001$), and academic stream ($r = .23$, $p < .001$). Estimated attitude and estimated subjective norm were correlated with intent but not as strongly as attitude and subjective norm.

As can be seen in Tables 6 to 8, other variables also were associated with intent, but all had correlations less than .20. Unlike the Native analyses, maternal and paternal education and income had statistically significant, though small, relations with intent. Presence of both parents and socioeconomic status had small correlations with intent ($r = .12$, $p < .05$; $-.10$, $p < .05$). There was some evidence that children of parents who were employed had more favourable intentions. Among the students surveyed in 1983, maternal and paternal employment status (employed/unemployed) had correlations of .15 ($p < .05$) and .10 (n.s.) with intent. The 1984 data also were suggestive of a minimal relation between employment status and intention. It should be noted that information on employment was not combined across the two years of the survey because the items assessing this topic were different. Consistent with Native

Table 8: Background factors:
Summary statistics and correlations with intent for non-Natives (n=311)

Variables	M	SD	r
Family size	4.7	1.3	$-.04^{ns}$
Living with both biological parents	0.8	0.4	$.12^{c}$
Father employed (yes/no)	0.9	0.3	$.10^{ns}$
Paternal SES[d]	3.6	1.4	$-.09^{ns}$
Maternal SES	4.5	1.4	$-.11^{c}$
Total annual household income[e]	5.3	2.0	$.13^{c}$
Home modernity	4.8	0.5	$-.04^{ns}$
Household reading material	2.4	0.7	$.15^{b}$
Mother's education	12.5	2.3	$.19^{a}$
Father's education	12.0	2.6	$.20^{a}$
Number of siblings having dropped	0.3	0.3	$-.09^{ns}$

[a] $p < .001$, [b] $p < .01$, [c] $p < .05$ (two-tailed).
[ns]: not statistically significant.

[d] socio-economic status (SES) was coded 1 (professional) to 6 (unskilled).
[e] income was coded 1 (<$8,000) to 8 (>$38,000).

results, internality was associated with favourable intentions ($r = .15$, $p < .001$) while externality was not ($r = -.07$, n.s.). In accordance with Lefcourt's theorizing, internality and externality were uncorrelated ($r = -.03$, n.s.). Attribution to effort was a positive predictor of intent ($r = .19$, $p < .001$), but attributions to ability, context, and luck were irrelevant. Thus, some support was found for Lefcourt's separation of internality into separate components (ability and effort).

A number of variables including gender, social desirability, family size, birth order, expectancy of success, and number of siblings who dropped were unrelated to intent.

IV) Non-Native: Multivariate Analyses

Expectancy-Value Approaches

Internality and externality together produced a multiple correlation of .17 with intent ($p < .05$; Table 9, Eq 1). When perceived value of education was allowed entry, R increased dramatically to .39:

$$\text{Intent} = -.04\text{Ext} + .08\text{Int} + .36\text{Val}_a;\ R = .39_a. \qquad \text{Eq 2}$$

Table 9a: Regression of intent on the expectancy-value variables for non-Natives: Standardized regression coefficients

Variables	Eq1	Eq2	Eq3	Eq4
Externality (Ext)	$-.07^{ns}$	$-.04^{ns}$		
Internality (Int)	$.15^{b}$	$.08^{ns}$		
Value of education		$.36^{a}$		$.36^{a}$
Ability			$.01^{ns}$	$-.04^{ns}$
Effort			$.18^{b}$	$.13^{c}$
Context			$.03^{ns}$	$.03^{ns}$
Luck			$-.08^{ns}$	$-.04^{ns}$
Multiple correlation (R) (n=311)	$.17^{c}$	$.39^{a}$	$.20^{c}$	$.40^{a}$
Cross-validated R (n=90)		$.37^{a}$		$.39^{a}$

^{a} $p < .001$, ^{b} $p < .01$, ^{c} $p < .05$ (two-tailed).
^{ns}: not statistically significant

Table 9b: Regression of intent on the expectancy-value variables for non-Natives: Unstandardized regression coefficients

Variables	Eq1	Eq2	Eq3	Eq4
Externality (Ext)	$-.01^{ns}$	$-.00^{ns}$		
Internality (Int)	$.03^{b}$	$.01^{ns}$		
Value of education		$.12^{a}$		$.12^{a}$
Ability			$.00^{ns}$	$-.01^{ns}$
Effort			$.05^{b}$	$.03^{c}$
Context			$.01^{ns}$	$.01^{ns}$
Luck			$-.02^{ns}$	$-.01^{ns}$
Multiple correlation (R) (n=311)	$.17^{c}$	$.39^{a}$	$.20^{c}$	$.40^{a}$
Cross-validated R (n=90)		$.37^{a}$		$.39^{a}$

^{a} $p < .001$, ^{b} $p < .01$, ^{c} $p < .05$ (two-tailed).
^{ns}: not statistically significant

On replication (n = 90), the multiple correlation was .37. The next analyses used the Lefcourt subscales rather than internality and externality. Again, value of education supplemented the attributional predictors. The equation containing these variable was:

$$\text{Intent} = .03\text{Context} - .04\text{Ability} + .13\text{Effort}_a - .04\text{Luck} + .36\text{Val}_a;\ R = .40_a. \qquad \text{Eq 4}$$

It held up remarkably well on cross-validation (R = .39). Although the multiple correlation for the differentiated approach was not larger, the partitioning of internality and externality is informative; attributions to effort were related to intent but attributions to ability were not, even though both are internal.

ii) Ajzen-Fishbein Model

The next analyses concern the Ajzen-Fishbein model. When intent was regressed on attitude and subjective norm this equation resulted:

$$\text{Intent} = .06\text{SN} + .61\text{A}_a;\ R = .63_a;\ R_c = .18_c. \qquad \text{Eq 5}$$

(Table 10)

Table 10a: Regression of intent on the Fishbein and other predictors for non-Natives: Standardized regression coefficients

Variables	Eq5	Eq6	Eq7	Eq8
Externality (Ext)				
Internality (Int)				
Value of education			dne	dne
Ability				
Effort			dne[d]	dne
Context				
Luck				
Subjective norm (SN)	.06[ns]	.06[ns]	.06[ns]	dne
Attitude (A)	.61[a]	.59[a]	.48[a]	.50[a]
Estimated attitude ($\sum$(b.e)/n)		.03[ns]		dne
Estimated SN ($\sum$(Nb.Mc)/n)		-.01[ns]		dne
Education expected			.10[c]	.11[c]
Level/stream			dne	dne
Absenteeism			-.17[a]	-.17[a]
Age			-.09[c]	-.10[c]
Multiple correlation (R) (n=311)	.63[a]	.63[a]	.67[a]	.66[a]
Cross-validated R (n=90)	.18[c]		.42[a]	.43[a]

[a] $p < .001$, [b] $p < .01$, [c] $p < .05$ (two-tailed).
[ns]: not statistically significant.

[d] dne: the variable did not enter in the stepwise analysis.

Table 10b: Regression of intent on the Fishbein and other predictors for non-Natives: Unstandardized regression coefficients

Variables	Eq5	Eq6	Eq7	Eq8
Externality (Ext)				
Internality (Int)				
Value of education			dne	dne
Ability				
Effort			dne[d]	dne
Context				
Luck				
Subjective norm (SN)	.07[ns]	.06[ns]	.06[ns]	dne
Attitude (A)	.77[a]	.75[a]	.61[a]	.63[a]
Estimated attitude ($\sum$(b.e)/n)		.02[ns]		dne
Estimated SN ($\sum$(Nb.Mc)/n)		-.00[ns]		dne
Education expected			.05[c]	.05[c]
Level/stream			dne	dne
Absenteeism			-.04[a]	-.04[a]
Age			-.09[c]	-.10[c]
Multiple correlation (R) (n=311)	.63[a]	.63[a]	.67[a]	.66[a]
Cross-validated R (n=90)	.18[c]		.42[a]	.43[a]

[a] $p < .001$, [b] $p < .01$, [c] $p < .05$ (two-tailed).
[ns]: not statistically significant.

[d] dne: the variable did not enter in the stepwise analysis.

where R_c is the multiple correlation for the holdout group. As anticipated, the Fishbein model outperformed the general expectancy-value model in predicting intentions (at least in the derivation group). It is likely that the shrinkage or reduction in multiple R from the original to the cross-validated analysis accompanying the use of the Fishbein predictors was caused by homogeneity among the holdout sample. That is, there was little variation on the predictors and the criterion. Consistent with this interpretation, intent had a standard deviation of .46 in the validation group compared to 1.1 in the derivation sample. Furthermore, the standard deviations for predicted intent (Y') were .49 and .67, respectively. In view of the difference in variability in the original and replication groups, the drop in multiple correlation probably should not be regarded as severely damaging.

The Fishbein model was quite successful in accounting for attitude and subjective norm as is evident from the correlations between $\sum$b.e and attitude ($r = .46$, $P < .001$) and $\sum$Nb.Mc and subjective norm ($r = .44$, $p < .001$). As in the Native analysis, the prediction of attitude was better using the utilty and affect ($R = .53$) factors than using b.e ($R = .47$).

Results supported the internal mediational capability of attitude and subjective norm. That is, the estimated constructs did not supplement attitude and subjective norm when regressed on intent.

To test the capacity of the model to mediate external factors, hierarchical-stepwise regression was used, with attitude and subjective norm entered on step 1 and other variables given the opportunity to enter on subsequent stages. All variables with correlations greater than or equal to the absolute value of .20 were allowed entry. The resulting equation was:

$$\text{Intent} = .06SN + .48A_a - .17\text{Absence}_a + .10\text{Edexp}_c - .09\text{Age}_c;\ R = .67_a;\ Rc = .42_a. \qquad \text{Eq 7}$$

The multiple correlation increased only marginally with the addition of the non-Fishbein variables (R = .63 versus .67). This equation, however, compared to the one solely based on A and SN held up better on cross-validation but this superior replicability was likely attributable to more variability among the predictors in the case of the equation containing more variables.

iii) Atheoretical Approach

The final analysis on intentions was strictly stepwise and only those variables with correlations greater than .20 were allowed entry. The equation that resulted was:

$$\text{Intent} = .50A_a - .17\text{Absence}_a - .10\text{Age}_c + .11\text{Edexp}_c;\ R = .66;\ Rc = .43_a. \qquad \text{Eq 8}$$

The variables are presented according to order of entry. As in the Native analysis, attitude entered first.

V) Comparison of Native and non-Native Results

Although the Native and non-Native results are remarkably similar, there are a few noteworthy differences. Examination of the correlations with intentions shows that not living with both natural parents, low family income, low levels of parental education, and weak performance in school had a more adverse impact on non-Natives than Natives. It is clear that these differences are not due to less variability on the predictors among Natives because on each of these variables the Native standard deviations

are at least as large as those for non-Natives. The actual reasons for these group differences are not clear but a few possibilities come to mind. Income might be less important for Natives because there are various government programs that underwrite the cost of Native education and that provide assistance in meeting living costs (e.g., housing; see Frideres, 1988, p. 182). These important programs probably help to offset the effects of low income.

Level of parental education was correlated with intentions only for non-Natives, despite similar standard deviations on education and intentions for the two groups. Since many Natives have had little formal education, low levels might be more acceptable than among non-Natives. If this speculation is correct, Native parents with little schooling might be coping better (e.g., in terms of psychological health) than their non-Native counterparts.

Low marks and course failures possibly are not as debilitating for Natives because these occurrences also are not uncommon among the Native population. As such, they likely are associated with less stigma. Being overage for a grade level is quite common among Natives and less so for non-Natives, and in this light, it should not be surprising that being overage is related only to non-Native intentions. Interestingly

(for some unknown reasons), gender was associated with intentions only among Natives, with males holding less favourable intentions.

There also were several interesting, though difficult to explain, differences between the groups in the results from the multivariate analyses. In general, more variables reached statistical significance for Natives. For example, both internality and externality were significant for Natives (Eq 1 in Table 4) whereas only internality was for non-Natives (Eq 1 in Table 9). Equations two, three, and four, which pertain tc the general expectancy value approach, each had more statistically significant variables for Natives. In addition, the Fishbein-based equations showed a similar tendency. In contrast to the Native analysis wherein both A and SN were significant, the analysis for non-Natives showed only A to be important. Because the correlations between A and SN for Natives (.35) and non-Natives (.34) were nearly identical, it is apparent that this Native/non-Native difference is not an artifact of different degrees of overlap between the two predictor variables. That is, both A and SN do not reach significance in the Native case simply because of less overlap between these predictors. Internality and externality correlated to a similar extent in both

groups (-.07 & -.03) and thus the fact that both variables were important only in the Native equations likewise can not be due to differences in the relatedness of the predictors. Indeed, none of the aforementioned differences between the groups was produced by this potential artifact.

Summary and Discussion

Many variables were associated with students' intentions to attend school the following Fall. Among the most important were attitudes, subjective norms, expected and desired education, perceived value of education, academic stream, grade average, absenteeism, expected socioeconomic status, internality, externality, and attributions to effort. A host of other variables also had statistically significant but small correlations with intent. However, not all of these variables should be regarded as causes of intentions. Some, no doubt, are spuriously related to intentions whereas others may be consequences of intentions. Greater confidence can be placed in those relations that persisted in multivariate contexts, which statistically control for potential confounds.

A differentiated approach using ability, effort, context, and luck was found to be more informative than a coarser analysis that used locus of control. Not unexpectedly, value of education substantially improved the prediction possible using only the attributional constructs. These results were robust, occurring for both Natives and non-Natives in the original and cross-validation runs. Clearly, researchers who use locus of control without considering value are ignoring useful information.

Consistent with expectation, the Fishbein predictors outperformed those of the general expectancy-value framework and this superiority likely is due to correspondence. The Fishbein variables corresponded better with the criterion, both in terms of action (being in school) and time (next Fall). The substantial multiple correlations produced when intentions were regressed on attitudes and subjective norms compare well with those reported in the literature on criteria other than dropout (see Ajzen & Fishbein, 1980) and show that the model also is useful in the academic domain.

Interestingly, the beta weight for attitude was larger than the coefficient for subjective norm as has been found in much other research (see Farley, Lehman, and Ryan, 1981). Although such findings are often

interpreted to reflect the relative importance of attitudinal and social factors, this practice can be misleading. Attitudes conceivably effect subjective norms and the opposite direction of influence may also occur, notwithstanding the omission of these links in the diagrams of the model presented by Fishbein (Liska, 1984; Warshaw, 1980). In fact, some research has reported influences between attitudes and subjective norms (Miniard & Cohen, 1979; Oliver & Bearden, 1985; Ryan, 1982; Shimp & Kavas, 1984; Wittenbraker, Gibbs, & Kahle, 1983). In fairness to Fishbein, it should be noted that he alludes to such effects in his writings. To the extent that A and SN are interrelated, interpretation of the weights can be difficult because they reflect only unique influence. Subjective norms can be important and yet receive small or even non-significant regression coefficients (Oliver & Bearden, 1985; Ryan & Bonfield, 1980). This can happen, for example, if what others encourage influences personal attitudes, with the social effect "captured" in attitudes. Researchers must be cognizant of this possibility.

There was little indication that attitudes and subjective norms have difficulty mediating the effects of their more distal counterparts, $\sum b.e$ and $\sum Nb.Mc$. In the derivation analysis among Natives, the estimated

constructs supplemented A and SN to a small degree, but this result did not replicate. For non-Natives, there was no supplementation. The ability of the model to mediate the effect of external variables was supported, though the evidence was equivocal. For both ethnic groups, external variables slightly improved the prediction of intent based only on attitudes and subjective norms. The important external variables for Natives were expected education, value of education, and level and for non-Natives included absences, expected education, and age. The improvement observed when the external variables were employed in the derivation analyses did not hold up well on cross-validation. Accordingly, due to its parsimony, the traditional Fishbein model should be considered sufficient for accounting for intentions concerning academic persistence. Researchers who have found that A and SN can be supplemented by external variables typically have used measures that did not follow Fishbein's guidelines and thus their work may not represent fair tests of the model (e.g., Granrose, 1984; Kantola, Syme, & Campbell, 1982; Schlegel, Crawford, & Sanborn, 1977; Stutzman & Green, 1982). The few researchers who have failed to find evidence for the mediation of external influences on intent while using adequate measures did not cross-validate

their findings (e.g., Ajzen & Madden,. 1985; Hom & Hulin, 1981). Thus, the contrary results in the literature might simply be the product of chance.

Taken together, the data indicate that the Fishbein model is useful for understanding intentions concerning academic persistence and that it needs little modification. Attitude is related to intent regardless of what variables are statistically controlled and thus the relation is not likely to be spurious. On the other hand, subjective norm seems less relevant, but this conclusion should be tempered by an awareness that it is difficult, if not impossible to separate the influence of A and SN. Together, attitudes and subjective norms offered a parsimonious way of accounting for intentions. However, because the model was designed primarily to explain intentions, and only secondarily to understand behaviour, it might be less successful when the criterion is dropout rather than intention. As Fishbein candidly admits in his discussion of "behaviours versus outcomes", the model performs well when predicting behaviours that are entirely volitional, but it is less effective for outcomes, which are characterized by a degree of external determination. The thesis now turns to examining actual dropout, a criterion which is generally thought to be partly volitional.

Chapter Six

ENROLLMENT STATUS ONE YEAR LATER

Unlike the previous chapter, which dealt with intentions, this chapter examines the factors associated with actual dropout. The analyses were directed at discerning what distinguishes students who had dropped one year subsequent (outyear1) to the survey (Fall 1985 and Fall 1984 for students surveyed in 1984 and 1983 respectively) from those who had persisted. The major issue addressed by the analyses to follow was the usefulness of the Fishbein model compared to the general expectancy-value model in accounting for outyear1 (out = 1; in = 0). In view of the correspondence principle (see Chapter 5), the Fishbein model was expected to be superior. Nevertheless, it was anticipated that the Fishbein approach would be improved by including variables in addition to intentions because, among other considerations, intentions were not expected to be based on all of the relevant information.

Enrollment status at the one year point was not available for 16 Natives and 17 non-Natives so that the

analyses were based on 383 Natives and 391 non-Natives. As in Chapter 5, the 1983 data were used unless the student was surveyed only in 1984. In this case, the information from the 1984 survey was used. Of the 383 Natives, 321 had persisted and 62 had dropped (34 males, 26 females, and 2 of unidentified sex). The corresponding figures for non-Natives were 368 and 23. Though these n's were reasonably large, especially compared to those used in most longitudinal investigations, they constrained the analyses somewhat. The Native sample size was sufficient for both univariate and multivariate analyses, but cross-validation was not possible. On the other hand, the small number of non-Native dropouts precluded the use of multivariate analyses. It should be noted that outyear1 was coded (out = 1, in = 0). Also, because the results were similar both with and without mean substitution for missing data, only the results with mean substitution are reported.

Results

I) Natives: Correlations with Outyear1

Of the background factors (see Table 1), living with both biological parents and number of siblings who had dropped were related to outyear1 (r = -. 11,

Table 1: Background factors:
Summary statistics and correlations with enrollment status 1 year later (Outyear1) for Natives (n=383)

Variables	M	SD	r
Family size	5.4	2.2	.04[ns]
Living with both biological parents	0.6	0.5	-.11[c]
Father employed (yes/no)	0.7	0.5	.03[ns]
Paternal SES[d]	4.2	1.4	.01[ns]
Maternal SES	4.7	1.3	-.05[ns]
Total annual household income[e]	3.8	1.9	.02[ns]
Home modernity	4.3	0.8	.02[ns]
Household reading material	2.0	0.9	.03[ns]
Mother's education	11.2	2.3	-.08[ns]
Father's education	10.6	2.5	-.09[ns]
Number of siblings having dropped	1.2	1.1	.14[b]

[a] $p < .001$, [b] $p < .01$, [c] $p < .05$ (two-tailed).
[ns]: not statistically significant.

[d] socio-economic status (SES) was coded 1 (professional) to 6 (unskilled).
[e] income was coded 1 (<$8,000) to 8 (>$38,000).

$p < .05$; $r = .14$, $p < .01$). In other words, students who were not living with both parents and those who had siblings who had dropped were more inclined to be nonpersisters. Furthermore, the effect of siblings who had dropped was not due to the discouragement of their brothers and sisters. When sibling encouragement concerning attending high school was controlled statistically via partial correlation, the relation between number of siblings having dropped and outyear1 remained unchanged. If dropouts did not discourage their siblings, how might they have influenced the propensity to dropout? One possibility is that they simply made the alternative of dropping more apparent as an option.

Since family income was not related to enrollment status, the advantage of living with both parents can not be due to intact families having greater financial resources, but must be a result of other factors such as a more stable home environment. The other background factors, language use in the home and the finer grained employment measures used in 1984 (e.g., work full time; self-employed etc.), were unrelated to the criterion. Religion (Longhouse versus non-Longhouse) also was statistically unimportant. This finding is surprising in view of comments made by

some individuals that Longhouse proponents view education with some skepticism, considering it to be antithetical to tradition and the Native lifestyle.

As shown in Table 2, personal and academic factors were more strongly related to enrollment status than were background variables. Students expecting or aspiring to high status jobs were more likely to persist ($r = .24$, $p < .001$; $r = .21$, $p < .001$). Years of education desired and years expected were negative predictors ($r = -.18$, $p < .001$; $r = -.22$, $p < .001$). Interestingly, for the predictors future education and occupation, expectancies were stronger correlates than aspirations. This probably indicates that students sometimes foresaw potential obstacles to achieving their goals or aspirations. Consistent with this interpretation, aspirations were higher than expectancies (educational: 15 vs 14.1 years; occupational: 2.6 vs 2.9, where a lower score indicates higher SES). Age was a strong correlate of dropout ($r = .31$, $p < .001$), with older students being more prone to leave.

The data from the school records also were strongly predictive of subsequent enrollment status. Absenteeism was the best predictor ($r = .36$, $p < .001$), followed by grade average in the previous year ($r = -.30$, $p < .001$), number of courses failed in the

Table 2: Personal and academic factors: Summary statistics and correlations with enrollment status one year later (Outyear1) for Natives (n=383)

Variables	M	SD	r
Age	15.7	1.2	.31[a]
Sex (female=1; male=0)	0.5	0.5	-.06[ns]
Birth order	3.3	2.4	.10[c]
Aspired socio-economic status (SES)	2.6	1.4	.21[a]
Expected SES	2.9	1.4	.24[a]
Level of education desired	15.0	2.4	-.18[a]
Level of education expected	14.1	2.0	-.22[a]
Average (self report)	69.4	8.1	-.22[a]
Absences	15.1	9.0	.36[a]
Average (records)	60.1	7.1	-.30[a]
Number of courses failed	1.8	1.4	.27[a]
Level (academic stream)	4.1	0.4	-.26[a]

[a] $p < .001$, [b] $p < .01$, [c] $p < .05$ (two-tailed).
[ns]: not statistically significant.

[d] Reported average is based on students in grades 8 to 10, whereas average from the records is for students in grades 9 and 10.

previous year ($r = .27$, $p < .001$), and academic level or stream ($r = -.26$, $p < .001$). Whereas only 3% in the advanced stream dropped, 23% in the general and 58% in the basic categories discontinued. In the media recently (Contenta, 1988; Hamilton Spectator, 1988), streaming has been condemned on the grounds of such associations. However, it is quite likely that streaming itself is not responsible for the different rates of dropout (Paikin Nolan, 1988). Students in the lower streams are considered to have less ability and possibly less motivation, factors which are, no doubt, important contributors to dropout. It would have been interesting to have tested for the effects of streaming, controlling for academic potential, but IQ data were not available for enough of the students in the current study. However, even if IQ had been available, there probably would have been little variation in scores among students at a particular level. That is, students at a given level have similar IQ and because of this homogeneity, controlling for IQ would not help to determine the role of level independent of IQ.

Intent was the best model-based predictor ($r = -.31$, $p < .001$), though all of the other Fishbein variables also had significant correlations with outyear1 (see Table 3). In addition, the correlation

Table 3: Model-based variables:
Summary statistics and correlations with enrollment status one year later (Outyear1) for Natives (n=383)

Variables		M	SD	r
Value of education		25.0	3.5	$-.11^{c}$
Expectancy of success (Motowidlo)		681.4	103.9	$.04^{ns}$
Attributions to:	ability	15.4	3.7	$-.08^{ns}$
	effort	19.0	3.7	$-.09^{ns}$
	context	13.2	4.3	$.06^{ns}$
	luck	11.5	4.6	$.00^{ns}$
	internality	34.4	6.0	$-.11^{c}$
	externality	24.7	7.8	$.03^{ns}$
Intent		2.5	1.1	$-.31^{a}$
Attitude		2.4	1.0	$-.24^{a}$
Subjective norm (SN)		2.2	1.3	$-.15^{b}$
Estimated attitude $\sum(b.e)/n$		3.4	2.1	$-.17^{a}$
Estimated subjective norm $\sum(Nb.Mc)/n$		8.5	5.5	$-.16^{b}$

^{a} $p < .001$, ^{b} $p < .01$, ^{c} $p < .05$ (two-tailed).
^{ns}: not statistically significant.

between value of education and outyear1 was significant, though small ($r = -.11$, $p < .05$). As in several of the previous investigations that have examined the relation between locus of control and academic persistence (see Chapter 2), internality was found to be associated with greater persistence ($r = .11$, $p < .05$). Unlike cross-sectional analyses, the current investigation, by virtue of being longitudinal, can rule out the possibility that the association is a result of persistence producing internality rather than the reverse causal ordering. However, even if internality contributes to persistence, the relation is small. None of the Lefcourt subscales had statistically significant correlations with outyear1. The delay of gratification items used in 1984 also were found to be of no predictive value.

II) Non-Native: Correlations with Outyear1

As for Natives, the background variables were not strongly associated with enrollment status (see Table 4), though more variables reached statistical significance. The factors correlated with outyear1 that were significant are living with both parents ($r = .16$, $p < .01$), paternal employment ($r = -.15$,

Table 4: Background factors:
Summary statistics and correlations with enrollment status one year later (Outyear1) for non-Natives (n=391)

Variables	M	SD	r
Family size	4.7	1.3	.03[ns]
Living with both biological parents	0.8	0.4	-.16[b]
Father employed (yes/no)	0.9	0.3	-.15[c]
Paternal SES[d]	3.6	1.4	.03[ns]
Maternal SES	4.6	1.4	-.01[ns]
Total annual household income[e]	5.2	1.9	-.10[ns]
Home modernity	4.8	0.5	.06[ns]
Household reading material	2.4	0.7	.03[ns]
Mother's education	12.4	2.4	-.16[b]
Father's education	12.1	2.6	-.12[c]
Number of siblings having dropped	0.3	0.3	.18[a]

[a] $p < .001$, [b] $p < .01$, [c] $p < .05$ (two-tailed).
[ns]: not statistically significant.

[d] socio-economic status (SES) was coded 1 (professional) to 6 (unskilled).
[e] income was coded 1 (<$8,000) to 8 (>$38,000).

$p < .05$), maternal education ($r = -.16$, $p < .01$), paternal education ($r = -.12$, $p < .05$), and the number of siblings who have dropped ($r = .18$, $p < .001$). The other background characteristics, including language use, were unrelated to the criterion.

Again, older students were more likely to drop ($r = .26$, $p < .001$) as were children with a high birth order indicating the presence of many siblings ($r = .20$, $p < .001$). Because of the small number of dropouts in the sample used to calculate these correlations, it was thought futile to try to trace via partial correlation techniques how birth order exerted its effect. Students who aspired to good occupations and expected to obtain them were more likely to persist as indicated by the correlation of aspired SES with outyear1 ($r = .16$, $p < .001$), and the correlation of expected SES with the criterion ($r = .13$, $p < .01$). Level of education desired and level expected also were associated with outyear1 ($r = -.14$, $p < .01$; and $r = -.26$, $p < .001$), indicating that high educational aspirations and expectancies were associated with greater persistence.

Absenteeism was found to be one of the best predictors ($r = .30$, $p < .001$; see Table 5). Grade average and number of courses failed in the previous

Table 5: Personal and academic factors: Summary statistics and correlations with enrollment one year later (Outyear1) for non-Natives (n=391)

Variables	M	SD	r
Age	15.2	1.1	.26[a]
Sex (female=1; male=0)	0.5	0.5	-.09[ns]
Birth order	2.4	1.7	.20[a]
Aspired socio-economic status (SES)	2.5	1.4	.16[a]
Expected SES	2.9	1.6	.13[b]
Level of education desired	15.4	2.3	-.14[b]
Level of education expected	14.7	2.1	-.26[a]
Average (self report)	77.0	46.7	-.05[ns]
Absences	7.6	4.9	.30[a]
Average (records)	68.8	6.0	-.18[a]
Number of courses failed	0.8	0.9	.15[b]
Level (academic stream)	4.5	0.3	-.09[ns]

[a] $p < .001$, [b] $p < .01$, [c] $p < .05$ (two-tailed).
[ns]: not statistically significant.

year also were predictive in the anticipated directions ($r = -.18$, $p < .001$; and $r = .15$, $p < .01$).

The expectancy-value variables were not strongly associated with outyear1 (see Table 6). The statistically significant correlates were value of education ($r = -.13$, $p < .01$), and effort ($r = -.10$, $p < .05$). In contast to the expectancy-value concepts, the Fishbein predictors fared well. The correlations with the criterion from largest to smallest were intent ($r = -.38$, $p < .001$), attitude ($r = -.36$, $p < .001$), estimated subjective norm ($r = -.19$, $p < .001$), estimated attitude ($r = -.18$, $p < .001$), and subjective norm ($r = -.10$, $p < .05$). None of the delay of gratification items proved useful.

Given the problem of having a small non-Native dropout n, no attempt is made to compare the non-Native and Native results.

Table 6: Model-based variables:
Summary statistics and correlations with enrollment status one year later (Outyear1) for non-Natives (n=391)

Variables		M	SD	r
Value of education		25.9	3.1	$-.13^{b}$
Expectancy of success (Motowidlo)		722.4	99.1	$-.08^{ns}$
Attributions to:	ability	15.4	3.7	$.00^{ns}$
	effort	19.1	3.8	$-.10^{c}$
	context	13.6	4.6	$.01^{ns}$
	luck	11.5	5.0	$.04^{ns}$
	internality	34.6	6.0	$-.07^{a}$
	externality	25.2	8.5	$.03^{ns}$
Intent		2.7	1.0	$-.38^{a}$
Attitude		2.7	0.8	$-.36^{a}$
Subjective norm (SN)		2.6	0.9	$-.10^{c}$
Estimated attitude $\sum(b.e)/n$		4.3	1.9	$-.18^{a}$
Estimated subjective norm $\sum(Nb.Mc)/n$		11.1	4.9	$-.19^{a}$

^{a} $p < .001$, ^{b} $p < .01$, ^{c} $p < .05$ (two-tailed).
^{ns}: not statistically significant.

III) Discriminant Analysis

With dichotomous dependent variables, or variables which only have two categories (e.g., persist/drop; typically coded 1 and 0) some of the assumptions of multiple regression are violated (see Aldrich & Cnudde, 1975; Aldrich & Nelson, 1984; Amemiya, 1981; Gensch & Recker, 1979; Studenmund & Cassidy, 1987). Furthermore, when the dependent variable is dichotomous, the predicted value of Y is the probability that Y = 1 (i.e., Expected value of Y = p(Y = 1) x 1 + p(Y=0) x 0) because the second term is zero. The predicted value of Y clearly is based on probability and as such should not take on values outside the range of 0 to 1 as it can in regression. Because of these considerations, the multivariate analyses in this chapter use discriminant analysis, a statistical technique which is basically an extension of multiple regression to be used with polychotomous (several categories) or dichotomous dependent variables.

In discriminant analysis, a number of variables are used to predict the score on the dependent variable. In essence, the predictor variables are combined, forming "discriminant function(s)," that can be used to ascertain the relative role of variables in

discriminating between groups. When the dependent variable is dichotomous, only one discriminant function is formed. The coefficients or discriminant weights are determined so that the scores produced by the function (discriminant scores) produce maximal separation between the groups (regardless of number). That is, the weights are selected to yield similar discriminant scores for individuals belonging to the same group and dissimilar scores for members of different groups. The magnitudes of the weights associated with the variables indicate the degree of their influence.

The success of discriminant analyses is gauged in at least two ways. First, the canonical correlation shows the extent to which the discriminant scores correlate with group membership; large correlations are better than small ones. Second, discriminant functions (or classification functions) can be used to classify cases into groups. High hit rates, reflecting accurate assignment to groups (e.g., predicted persisted and actually persisted), attest to the usefulness of the functions.

Discriminant analysis, then, is like regression in several ways, but overcomes some of its limitations when the dependent variable is dichotomous. As with regression, there are several varieties of discriminant

analysis including standard, stepwise, and hierarchical.

Results (continued)

IV) Native Multivariate Analyses

i) Expectancy-Value Approaches

The first discriminant analyses to be reported were used to determine the usefulness of the general expectancy- value (E-V) model in accounting for enrollment status at the one year point. In light of the low bivariate correlations involving the E-V predictors, the multivariate analyses based on these variables were not expected to be strongly predictive. Consistent with expectations, the equations using the E-V predictors (equations 1 and 2 in Table 7) produced non-significant canonical correlations and hit rates (61.4% & 62.7%) not much higher than the 50% rate that would arise from merely guessing enrollment status and randomly assigning one half of the students to a group of persisters and the other half to a group of dropouts.

Table 7a: Discriminant analyses on Outyear1 for Natives: Standardized discriminant function coefficients

Variables	Eq1	Eq2	Eq3	Eq4	Eq5
Externality (Ext)	-.09				
Internality (Int)	.57				
Value of Education (Val)	.66	.60			
Ability		.39			
Effort		.25			
Context		-.61			
Luck		.45			
Intent (I)			.82	-.30	-.30
Attitude (A)			.28	-.15	-.15
Subjective norm (SN)			dne[d]		
Estimated A ($\sum$(b.e)/n)					
Estimated SN ($\sum$(Nb.Mc)/r					
Education expected				dne	dne
Age				.45	.45
Absenteeism (Abs)				.50	.50
Average (Avg)				dne	dne
Failures (Fail)				.27	.27
Level (Lev)				dne	dne
Expected SES				.16	.16
Group centroids: D[e]:	-.31	-.36	-.75	1.30	1.30
P:	.06	.07	.14	-.26	-.26
Validation: Can Corr:	.14[ns]	.16[ns]	.31[a]	.51[a]	.51[a]
Hit rate:	61.4%	62.7%	75.2%	81.7%	81.7%

[a] $p < .001$, [b] $p < .01$, [c] $p < .05$ (two-tailed).
[ns]: not statistically significant.

[d] dne: the variable did not enter in the stepwise analysis.
[e] D: dropout, P: persister.

Table 7b: Discriminant analyses on Outyear1 for Natives:
Unstandardized discriminant function coefficients

Variables	Eq1	Eq2	Eq3	Eq4	Eq5
Externality (Ext)	-.01				
Internality (Int)	.09				
Value of Education (Val)	.20	.17			
Ability		.10			
Effort		.07			
Context		-.14			
Luck		.10			
Intent (I)			.76	-.28	-.28
Attitude (A)			.27	-.15	-.15
Subjective norm (SN)			dne[d]		
Estimated A ($\sum$(b.e)/n)					
Estimated SN ($\sum$(Nb.Mc)/r					
Education expected				dne	dne
Age				.38	.38
Absenteeism (Abs)				.06	.06
Average (Avg)				dne	dne
Failures (Fail)				.19	.19
Level (Lev)				dne	dne
Expected SES				.11	.11
Group centroids: D[e]:	-.31	-.36	-.75	1.30	1.30
P:	.06	.07	.14	-.26	-.26
Validation: Can Corr:	.14[ns]	.16[ns]	.31[a]	.51[a]	.51[a]
Hit rate:	61.4%	62.7%	75.2%	81.7%	81.7%

[a] p< .001, [b] p< .01, [c] p< .05 (two-tailed).
[ns]: not statistically significant.

[d] dne: the variable did not enter in the stepwise analysis.
[e] D: dropout, P: persister.

ii) Analyses based on the Ajzen-Fishbein Model

a) Can A and SN Supplement Intent?

For equation 3 (Table 7), intent was entered on step one and then attitude (A) and subjective norm (SN) were allowed entry to determine if attitudes or subjective norms could supplement intent in accounting for outyear1. Previous research on whether A and/or SN supplement intent has produced mixed results. Shimp and Kavas (1984) found no evidence for such an effect while Manstead and colleagues (1984) and Toneatto and Binik (1987) did. In the research in this dissertation, attitude but not subjective norm entered after intent. Nevertheless, the increment to the prediction of outyear1 was so small that it should not be interpreted as evidence against the model. It is likely that if cross validation were possible, attitude would not supplement intent.

b) Can External Variables Supplement Intent?

Although attitudes and subjective norms did not substantially improve the prediction based on intent, it was anticipated that intent could be supplemented by variables external to the model. As mentioned earlier, students' intentions were not expected to take into

account all of the relevant information. To test whether other factors could contribute over and above intent, hierarchical-stepwise analysis (Eq.4) was conducted in which intent was entered on the first step and other variables that had correlations > |.2| with outyear1 were allowed access. The variables meeting this criterion were age, expected socioeconomic status, education expected, absenteeism, grade average, number of failures, educational level or stream, and attitude. The discriminant function, with the standardized discriminant coefficients, that resulted was:

$$\text{Outyear1} = -.30I + .50Abs + .45Age + .27Fail + .16Sesexpt - .15A. \qquad \text{Eq.4} \quad (R = .51)$$

As for all stepwise analyses in this thesis, the order of variables in the equation corresponds to their order of entry.

iii) Atheoretical or Stepwise Approach

It should be noted that when a strictly stepwise analysis was conducted (intent was not given priority), intent entered on step 3 and the coefficients were identical to those presented in equation 4. Those students who were likely to discontinue had unfavourable attitudes (A) and

intentions (I), were older, expected worse jobs (Sesexpt), were absent (Abs) often, and had failed more courses in the previous year than their peers. The canonical correlation between the scores produced by the equation and enrollment status was an impressive .51, and the hit rate produced when the cases were classified was almost 82%. Considering that both the correlation between intent and outyear1 (-.31) and the hit rate based on intent alone (72%) were lower, it is clear that intent can be supplemented as was expected. In fact, age and absenteeism had larger standardized discriminant coefficients than intent.

It is interesting that both age and number of failures entered, indicating that they were not redundant. Older students have typically failed more often than their peers, though in some cases they started school late. The fact that both variables had substantial weightings suggests that older students were not more prone to drop solely due to having failed more courses in the previous year than their peers. However, the number of courses that they failed throughout their educational career might be relevant, in which case controlling for total number of failures would decrease the size of the weight associated with age.

Not surprisingly, students who expected lower status occupations (high SES scores) were more likely to discontinue by the one year point. These students might not have been as motivated to achieve prestigious jobs, with the result that school might have seemed less important to them. Consistent with this speculation, expected socioeconomic status was correlated with perceived value of education ($r = -.19$, $p < .001$) such that students who expected worse jobs placed less value on education. It should be realized that some students might have had low occupational expectations not because they were unmotivated but because they thought they lacked the ability to achieve the highly esteemed occupations. Those students who did worse in school may have lowered their occupational expectations (the correlation between average and expected SES was $-.20$ ($p < .001$). Nevertheless, since expected SES remained in the equation containing number of failures in the previous year, occupational expectations had some effect on outyear1 independent of this aspect of academic performance. Interestingly, partial correlational analyses showed that the association between expected SES and outyear1 persisted, only marginally reduced ($r = .20$ vs. $.24$), when grade average was controlled.

Thus, expected SES has an effect not attributable to recent academic performance.

Somewhat unexpectedly, absenteeism influenced outyear1 even with attitudes and intentions controlled. Apparently, absenteeism had an effect independent of attitude such that the relation between absenteeism and outyear1 can not be attributed to students with considerable absenteeism having had more negative attitudes. It was thought that those students who were absent frequently may have come from households that did not value education highly or that did not encourage persistence. Thus, a student might have had weak attendance because of a lack of parental encouragement on educational matters rather than because of personal attitudes that were negative. Contrary to this speculation, however, the relation between absenteeism and outyear1 was unaffected in a partial correlational analysis controlling for parental encouragement as indexed by the item: My parent(s) (step-parent(s)) think I should be in high school next Fall (strongly agree to strongly disagree). Though controlling for failures reduced the correlation between absenteeism and the dependent variable (.30 vs. .36) as did partialling for average (.25 vs. .36), the relation was still substantial. Taken together, these results indicate that the effect of absenteeism is

independent of students' attitudes and parental encouragement, and largely independent of academic performance.

As mentioned, 82% of the students were correctly assigned. However, it is possible that the rate would not have been as high had it been possible to use cross-validation (see Chapter 3). The classification matrix is presented in Table 8.

Table 8: Classification Results based on Equation Five

	Predicted group	
	in	out
	0	1
Actual group		
in: 0 (n=321)	275 a	46 b
out: 1 (n=62)	24 c	38 d

The correct predictions are given in cells a and d, whereas the mistakes are represented by cells b and c. The overall accuracy or hit rate of 82% is given by the number of correct decisions (313) divided by the total number of decisions (383). The table shows that the equation is very successful when

persistence is predicted (outyear1 is predicted to be 0; first column in Table 8). In fact, of those predicted to persist 92% did. The equation does less well for those students predicted to drop, with an accuracy of 45%. Even if a student was "predicted" to drop, the individual often persisted for the year at least. Compulsory attendance laws and parents may have kept children in school who preferred not to attend. To reiterate, the equation, despite the mispredictions, is useful in identifying students with an elevated risk of dropping. Whereas students who were predicted to persist had an actual 8% dropout rate, those who were predicted to discontinue had a 45% dropout rate. The difference in rates shows that those who were predicted to drop had a much greater risk of actually leaving.

V) Intentions Compared to the Enrollment Data (Natives and non-Natives)

It was of some interest to determine whether the results for the outyear1 variable would parallel those for intent. No extant research seems to have made such a comparison probably because few investigations have been longitudinal. Though there is no research from which to derive predictions about how the results for the two dependent variables would compare, it seemed plausible that differences would

arise. Considering the growing body of research in psychology showing that people often do not know all of the determinants of their behaviour (e.g., Nisbett & Wilson, 1977), it was expected that students' intentions would be determined by a subset rather than by all of the relevant factors. Thus, some factors that were not important to understanding intentions nevertheless might contribute to dropout. It also was thought possible that some factors might be considered in forming intentions but not in making the actual enrollment decision.

Before discussing the differences in the results obtained for intent and outyear1, it is appropriate to mention that there was considerable similarity. For both dependent variables, the univariate and multivariate analyses indicated that the most important variables were attitudes, age, absenteeism, expected and desired education, expected and desired socioeconomic status, and academic performance. Examination of the data also shows that some factors (e.g., expectancy of success) were unimportant for both intent and outyear1.

As anticipated, several variables correlated with outyear1 but not intent. Among these were number of siblings who dropped and birth order. Presumably, these factors do not influence intentions because

students either do not take them into account or do not understand their significance. For Natives, age and academic performance were correlated with outyear1 to a greater degree than with intent, possibly indicating that the role of these influences was underestimated by the students.

There were few instances in which factors were associated with intent but not outyear1. Among Natives, gender had such an effect. Although males had more unfavourable intentions than females, they were not more likely to discontinue at the one year point. It is possible that the males' more negative intentions were offset by more encouragement to remain in school. For non-Natives, level or stream was associated with intentions but not with actual behaviour. Again, intentions may not have been acted on due to countervailing pressures.

Although differences in the results obtained for intent and outyear1 might indicate that students did not base their intentions on all of the same variables that influence actual dropout, there is an alternative explanation. Whereas outyear1 is a dichotomous variable with minimal variation (.37 for Natives and .24 for non-Natives), intent more closely approximates a continuous dependent variable with considerable variability (SD for Natives and non-

Natives was 1.1). The correlations with intent, compared to those with outyear1, may be larger simply due to increased variation on the dependent variable. Of course, this difference is not problematic in interpreting those findings concerning variables associated with outyear1 but not with intent. In this case, outyear1 having less variability than intent, is less, rather than more likely, to achieve significant correlates. Thus, most of the differences mentioned above probably are genuine; intent and outyear1 do have some reliable differences in correlates. Furthermore, the magnitudes of the correlations between intent and outyear1 (Native: -.31; non-Native: -.38) indicate that the two criterion variables are not redundant. Though it would be convenient to study intent rather than actual dropout, thereby avoiding the complexities associated with longitudinal designs and dichotomous dependent variables, such an approach can not be recommended on the basis of these results. Intent, though related to enrollment, is a distinct dependent variable and it should not be treated as a proxy variable that can be studied instead of enrollment.

Summary and Discussion

Although the background factors, with the exception of whether both parents were present, and number of siblings who had dropped, were uncorrelated with outyear1, many other variables were associated with Natives' enrollment status one year after the surveys. The univariate and multivariate analyses indicated that the most important of these were intentions, attitudes, age, absenteeism, expected and desired education, expected and desired socioeconomic status, level, and academic performance. Expected educational level and occupation were better predictors than desired (aspired) educational level and occupation. Presumably, expectancies take into account possible constraints to fulfilling aspirations and therefore are stronger correlates.

Discriminant analysis showed the general expectancy-value model to be of little value in accounting for outyear1. On the other hand, intent (Fishbein predictor) had a sizeable correlation with the criterion and by itself yielded a hit rate of 72%. The superiority of the Fishbein approach is considered to be a result of its greater correspondence with outyear1. Intentions concerning attending school next Fall are similar to the criterion (attending next

Fall), whereas locus of control and value of education are not. It was heartening to find that intentions were useful predictors even over a one year time span.

Consistent with expectation, prediction was improved when variables in addition to intent were considered. Together, intent, attitude, age, expected socioeconomic status, absenteeism, and number of failures comprised an equation that identified students as persisters or non-persisters with 82% accuracy, compared to 72% for intent alone. From an educator's perspective, it is encouraging that a mere 6 variables afford reasonable prediction especially considering that much of the information is available in school records and that which is not can be easily collected. It appears that the variables that supplemented intent (e.g., course failure) were given insufficient attention by students in forming their intentions, despite the availability of this information. It may be advantageous for students to disregard information such as failures because by doing so they can be optimistic about their future chances of succeeding in school.

Though intent correlated with enrollment status ($r = -.31$), the two variables are not synonymous. Furthermore, outyear1 and intent had some different correlates. Future researchers would benefit by adding

intent to the variables they use to predict enrollment. However in view of these considerations they should not, as a few researchers studying occupational turnover and persistence at the post-secondary level have done, be tempted to study it as a dependent variable instead of enrollment.

Using partial correlational analysis, some insight was gained concerning how correlates of outyear1 might have exerted their effects. For some variables more was learned about how a variable was not acting than about how it exerted its effect (e.g., number of siblings having dropped). Interestingly, and somewhat counter to intuition, the negative impact of having siblings who had dropped apparently was not caused by the dropouts discouraging their brothers and sisters. It was speculated that having dropouts in the family simply might increase the student's awareness of the option of dropping out. It also was learned that absenteeism influenced dropping, independent of students' attitudes and parental encouragement of persistence. Absenteeism contributed to dropout by lowering students marks and increasing the amount of failure they experienced. Nevertheless, absenteeism still exerted a strong influence controlling for weak academic performance. More research is required to understand the basis of such associations.

Unfortunately, little can be said with confidence about the causes of non-Native dropout one year after the surveys because of the small sample size. However, it seems that as for Natives, the Fishbein variables were more helpful than those of the general expectancy-value model. It also appears that the background variables were not as useful as the personal, academic, or model-based factors. This imbalance in the understanding of non-Native compared to Native dropout is overcome in Chapter 7, which examines enrollment several years, rather than one year, after the survey. In this analysis, the sample sizes are more than adequate.

Chapter Seven

ENROLLMENT STATUS IN JUNE 1987

Although it is encouraging to have predicted outyear1 with considerable success, whether enrollment several years later can be similarly predicted remains to be tested. Therefore in contrast to the previous chapters, this chapter takes a longer time perspective. Because research shows that prediction is improved when the predictors are assessed close in time to the criterion measurement (Ajzen & Fishbein, 1974, 1980; Kuhl & Beckman, 1985; Mobley, Griffeth, Hand, & Meglino, 1979; Steele & Ovalle, 1984; Waters & Roach, 1979), the most recent predictive information is used (1984 data unless the subject was not surveyed in 1984) to predict enrollment status in June 1987 (OutJune87; yes=1, no=0).

The major issues to be investigated are a) What factors are useful predictors of dropout?, b) What version of the general expectancy-value model is most appropriate: e.g., internality and externality or ability, effort, context, luck?, and c) Will the Ajzen-Fishbein or the general expectancy-value model better account for OutJune87?

The Ajzen-Fishbein model is not expected to fare as well as before because the Fishbein predictors lack close correspondence with the criterion; the Fishbein variables were measured with respect to being enrolled one year, not several years later. As such, it is difficult to know which model will prove more useful.

Methodology

Considerable care was taken to confirm enrollment status. School records, school personnel, and graduation lists were used to determine whether students had dropped, graduated, transferred, or whether they were still in attendance. The status of students who had transferred between the schools used in this investigation (e,g., Cayuga to Hagersville) also was ascertained. However, it was not possible to verify if students who had transferred to other schools had persisted or dropped. Consequently, all "external transferees" were excluded from the analyses.

This study, like all investigations, has a fixed time frame. Thus it is possible that the status of some students might change after the completion of the study. That is, a few of the students who persisted until June 1987 might subsequently drop. Also, a few students who were dropouts as of June 1987

might eventually return and graduate. Concerning the first type of error involving "persisters" who drop at a later date, it should be noted that previous research shows that dropout peaks at grade 10 or 11 and is much less frequent afterwards (Biniaminov & Glasman, 1982; Delaney & Tovian, 1972; Elliott & Voss, 1974; HLA, 1983; Inner City Dropout Study, 1985; Lee, 1972; Lloyd, 1976; McNally, 1979; Young, 1981; Yudin et al., 1973). In the current study, all students had passed this critical point by June 1987. In fact, of those students who did not fail, only those who were in grade 9 in 1984 would still have been attending high school and they should have finished grade 11 by June 1987. Thus, few students from the study are likely to have dropped after June 1987. Erroneously considering these cases to be persisters is not a major problem because a) there likely are few of them and b) the effect would be to attenuate the differences between persisters and leavers. In view of this potential attenuation, any observed differences are particularly impressive.

The second type of error (dropouts who eventually graduate) also is not as problematic as it seems at first glance. Previous research shows that few dropouts return to school and even fewer graduate (Elliott & Voss, 1974; Inner City Dropout Study, 1985; Mensch & Kandel, 1988). For example, Mensch and Kandel

estimate that only 6.2% of U.S. dropouts graduate by age 19 to 27. Clearly, not many dropouts achieve conventional graduation.

Enrollment status in June 1987 was not available for 19 Natives and 36 non-Natives so that the status of 380 Natives and 373 non-Natives was known. Of the 380 Natives, 142 had dropped and 238 had persisted. The corresponding figures for non-Natives were 64 and 309.[1] The measurement of variables, treatment of missing data (mean substitution), and analytic techniques (correlation and discriminant analysis) parallel those described previously. As in Chapter 5, because the sample size was large enough, cross-validation was used (75% calibration and 25% replication) in the Native analyses. The non-Native sample size was too small to permit the use of a holdout sample.

Results

I) Natives: Correlations with Enrollment in June 1987

The correlations presented here are based on a random sample of 75% of the Native students (n = 312: 114 dropouts, 184 persisters; 14 of unknown status were excluded).

The school-record variables for the years before the survey (1982 & 1983) were among the best predictors of status in June 1987 (OutJune87; out=1; in=0). Absenteeism and number of courses failed were positively correlated with OutJune87 ($r = .29$, $p < .001$; $r = .24$, $p < .001$; Table 1), indicating that students who had failed courses and those with much absenteeism were more prone to discontinue. Students who had low grade averages were more likely to drop out as shown by the negative correlation between average and OutJune87 ($r = -.26$, $p < .001$). Age at the time of the surveys also was correlated with OutJune87 ($r = .24$, $p < .001$). The correlation between level or stream and the criterion was $r = -.23$ ($p < .001$). Whereas only 17% in the advanced stream dropped, the figures for the general and basic categories were 37% and 71%. However, as noted in Chapter 6 it would be fallacious to interpret this association as grounds for condemning streaming. Levels of expected and desired education

Table 1: Personal and academic factors:
Summary statistics and correlations with
enrollment (OutJune87) for Natives (n=312)

Variables	M	SD	r
Age	16.0	1.2	.24[a]
Sex (female=1; male=0)	0.5	0.5	.01[ns]
Birth order	3.3	2.5	.11[ns]
Aspired socio-economic status (SES)	2.7	1.4	.14[c]
Expected SES	3.0	1.5	.14[c]
Level of education desired	15.0	2.5	-.22[a]
Level of education expected	13.9	1.8	-.29[a]
Average (self report)	69.0	7.9	-.10[ns]
Absences	14.8	9.2	.29[a]
Average (records)	60.3	8.1	-.26[a]
Number of courses failed	1.7	1.4	.24[a]
Level (academic stream)	4.1	0.4	-.23[a]

[a] $p < .001$, [b] $p < .01$, [c] $p < .05$ (two-tailed)
[ns]: not statistically significant.

also were substantially associated with OutJune87 ($r = -.29$, $p < .001$ and $r = -.22$, $p < .001$) and, as in the analyses on Outyear1 (enrollment one year later), expectancies were more highly associated than aspirations with the criterion. Though expected and desired socioeconomic status were associated with OutJune87, the correlations were low (both were .14, $p < .05$).

Of the home background characteristics (Table 2), living with both parents and number of siblings having dropped were the only variables associated with OutJune87 ($r = -.20$, $p < .001$; $r = .12$, $p < .05$). The reason why living with only one parent is detrimental is unclear, although partial correlational analysis provides some insight. With income, absenteeism, number of failures, or grade average controlled, the relation between "both parents" and the criterion did not decrease. Thus students who live with only one biological parent are not more prone to leaving by virtue of coming from less affluent homes, being absent more often or by performing worse in school. The other background items concerning language use in the home, religion, and specific information on parental employment were not statistically significant correlates of OutJune87.

Table 2: Background factors:
Summary statistics and correlations with enrollment (OutJune87) for Natives (n=312)

Variables	M	SD	r
Family size	5.4	2.2	.01[ns]
Living with both biological parents	0.6	0.5	-.20[a]
Father employed (yes/no)	0.7	0.3	.06[ns]
Paternal SES[d]	4.2	1.1	.10[ns]
Maternal SES	4.9	1.5	-.02[ns]
Total annual household income[e]	4.0	2.0	-.04[ns]
Home modernity	4.2	0.9	-.03[ns]
Household reading material	2.1	0.9	-.05[ns]
Mother's education	11.4	2.1	-.08[ns]
Father's education	10.8	2.5	-.10[ns]
Number of siblings having dropped	1.3	1.3	.12[c]

[a] $p < .001$, [b] $p < .01$, [c] $p < .05$ (two-tailed).
[ns]: not statistically significant.

[d] socio-economic status (SES) was coded 1 (professional) to 6 (unskilled).
[e] income was coded 1 (<$8,000) to 8 (>$38,000).

As can be seen in Table 3, most of the variables based on the models were strongly associated with enrollment status. The largest correlations with OutJune87 were produced by the Fishbein variables: subjective norm ($r = -.27$, $p < .001$), attitude ($r = -.23$, $p < .001$), and intent ($r = -.19$, $p < .001$). Students who had less favourable attitudes (A) and intentions (I) about being in high school one year later were less likely to have persisted. Those students for whom important others (SN) were perceived to be less encouraging also were less likely to continue. That the Fishbein variables performed as well as they did despite the lack of correspondence with the criterion is surprising. If I, A, and SN had been measured with respect to enrollment in June 1987 rather than one year later, the correlations with the criterion likely would have been much larger. Perceived value of education also was substantially associated with OutJune87 ($r = -.21$, $p < .001$), though the attributional tendencies proved to be of little value. As in previous research, and in the analysis of Outyear1, internality was related to persistence, albeit weakly ($r = -.11$, $p < .05$). None of the delay of gratification items were useful correlates.

Table 3: Model-based variables:
Summary statistics and correlations with enrollment (OutJune87) for Natives (n=312)

Variables		M	SD	r
Value of education		25.2	3.7	-.21
Expectancy of success (Motowidlo)		697.9	102.4	.02[ns]
Attributions to:	ability	15.2	3.6	-.11[c]
	effort	19.1	3.7	-.08[ns]
	context	13.2	4.3	.08[ns]
	luck	11.6	4.6	.06[ns]
	internality	34.3	5.9	-.11[c]
	externality	24.8	7.8	.08[ns]
Intent		2.5	1.2	-.19[a]
Attitude		2.4	1.1	-.23[a]
Subjective norm (SN)		2.2	1.4	-.27[a]
Estimated attitude $\sum$(b.e)/n		3.3	2.1	-.22[a]
Estimated subjective norm $\sum$(Nb.Mc)/n		8.0	5.5	-.15[c]

[a] $p < .001$, [b] $p < .01$, [c] $p < .05$ (two-tailed).
[ns]: not statistically significant.

II) Non-Natives: Correlations with Enrollment in June 1987.

The variables with the largest negative correlations with OutJune87 (indicating that low scorers were more likely to drop) were level of education expected ($r = -.34$ $p < .001$), level of education desired ($r = -.22$, $p < .001$), grade average ($r = -.32$, $p < .001$), level or stream ($r = -.26$, $p < .001$), value of education ($r = -.30$, $p < .001$), intent ($r = -.37$, $p < .001$), and attitude ($r = -.33$, $p < .001$; Tables 4 to 6). The dropout rates by level were advanced (8%), general (27%), and basic (60%). Interestingly, as in the Native analysis, intent concerning plans for the next year was a useful predictor despite the lack of correspondence with the criterion (time frames of 1 year vs 2.7 to 3.7 years). In fact, intent to be in school next Fall fared as well as years of education desired, a variable with greater correspondence with the criterion. As before, education expected produced a larger correlation than education desired (-.34 vs -.22). The variables with the largest positive correlations with OutJune87 (indicating that high scorers were more likely to drop) were age ($r = .28$, $p < .001$), number of courses failed

($r = .23$, $p < .001$), aspired and expected SES ($r = .22$ & $.23$, $p < .001$), and absenteeism ($r = .30$, $p < .001$).

Females were less likely to drop as indicated by the statistically significant, though small, correlation between gender and OutJune87 ($r = -.14$, $p < .01$). The relation between birth order and the criterion ($r = .14$, $p < .01$) shows that later borns were more prone to drop. Several of the background variables also were somewhat relevant (family size: $r = .13$, $p < .05$; number of siblings having dropped: $r = .20$, $p < .001$; living with both parents: $r = -.10$, $p < .05$; paternal employment: $r = -.17$, $p < .001$; and maternal and paternal education: $r = -.22$ and $-.19$, $p < .001$). Of the MMCS subscales, ability ($r = -.12$, $p < .05$), effort ($r = -.21$, $p < .001$) and internality ($r = -.19$, $p < .001$) were associated with OutJune87. The items designed to measure delay of gratification also were associated with enrollment status such that those who reported less ability to delay seeking pleasure were more inclined to drop out, though all correlations were less than .16.

Table 4: Personal and academic factors:
Summary statistics and correlations with
enrollment (OutJune87) for non-Natives (n=373)

Variables	M	SD	r
Age	15.5	1.1	.28[a]
Sex (female=1; male=0)	0.5	0.5	-.14[b]
Birth order	2.4	1.7	.14[b]
Aspired socio-economic status (SES)	2.4	1.4	.22[a]
Expected SES	2.8	1.6	.23[a]
Level of education desired	15.4	2.5	-.22[a]
Level of education expected	14.5	1.9	-.34[a]
Average (self report)	76.0	46.7	-.09[ns]
Absences	7.5	6.3	.30[a]
Average (records)	69.1	8.0	-.25[a]
Number of courses failed	0.7	1.0	.23[a]
Level (academic stream)	4.5	0.4	-.26[a]

[a] $p < .001$; [b] $p < .01$, [c] $p < .05$ (two-tailed).
[ns]: not statistically significant.

Table 5: Background factors:
Summary statistics and correlations with enrollment (OutJune87) for non-Natives (n=373)

Variables	M	SD	r
Family size	4.7	1.4	.13[c]
Living with both biological parents	0.8	0.4	-.10[c]
Father employed (yes/no)	0.9	0.2	-.17[a]
Paternal SES[d]	3.6	1.4	.08[ns]
Maternal SES	4.8	1.7	-.02[ns]
Total annual household income[e]	5.4	2.0	-.07[ns]
Home modernity	4.6	0.6	.02[ns]
Household reading material	2.5	0.7	.01[ns]
Mother's education	12.5	2.3	-.22[a]
Father's education	12.1	2.6	-.19[a]
Number of siblings having dropped	0.4	0.5	.20[a]

[a] $p < .001$, [b] $p < .01$, [c] $p < .05$ (two-tailed).
[ns]: not statistically significant.

[d] socio-economic status (SES) was coded 1 (professional) to 6 (unskilled).
[e] income was coded 1 (<$8,000) to 8 (>$38,000).

Table 6: Model-based variables:
Summary statistics and correlations with enrollment (OutJune87) for non-Natives (n=373)

Variables		M	SD	r
Value of education		25.9	3.0	-.30[a]
Expectancy of success (Motowidlo)		728.2	99.8	-.04[ns]
Attributions to:	ability	15.2	3.6	-.12[c]
	effort	18.7	3.7	-.21[a]
	context	14.3	4.4	.02[ns]
	luck	12.0	4.8	.06[ns]
	internality	34.0	5.9	-.19[a]
	externality	26.2	7.9	.05[ns]
Intent		2.7	0.9	-.37[a]
Attitude		2.6	0.8	-.33[a]
Subjective norm (SN)		2.5	1.1	-.14[b]
Estimated attitude Σ(b.e)/n		4.1	2.0	-.26[a]
Estimated subjective norm Σ(Nb.Mc)/n		10.1	5.1	-.26[a]

[a] $p < .001$, [b] $p < .01$, c $p < .05$ (two-tailed).
[ns]: not statistically significant.

III) Native Discriminant Analyses

The next step was to determine the importance of the variables in a multivariate context. As in previous chapters, several versions of the general expectancy-value model were tried and compared with other models including Fishbein's, the school records, and a strictly stepwise approach.

i) Expectancy-Value Approaches

The most general version of the E-V approach used the constructs internality, externality, and value of education. Internality and externality were forced to enter first and then value of education was allowed entry so that it was possible to determine if value of education supplemented the expectancies. As anticipated the value construct supplemented expectancies ($p < .01$). In fact, the standardized discriminant coefficients listed in Table 7 show that value of education (.86) was a better discriminator of persisters from dropouts than were the expectancies (-.15 and .25). The centroids (dropouts: -.28 and persisters: .17) indicate that students with higher scores on the function were more likely to continue. That is, high internality, high value of education, and low externality were associated with greater perseverance. Together, the three variables produced a

Table 7a: Discriminant analyses on OutJune87 for Natives:
Standardized discriminant function coefficients

Variables	Eq1	Eq2	Eq3	Eq4	Eq5
Externality (Ext)	-.15				
Internality (Int)	.25				
Value of Education (Val)	.86	.82		dne[d]	dne
Ability		.39			
Effort		-.07			
Context		-.36			
Luck		.11			
Intent (I)				dne	dne
Attitude (A)				.20	-.20
Subjective norm (SN)				.39	-.40
Estimated A ($\sum$(b.e)/n)				dne	dne
Estimated SN ($\sum$(Nb.Mc)/r					
Education desired				dne	dne
Education expected				.27	-.28
Age			.51	-.43	.44
Absenteeism (Abs)			.42	-.31	.34
Average (Avg)			-.21	.09	dne
Failures (Fail)			.20	-.17	.24
Level (Lev)			-.22	.04	dne
Group centroids: D[e]:	-.28	-.30	.53	-.66	.66
P:	.17	.18	-.32	.41	-.41
Validation: Can Corr:	.21[b]	.23[b]	.38[a]	.46[a]	.46[a]
Hit rate:	64.1%	63.0%	66.4%	68.1%	67.5%
Cross-valid: Hit rate:	64.7%	62.4%	65.9%	60.0%	61.2%

[a] p< .001, [b] p< .01, [c] p< .05 (two-tailed).
[ns]: not statistically significant.

[d] dne: the variable did not enter in the stepwise analysis.
[e] D: dropout, P: persister.

Table 7b: Discriminant analyses on OutJune87 for Natives:
Unstandardized discriminant function coefficients

Variables	Eq1	Eq2	Eq3	Eq4	Eq5
Externality (Ext)	-.02				
Internality (Int)	.04				
Value of Education (Val)	.24	.23		dne[d]	dne
Ability		.11			
Effort		-.02			
Context		-.04			
Luck		.02			
Intent (I)				dne	dne
Attitude (A)				.19	-.19
Subjective norm (SN)				.29	-.29
Estimated A ($\sum$(b.e)/n)				dne	dne
Estimated SN ($\sum$(Nb.Mc)/r					
Education desired				dne	dne
Education expected				.15	-.16
Age			.41	-.35	.36
Absenteeism (Abs)			.05	-.04	.04
Average (Avg)			-.03	.02	dne
Failures (Fail)			.14	-.12	.17
Level (Lev)			-.50	.08	dne
Group centroids: D[d]:	-.28	-.30	.53	-.66	.66
P:	.17	.18	-.32	.41	-.41
Validation: Can Corr:	.21[b]	.23[b]	.38[a]	.46[a]	.46[a]
Hit rate:	64.1%	63.0%	66.4%	68.1%	67.5%
Cross-valid: Hit rate:	64.7%	62.4%	65.9%	60.0%	61.2%

[a] p< .001, [b] p< .01, [c] p< .05 (two-tailed).
[ns]: not statistically significant.

[d] dne: the variable did not enter in the stepwise analysis.
[e] D: dropout, P: persister.

canonical correlation of .21 and a classification accuracy of 64.1% in the derivation group and 64.7% in the holdout sample. These hit rates clearly are higher than the 50% rate that would be achieved by chance.

Next a more differentiated version of the E-V model was examined. Attributions to effort, context, luck, and ability were entered together along with value of education. Again, value of education predominated. Interestingly, though both ability and effort are components of internality, they had coefficients that were quite different (.39 vs -.07) as did context and luck (which comprise externality). Examination of the canonical correlation (R = .23) and the hit rate (63%) suggests that this equation was performing about as well as the more general model. Furthermore, the model based on the locus of control subscales and value of education cross-validated well (62.4% hit rate). The differentiated model shows that the ability and context components of the expectancies are responsible for the associations of internality and externality with the criterion. Those students who use ability attributions and those who tend to not use context attributions (e.g., good marks attributed to easy test) were more likely to persist. For this sample at least, effort and luck attributions seem to be of lesser importance.

Given that both the specific and general version produce similar classification results, the classification matrix is presented only for the specific model.

Table 8: Classification based on ability, effort, context and value of education (Native).

		Predicted	
		Out	In
Actual Status	Out	59a	53b
	In	56c	127d

As mentioned, the overall hit rate was 63% ((a + d)/(a + b + c + d)). Of those students predicted to persist, 29.4% (b/ (b + d)) discontinued. By contrast, among those predicted to drop, 51% left. Clearly, students predicted to drop were at significantly greater risk of leaving (51% versus 29.4%).

The simple version of the Fishbein model in which enrollment status is regarded as entirely volitional would predict OutJune87 solely on the basis of the association between intent and OutJune87 ($r = -.19$, $p < .001$). This relation is of similar magnitude to the canonical correlations found for the

general expectancy-value approaches (R = .21 and .23) but would probably be larger had the predictor corresponded with the criterion as mentioned earlier.

ii) School Records

In the next analysis based on the school records (age, absenteeism, average, stream, and number of failures), the variables were entered simultaneously (standard discriminant analysis; Eq 3). Table 7 shows that age and absenteeism had the largest standardized discriminant coefficients (.51 and .42). The dropout group had a larger centroid than the persisters (.53 vs -.32). Three variables had positive standardized discriminant coefficients (absenteeism, age, and failures), indicating that large scores were associated with dropout, while the other two (average and level) had negative coefficients. In the latter case, high scores were associated with persistence. Together, the five variables produced a canonical correlation of .38 and a classification accuracy of 66.4%. The equation cross-validated well as indicated by a 65.9% hit rate in the hold-out group. Apparently, the school record information was more effective than the approaches based on the E-V model. The classification matrix for the school-based predictors is shown in Table 9.

Table 9: Classification based on school records (Native)

		Predicted	
		Out	In
Actual	Out	62	50
	In	49	134

Of those students predicted to persist, 27.2% discontinued. By comparison, 55.9% of those predicted to leave actually did so. Thus, those students who were predicted to drop were at greater risk of dropping (55.9% vs 27.2%).

iii) Supplementing the School Records

In the next analysis (see Table 7, Eq 4), the school record information was entered first (as a block), then other variables with correlations > |.19| with OutJune87 were allowed stepwise entry. The other variables that entered were attitude, subjective norm, and education expected. In the resulting equation,

persisters had a larger centroid (.41) than dropouts (-.66), indicating that high scores were associated with persistence. The analysis produced a canonical correlation of .46 and a hit rate of 68.1%. Though these values are larger than those produced by any approach so far, the equation lost some of its efficacy on cross-validation (68.1 vs 60.0% accuracy). Therefore, it might be misguided to regard this equation as the best.

iv) Stepwise

The final analysis (see Table 7, Eq 5) was strictly stepwise. All variables with correlations > .19 with OutJune87 were used. Six variables entered, producing a canonical correlation of .46 and a hit rate of 67.5%. However, as in the previous analysis, the equation did not perform as well in the holdout sample (61.2%). Because of this considerable shrinkage, equation 5 probably is not really superior to equations 1,2, and 3 as the analyses based on the derivation group suggest.

IV) Non-Native Discriminant Analyses

i) Expectancy-Value Models

In the first analysis based on the general expectancy-value model (Table 10a, Eq 1), value of education supplemented internality and externality, and it had the largest standardized discriminant coefficient (.83). Paralleling the Native results, internality had a larger discriminant coefficient than externality (.43 vs -.16). Together, the three variables produced a canonical correlation of .33 and a hit rate (for the derivation group) of 72%. As mentioned, the sample was not large enough to cross-validate.

The differentiated E-V approach (Eq 2) was examined next. Value of education had the largest coefficient again. Supporting the partitioning of internality, effort and ability had coefficients that differed substantially (.38 vs .17). Effort was revealed to be the most important of the attributional tendencies. Students who made extensive use of effort as an explanation for academic outcomes were more likely to persist as were those who highly valued education. Together the five variables had a canonical correlation with OutJune87 of .34 and a hit rate of

Table 10a: Discriminant analyses on OutJune87 for non-Natives: Standardized discriminant function coefficients

Variables	Eq1	Eq2	Eq3	Eq4[d]	Eq5
Externality (Ext)	-.16				
Internality (Int)	.43			dne[e]	dne
Value of education (Val)	.83	.80		-.24	-.24
Ability		.17			
Effort		.38		-.18	-.18
Context		-.08			
Luck		-.05			
Intent (I)				-.16	-.16
Subjective norm (SN)				-.21	-.21
Education expected				-.19	-.20
Age			.57	.32	.33
Absenteeism (Abs)			.46	.33	.32
Average (Avg)			-.17	-.01	dne
Failures (Fail)			.10	.13	.13
Level (Lev)			-.27	.05	dne
Siblings having dropped				.24	.25
Desired SES				.11	.11
Maternal education				-.15	-.19
Paternal education				-.12	dne
Group centroids: D[f]:	-.76	-.77	.99	1.40	1.40
P:	.16	.16	-.21	-.30	-.30
Canonical correlation	.33[a]	.34[a]	.42[a]	.54[a]	.54[a]
Hit rate	72.0%	72.4%	77.5%	81.0%	81.8%

[a] p< .001, [b] p< .01, [c] p< .05 (two-tailed).
[ns]: not statistically significant.

[d] The other variables that did not enter Eq 4 & 5 were attitude, estimated attitude, estimated subjective norm, expected SES, and education desired.
[e] dne: the variable did not enter in the stepwise analysis.

Table 10b: Discriminant analyses on OutJune87 for non-Natives: Unstandardized discriminant function coefficients

Variables	Eq1	Eq2	Eq3	Eq4[d]	Eq5
Externality (Ext)	-.02				
Internality (Int)	.07			dne	dne
Value of education (Val)	.29	.28		-.08	-.08
Ability		.05			
Effort		.10		-.05	-.05
Context		-.02			
Luck		-.01			
Intent (I)				-.19	-.19
Subjective norm (SN)				-.15	-.15
Education expected				-.11	-.11
Age			.55	.31	.32
Absenteeism (Abs)			.07	.05	.05
Average (Avg)			-.02	-.00	dne
Failures (Fail)			.10	.13	.12
Level (Lev)			-.63	.12	dne
Siblings having dropped				.52	.53
Desired SES				.08	.08
Maternal education				-.07	-.09
Paternal education				-.05	dne
Group centroids: D[e]:	-.76	-.77	.99	1.40	1.40
P:	.16	.16	-.21	-.30	-.30
Canonical correlation	.33[a]	.34[a]	.42[a]	.54[a]	.54[a]
Hit rate	72.0%	72.4%	77.5%	81.0%	81.8%

[a] $p < .001$, [b] $p < .01$, [c] $p < .05$ (two-tailed).
[ns]: not statistically significant.

[d] The other variables that did not enter Eq 4 & 5 were attitude, estimated attitude, estimated subjective norm, expected SES, and education desired.
[e] D: dropout, P: persister.

72.4%. For comparison, it should be noted that intent alone was more highly related to OutJune87 (r = -.37).

ii) School Records

Equation 3 employed the variables from the school records. The resulting equation was keyed towards dropouts, who had a larger centroid than persisters (.99 vs -.21). Being overage, having considerable absenteeism, and course failures were associated with dropping, while a high average and placement in higher streams were conducive to persistence. The two variables with the strongest relations with the criterion, statistically controlling for the other variables, were age and absenteeism. The record-based approach was quite successful as shown by a canonical correlation of .42 with OutJune87 and an impressive hit rate (77.5%; see Table 11).

Table 11: Classification based on school records (non-Native)

		Predicted	
		Out	In
Actual	Out	39	26
	In	58	250

Whereas those students who were predicted to persist had a 9.4% probability of dropping, their counterparts for whom dropout was anticipated had a 40.2% risk (Table 11).

iii) Supplementing the School Records

The next analysis (Eq 4) concerned whether the school-record variables could be supplemented. The five variables from the records were forced in on step 1 and then all variables having correlations > |.19| were allowed to enter stepwise. Intent was the first to enter and was followed by education expected, number of siblings who dropped, subjective norm, value of

education, maternal education, effort, paternal education, and finally aspired socioeconomic status. The most important variables in this multivariate context were age (.32), absenteeism (.33), siblings having dropped (.24), value of education (-.24), and subjective norm (-.21). The 14 variables produced a canonical correlation of .54 and the hit rate was 81%. It is noteworthy that siblings having dropped is related to OutJune87 even controlling for parental education, performance in school, and expectancies and aspirations. Given that the hit rate for equation 4 is higher than that for the strictly record-based approach (81% vs 77.5%), it would seem that it was useful to consider variables in addition to those available in the school records.

iv) Stepwise

Unlike the previous approach in which the school-record variables were given priority by being entered first, the next analysis (Eq 5) was strictly stepwise with all variables having correlations with June87 > |.19| allowed entry. The resulting equation, which was very similar to equation 4, is shown in Table 11. The canonical correlation was .54 and the hit rate was 81.8%. Although the success of equation 4 and

equation 5 compares favourably with many published results, it should be realized that it was not possible to test for robustness via cross-validation. Nevertheless, the similarity between the coefficients in equation 4 and 5, despite the use of some different variables, lends some support to their stability. Furthermore, shrinkage is less of a problem in situations like the current one in which the case/variable ratio of approximately 30 to 1 is generally considered good (e.g., Tabachnick & Fidell, 1983).

The final analysis was conducted with parsimony in mind and tested how a subset of the 11 variables that entered the stepwise analysis would fare. It was reasoned that because the Native stepwise analysis revealed that no more than six variables were needed, a similar number of variables might suffice for non-Natives; use of 11 variables might have been "overkill". Therefore, this stepwise analysis was restricted to the six variables that first entered in the unrestricted analysis: intent(I), expected education(Edexp), age, absenteeism(Abs), number of siblings having dropped(Sibsdrop), and value of education(Val). The discriminant function that resulted using standardized discriminant coefficients was:

$$\text{OutJune87} = -.25\text{I} - .33\text{Edexp} + .37\text{Age} + .36\text{Abs} + \\ +.30\text{Sibsdrop} - .29\text{Val}$$

The canonical correlation for this equation was not substantially smaller than the one based on all 11 variables (.51 vs .54). Furthermore, the hit rates were comparable (6 variables: 80.7% ; 11 variables: 81.8%). Compared to the 11 variable model, the shortened version has the advantage of having less potential for problems with multicollinearity, and has a more favourable case to variable ratio (62 to 1 vs 34 to 1). The larger case to variable ratio helps to guard against capitalization on chance and ensuing shrinkage that all too often plague stepwise analyses (Berk, 1983; Cohen & Cohen, 1983; Tabachnick & Fidell, 1983). Thus, the six variable approach is preferred.

V) Native/non-Native Differences

Perusal of Tables 1 to 6 shows that there were some interesting differences in the correlations between the predictors and enrollment several years later. Among non-Natives but not Natives, males were more likely to drop than females. It is conceivable that males might experience more pressure to enter the work-force. A shortage of work might tend to keep many

Natives males in school who otherwise might drop, thereby eliminating a potential sex difference. Although the above scenario seems plausible, partial correlation analyses do not support the notion that non-Native males, compared to non-Native females, drop more frequently because of increased pressure to work. When importance of holding a job during the school year was partialled, the sex-dropout relation remained unchanged. Partial correlation analysis also ruled out the possibility that males drop in greater numbers than females because they receive less encouragement (i.e., subjective norm) to continue.

Despite similar standard deviations on internality for the two ethnicities, the non-Native correlation was higher (-.19 vs -.11). This difference could be the result of Natives being more likely to encounter obstacles (e.g.,low grades) to their plans. In such a scenario, feeling in control of academic outcomes might not translate into greater persistence. Alternatively, the difference in the correlation coefficients might simply indicate that the MMCS is more valid for populations similar to the ones it was developed on (non-Natives).

Parental education and employment status (employed/unemployed) were of greater importance among non-Natives even though this group exhibited less

variability on the predictors. To understand why education was more important for non-Natives, it is necessary to know how the influence of education on persistence is mediated. Parental education was associated with higher income for both Natives and non-Natives (r = .26 & .27), but it will be recalled that income was unrelated to persistence in both ethnic groups. Therefore, parental education was not associated with greater perseverance among non-Natives by being associated with the advantages of higher income. Another potential route by which parental education might have acted is via encouragement for academic matters. However, it seems unlikely that only highly educated non-Natives would encourage their offspring to graduate. It should be noted that parental education also has been found to be of little value in predicting educational attainment among Blacks (Hill, 1979; Stroup & Robins, 1972; Timberlake, 1982). Parental employment might be more important for non-Natives than for Natives because unemployment is conceivably more stigmatizing among the former for whom it is less common. Natives also might be less adversely affected by unemployment because the presence of strong social support from family and friends might serve to lessen the impact.

Intent and attitude were more strongly related to OutJune87 for non-Natives (r = -.37 & -.33) than Natives (-.19 & -.23), a finding that is noteworthy because Natives had larger standard deviations on these variables (the influence of standard deviations on r's was mentioned in Chapter 5). However, subjective norm was more relevant to persistence among Natives than non-Natives (r = -.27; r = -.14). Presumably, social influences are more important for Natives, but the larger coefficient for SN may in part, be caused by the larger standard deviation for Natives (1.4 vs 1.1).

The multivariate results were quite similar for Natives and non-Natives as examination of Table 7 and Table 10 reveals. In equation 1 (internality, externality, and value of education), value of education had the largest discriminant coefficient, and internality had the second largest for both groups. By contrast, the results differed in the more differentiated form of the E-V model. For Natives, the most important variables after value of education were ability and context. Among non-Natives, effort followed value of education in terms of importance. Equation 3, concerning the school records, produced similar results for the two groups, both in terms of the relative magnitude of the coefficients and their signs. The stepwise results that occurred when all

variables with correlations > |.19| were allowed to enter were quite similar, though more variables entered for non-Natives (11 vs 6). Subjective norm was determined to be important in a multivariate context (Eq 5) for Natives, but of lesser importance for non-Natives. Both the univariate and multivariate analyses indicated that what others encourage is especially important for Natives.

Another major difference between the Native and non-Native results was that the canonical correlations and hit rates were higher for non-Natives. The best equation for Natives had a canonical correlation of .38 and a hit rate of 66% compared to .54 and 81% for non-Natives. Although it is possible that performance was better for non-Natives than Natives because most of the measures were developed and standardized among non-Native populations, this seems unlikely for three reasons. First, measures that were constructed for this research were designed so as to foster cross-cultural comparability (see Chapter 4). Second, the Natives in the current study have probably had more contact with non-Native culture than any of the other Native groups in Canada (Farmer, 1988). Finally, Native persistence was predicted with considerable success for the 1 year criterion (outyear1; 81 - 82% accuracy). If the measures had been faulty, they would

have been of little use for predicting both criteria rather than just one of them. A more plausible explanation for the difference in predictability is that some of the factors relevant to long-term Native persistence may not have been considered. It has been claimed that Natives often have ambivalent feelings toward education because on the one hand they realize that training is useful to employment prospects but on the other they think that education can cause them to lose their Indian identity and way of life (Brooks, 1975). Future research should examine whether dropouts, compared to persisters, are more fearful of becoming "brown white men". Furthermore, whether Natives plan to eventually live on or off reserve may be a potentially important factor. It is possible that the relation between educational attainment and occupational success varies by residence. Another possibility for the difference in the success of the Native and non-Native analyses is that Natives may encounter more obstacles to fulfilling their intentions and plans. For example, Natives' intentions might be counteracted if their marks drop considerably or if one or more of their parents suddenly become unemployed. Presumably, the non-Native situation is less volatile thereby making them more predictable than Natives.

VI) Additional Analyses

i) The Use of Priors

The ratio of dropouts to persisters was .38/.62 among Natives and .17/.83 for non-Natives. Nevertheless, in the previous analyses equal prior probabilities for dropouts and persisters were used. Thus, the different base rates for dropout and persistence were not used in classifying cases. Ignoring these prior probabilities (priors) is known to often produce conservative estimates of correct classification (Pascarella, Duby, Miller, & Rasker, 1981, p. 334). To test whether classification accuracy could be improved by taking the different group proportions into account, several analyses were conducted using prior probabilities.

For Native students, it was shown previously that the variables from the school records (Table 7, Eq 3) and the expectancy value model (Eq 2) were useful in differentiating dropouts from persisters. Accordingly, these two approaches were selected to be employed with the use of priors. Use of the predictors from the school records resulted in a classification accuracy of 68.1% with priors versus 66.4% without them in the derivation sample. Similarly, the E-V approach yielded figures of 63.8% versus 63.0%. The accuracy

rates from the cross-validation groups corroborated that the use of priors helped only marginally. The results with and without priors probably were similar because the ratio of .38/.62 is not much different from the one employed originally (.5/.5).

For non-Natives, two predictive approaches also were used, these being a) expectancy-value, and b) intent, education expected, age, absenteeism, number of siblings having dropped, and perceived value of education. The expectancy-value approach performed better when the prior probabilities of .17/.83 were used (83.4% versus 72.4%). The second approach (b) also was more successful when the different priors were taken into account (86.9% versus 80.7%). Thus, in contrast to the Native analyses, those for non-Natives show that the use of priors improved <u>overall</u> classification accuracy. However, employing priors decreased the accuracy of predictions for <u>actual dropouts</u> as shown in Table 12. The figures when prior probabilities were not used are unbracketed whereas those based on the use of priors are enclosed in brackets. Row 2 in the table shows that dropouts were classified correctly more often without priors (55.4%) than with them (35.4%). To reiterate, the use of priors improved the classification of persisters and the overall classification rates (80.7% versus 86.6%)

but was detrimental to predicting the status of actual dropouts.

Table 12: Classification Accuracy for Six Variables with and without Priors (non-Native)

	Predicted	
	In	Out
Actual		
In (n=308) (persisters)	86.0% (97.4%)	14.0% (2.6%)
Out (n=65) (dropouts)	44.6% (64.6%)	55.4% (35.4%)

It is worth noting that fewer students were predicted to drop when priors were used (32 versus 79). Since the group with the lower base rate (dropout) is actually of greater concern, employing priors is somewhat counter to the direction of the thesis. As noted by Norusis (1985), it is sometimes more important to increase the predictive accuracy for the infrequent group at the expense of overall predictive accuracy.

ii) Dichotomized Versions of Parental Education

In Chapter 3, it was mentioned that an eta appreciably larger than the Pearson correlation indicates that the relation is non-linear, and that cross-tabulation can be used to gain insight into the nature of the relationship. In this investigation, when cross-tabulation revealed a simple non-linear pattern between two variables, effort was devoted to trying to "fit" the relation. However, few variables with an eta larger than r had simple relationships with the criterion. An exception was parental education. Examination of the cross-tabulation between education of parent (maternal or paternal) and OutJune87 revealed what could be described as a threshold effect. Adolescents from households with parents who had grade 11 or less compared to those with grade 12 or more were much more likely to drop out. When education was dichotomized at grade 11, the correlation with the criterion increased markedly for non-Natives but not for Natives, for whom education was not statistically significant in either case. Among non-Natives, the continuous form of education correlated -.20 with the criterion compared with r = -.28 for the dichotomous version (no mean substitution). The corresponding figures for maternal education were -.22 and -.32. It

should be noted that the correlations were higher for the dichotomous versions despite smaller standard deviations (paternal: .4 vs 2.7; maternal: .3 vs 2.4). Another reason for suspecting that the differences were genuine is that other researchers have found data supporting the usefulness of a dichotomous approach (Borus & Carpenter, 1984; McNally, 1979). In the current research, the partition (11 or less vs 12 or more) was made at the grade 11 level because one of the seven categories that had been used in the items on parental education was grade 12 or less. It was not clear whether students who chose this category had parents who had dropped or not. To be conservative in the assignment of a dropout designation, parents cited as having grade 12 or less were treated as graduates. A better category than grade 12 or less would have been <u>less</u> than grade 12. The value of dichotomization might have been somewhat diminished in this research because the separation of parents as dropouts or graduates was not perfect (i.e., 6 categories enabled the determination of whether parents were dropouts or peristers whereas one did not). To reiterate, counter to the conventional wisdom that in general it is better to use measures that assess gradations, the current research showed a dichotomous version of parental education to be more useful than the more continuous

measure. The finding is not surprising since for non-Natives, grade 12 is regarded as the minimal level at which one's education can be considered complete and is a credentialling point.

Given that parental education fared better when dichotomized (for non-Natives), it seemed worthwhile to give the dichotomized education variables a chance to enter in a stepwise analysis to determine whether the results would differ from those based on the continuous approach (Equation 5). All variables (now including dichotomized versions of maternal and paternal education) having correlations > |.19| with OutJune87 were allowed entry. Eleven variables entered, two of which were maternal and paternal education, producing a multiple correlation of .56 and a hit rate of 80.7%. The importance of parental education is attested to in three ways:

a) maternal education entered on the second step of the analysis (after intent)

b) paternal education also entered

c) maternal education (despite the presence of paternal education in the equation) had one of the largest standardized discriminant function coefficients (-.28), only exceeded in magnitude by age (.29), value of education (-.29) and absenteeism (.31).

These results are somewhat in contrast to those based on <u>years</u> of parental education, where maternal education was relatively unimportant compared with

other variables, and show the potential value of dichotomizing the variable. Future investigators also should compare dichotomization with the continuous treatment to determine whether this finding is a general one.

iii) The Individual Fishbein Items

It will be recalled that from the Fishbein perspective, attitudes and subjective norms determine intentions (see Chapter 2). Thus, the examination of attitudes and subjective norms is useful in understanding the basis for individuals' intentions and ultimately their behaviour. A deeper appreciation is available by tracing the determinants of attitudes and subjective norms, which are respectively beliefs(b) and evaluations(e); and normative beliefs(Nb) and motivation to comply(Mc). In areas other than dropout, comparison of different groups (e.g., breast vs bottle feeders) on beliefs, evaluations, normative beliefs, and motivation to comply has been informative (see Bagozzi, 1981; Brinberg & Cummings, 1984; Fishbein, 1979; Manstead, Plevin, & Smart, 1984; Toneatto & Binik, 1987) and has provided insight into how attitudes and behaviour might be changed. In the current research, because intentions, attitudes, and

subjective norms were useful to understanding academic persistence, dropouts and persisters were compared on these more "distal components" (b, e, Nb, Mc) of the model.

Normative beliefs and motivation to comply each were assessed using eight items. The referents or important others were sisters, brothers, religion, friends, grandparents, parents, teachers, and aunts and uncles. For each of these potential influences, the respondents indicated whether the "person" thought they should attend high school the next Fall. A 7-point scale (coded -3 to +3, in accordance with Fishbein guidelines) anchored by strongly agree and strongly disagree was used for each of the items. The students also indicated their general motivation to comply (coded 1 to 7) with each of the eight referents. Fifteen items were used to assess beliefs. On each of these, the students were asked to respond to scales with likely (+3) and unlikely on the poles (-3). The corresponding items for the evaluations of the outcomes were similar but concerned how good (+3) or bad (-3) the various outcomes were perceived to be.

T-tests (two-tailed) were used to assess the statistical significance of differences in the mean responses of dropouts and persisters. The pooled variance was used if the two groups did not have

variances on the independent variables that were statistically different. Otherwise, the groups' separate variances were used. With 46 comparisons, it is likely that the null hypothesis would be falsely rejected (type 1 error) in a few cases, thereby raising the overall (investigation-wise alpha) above the conventional levels of .05 or .01. To prevent this "alpha inflation", the Bonferroni procedure was used. In this method, with 46 comparisons, an overall alpha of .05, and a sample size of more than 370, a t value of 3.3 is statistically significant (Wike, 1971, Table I, p. 216). Although the Bonferroni procedure increases the likelihood of type 2 errors (not rejecting false null hypotheses), this disadvantage was deemed to be more than offset by a lower likelihood of the more serious type 1 errors.

a) Natives

Dropouts perceived their sisters to be less encouraging ($M = 1.6$ vs 2.1; $t = 3.5$, $p < .001$) but did not differ significantly from persisters on any of the other normative beliefs. As anticipated, dropouts and persisters did not differ in their desire to comply with important others.

Table 13 shows that persisters and dropouts differed on several beliefs. Dropouts thought that quarrels with teachers were more likely (item 3). Low marks (item 2) also were regarded as more likely by dropouts. Those who discontinued felt that education was less likely to make make them knowledgeable or intelligent (item 13). Furthermore, dropouts perceived education to be less instrumental concerning employment, both in terms of obtaining a job (item 4) and getting the career of one's choice (item 9). The two groups did not differ on any of the other beliefs. Furthermore, dropouts and persisters evaluated the outcomes similarly (Table 14); there were no significant differences on values.

Table 13: Native dropouts and persisters compared on perceived likelihood of potential outcomes of attending high school

	Dropouts (n=142)		Persisters (n=238)		
Outcome	M	SD	M	SD	t
Arguments & disagree. with students	-0.9	1.9	-1.4	1.8	-2.1
Low marks	-1.1	1.7	-1.8	1.5	-3.6
Arg. & disagreements teachers	-1.0	1.9	-1.6	1.7	-3.3
Getting a job	1.7	1.6	2.3	1.1	4.0
Higher education	2.1	1.6	2.5	1.1	2.9
Enjoyable activities	1.1	2.0	1.3	2.0	1.3
Useful skills & habits	2.1	1.3	2.4	1.1	2.1
Boredom	-0.1	2.0	-0.5	1.9	-1.9
Career of choice	1.5	1.7	2.1	1.2	4.0
Reduced chances of job during the year	0.5	2.1	0.2	2.2	-1.0
Making new friends	1.8	1.7	2.0	1.5	1.4
Reduced social life	-0.7	2.0	-0.9	2.0	-0.9
Knowledgeability	1.6	1.5	2.1	1.3	3.3
Being with friends	1.8	1.8	2.0	1.6	1.2
Decreased spare time	0.2	2.2	-0.2	2.2	-1.8

Note. Using the Bonferroni correction for multiple comparisons, a t-value of 3.3 is significant

Table 14: Native dropouts and persisters compared on <u>evaluations</u> of potential outcomes of attending high school

	Dropouts (n=142)		Persisters (n=238)		
Outcome	M	SD	M	SD	t
Arguments & disagree. with students	-0.5	1.7	-0.8	1.6	-2.1
Low marks	-2.2	1.1	-2.2	1.2	0.0
Arg. & disagreements teachers	-1.5	1.7	-1.5	1.7	-0.2
Getting a job	2.3	1.1	2.4	1.2	1.2
Higher education	2.0	1.3	2.2	1.2	1.6
Enjoyable activities	1.2	1.7	1.5	1.8	1.7
Useful skills & habits	2.2	1.0	2.4	0.9	1.9
Boredom	-1.7	1.5	-1.5	1.5	1.0
Career of choice	2.4	1.0	2.4	1.1	0.4
Reduced chances of job during the year	0.7	1.8	-0.4	1.9	1.1
Making new friends	1.9	1.4	2.3	1.1	2.7
Reduced social life	-0.9	1.9	-1.4	1.8	-2.5
Knowledgeability	1.6	1.5	2.0	1.4	2.2
Being with friends	2.3	1.0	2.5	0.9	2.4
Decreased spare time	0.2	2.3	-0.4	2.3	-2.4

<u>Note.</u> Using the Bonferroni correction for multiple comparisons, a t-value of 3.3 is significant

b) Non-Natives

Among non-Natives, dropouts reported less encouragement from their sisters ($M = 1.5$) than did persisters ($M = 2.3$), $t = 3.6$, $p < .001$). Parents of dropouts also seem to be less supportive concerning educational persistence ($M = 2.1$ vs 2.8, $t = 3.5$, $p < .001$). Although dropouts often had less desire to comply with the wishes of others, only one difference reached statistical significance. Dropouts had less motivation to comply with teachers ($M = 3.6$) compared to persisters ($M = 4.8$, $t = 4.9$, $p < .001$).

As can be seen in Table 15, dropouts viewed low marks, arguments and disagreements (with both teachers and students), and boredom as more likely. Although there were no significant differences on the other 11 beliefs, dropouts had a tendency to perceive positive outcomes (e.g., obtaining career of choice) as less likely to be associated with attendance, and negative outcomes to be more likely (e.g., decreased spare time). The two groups exhibited no differences in their evaluations of the various outcomes (Table 16).

Table 15: Non-Native dropouts and persisters compared on perceived likelihood of potential outcomes of attending high school

Outcome	Dropouts (n=65) M	Dropouts (n=65) SD	Persisters (n=308) M	Persisters (n=308) SD	t
Arguments & disagree. with students	-0.6	2.2	-1.6	1.7	-3.5
Low marks	-1.1	1.9	-1.9	1.4	-3.6
Arg. & disagreements teachers	-0.6	2.3	-1.7	1.8	-3.8
Getting a job	2.2	1.5	2.4	1.0	1.2
Higher education	2.2	1.7	2.7	0.9	2.5
Enjoyable activities	1.7	1.9	2.0	1.5	1.3
Useful skills & habits	1.9	1.8	2.5	1.0	2.6
Boredom	0.4	2.2	-0.5	2.0	-3.4
Career of choice	1.6	1.9	2.1	1.2	2.0
Reduced chances of job during the year	0.9	2.3	0.1	2.3	-2.6
Making new friends	2.0	1.5	2.2	1.3	1.0
Reduced social life	-0.8	2.1	-1.2	1.9	-1.4
Knowledgeability	1.7	1.8	2.4	0.9	3.1
Being with friends	2.1	1.5	2.6	1.0	2.2
Decreased spare time	0.8	2.2	0.3	2.1	-1.7

Note. Using the Bonferroni correction for multiple comparisons, a t-value of 3.3 is significant

Table 16: Non-Native dropouts and persisters compared on evaluations of potential outcomes of attending high school

Outcome	Dropouts (n=65) M	Dropouts (n=65) SD	Persisters (n=308) M	Persisters (n=308) SD	t
Arguments & disagree. with students	-0.5	2.0	-1.1	1.6	-2.4
Low marks	-2.1	1.3	-2.3	1.0	-1.1
Arg. & disagreements teachers	-1.1	2.0	-1.7	1.6	-2.4
Getting a job	2.6	1.1	2.7	0.7	1.2
Higher education	1.9	1.6	2.5	1.1	2.6
Enjoyable activities	1.7	1.7	2.0	1.4	1.5
Useful skills & habits	2.0	1.5	2.5	1.0	2.3
Boredom	-1.6	1.7	-1.9	1.3	-1.4
Career of choice	2.5	1.1	2.7	0.7	1.2
Reduced chances of job during the year	-1.1	2.0	-1.2	1.6	-0.3
Making new friends	2.5	1.0	2.5	0.9	0.3
Reduced social life	-1.7	1.6	-1.9	1.5	-0.8
Knowledgeability	2.0	1.5	2.4	1.0	2.0
Being with friends	2.5	1.1	2.5	0.9	-0.0
Decreased spare time	-0.9	2.2	-0.7	2.1	0.9

Note. Using the Bonferroni correction for multiple comparisons, a t-value of 3.3 is significant

Summary and Discussion

For Natives, the factors shown to be most important to understanding enrollment in June 1987 were absenteeism, age, number of failures, grade average, stream, education expected, education desired, the presence of both parents, subjective norm, attitude, intention, and value of education. As in the analyses on intent and Outyear1, value of education added to the prediction based solely on expectancies. As anticipated, the school-record variables outperformed expectancy-value approaches in the discriminant analyses that were conducted. Moreover, there was little evidence that the information from the school records could be supplemented by any variables. Although a few variables seemed to add to the prediction afforded by the records in the derivation analyses, there was a failure to cross-validate. It would seem that the hit rate of 66% for the equation based on age, absenteeism, average, number of failures, and level was about as high as could be achieved in the current study. The consideration of non-linearity, prior probabilities, and the possibility of interactions did not prove useful.

For non-Natives, the important variables were revealed to be intent, absenteeism, age, number of

failures, average, stream, education desired, education expected, attitude, value of education, number of siblings having dropped, parental education, desired socioeconomic status, expected socioeconomic status, and internality. Interestingly, a dichotomous version of parental education in which parents were regarded as either high school graduates or non-graduates was more effective than the variable years of parental education. Though the result is not likely to be artifactual, further research is necessary to test the generality of this finding. Consistent with previous results, value of education was shown to be important in analyses combining expectancies and values. However, the expectancy-value approaches were not as useful as the school records or an 11 variables approach (accuracies of 72.4%, 77.5%, and 81.8%). A subset of six of the 11 variables yielded a hit rate of 80.7% (intent, education expected, age, absenteeism, number of siblings having dropped, value of education). Intent was shown to be very important in univariate and multivariate analyses despite its being measured for one rather than several years later. This would seem to imply that non-Native intentions are rather stable. Although use of the base-rates for dropout and persistence increased the classification accuracies to as high as 86.0%, the increment was at increased cost

because dropout was predicted less often. Thus, consideration of prior probabilities was not helpful.

Examination of the Fishbein items showed that persisters and dropouts held different beliefs concerning the relation of attending school to various outcomes (e.g., getting career of choice). If such beliefs were changed, such that dropouts' beliefs became more favourable, the Fishbein model would predict that their attitudes and possibly intentions would become more conducive to remaining in school. Increased encouragement from others might also help, but it is expected that it would be difficult to influence the behaviour of the students' referents. Thus it might be wise to focus on changing beliefs. However, changing beliefs alone would not be sufficient. For example, if a student is doing poorly in school due to a lack of skills, decreasing the student's expectation of low marks in the future likely would not prove effective because any change in belief would be short lived in the face of subsequent failure. The student's skills would have to be targeted too!

Chapter 7 Notes

[1] It is difficult to determine the cumulative dropout rate (across all grade levels) for the schools in this investigation. The one year dropout rate (i.e., the proportion who had discontinued by one year after the surveys) for surveyed students was 16.2% for Natives and 6.0% for non-Natives. Assuming that these rates are similar across grade levels and that the one year dropouts will not return and graduate, extrapolation indicates that 41% of the Native and 17% of the non-Native students from a grade 9 cohort would not finish grade 12. However, these figures should be viewed as tentative in light of several considerations. First, some of these "dropouts" may return and graduate but, as discussed earlier, few are likely to do so. Second, these figures were based on surveyed students, a group that had a lower dropout rate. Third, the estimates do not include attrition at the elementary level.

Chapter Eight

SUMMARY AND IMPLICATIONS FOR PREVENTION

Previous research on academic dropout has been plagued by many problems which cast doubt on the validity of the findings reported. These limitations include weak sampling, failure to recognize that many factors rather than one or two contribute to dropout, and the use of weak (e.g., cross-sectional) designs that make it impossible to determine the direction of causal influence. Furthermore, previous researchers often have made the dubious assumption that dropouts know why they left school and that they will reveal these reasons freely. Extant research also can be faulted for not using theories which are capable of organizing findings in a conceptually appealing manner and of suggesting directions for future research. In addition, there is a lack of research on Natives.

I) Methodological Overview

The current investigation was designed to overcome many of these problems. A pre-tested questionnaire was administered to Native and non-Native students in attendance at four high schools. Virtually all Natives and a random sample of non-Natives in Grades 9 to 11 were surveyed. Many precautions were taken to ensure that the data would be of good quality. These included guarantees of confidentiality, the use of scales with well-established psychometric characteristics, the inclusion of a social desirability scale, a seating arrangement that minimized social influences on responding, and the assurance that the researcher was interested in group rather than individual responses. The questionnaires contained items that assessed previously uninvestigated variables as well as factors identified by other investigators to be important. School records were used to obtain students' grades, absenteeism, and academic level or stream. Forty variables were central to this investigation, although many others were included as well, particularly when interactions were considered. For convenience, the variables were categorized using the taxonomy: background, personal (or characteristics of the respondent), and model-based. The Ajzen-

Fishbein model and an expectancy-value approach were used to guide the research. Also, stepwise analyses (regression and discriminant analysis) were employed to identify useful combinations of variables. The expectancy-value constructs were expectancies (at various levels of specificity) and perceived value of education, whereas the explanatory concepts in the Fishbein approach were intentions (I), attitudes (A), subjective norms (SN), and the model based antecedents of A and SN. In addition to testing the role of various factors in contributing to dropout using rigorous methodology, the research examined the usefulness of these two models, neither of which has been applied to educational attrition.

A longitudinal multivariate design was used in which information collected in 1983 and 1984 was employed to determine the variables that distinguish among dropouts and persisters. The longitudinal aspect of the design made it impossible to mistake consequences of dropout as causes, as has, no doubt, happened in previous work. Furthermore, the use of multivariate statistics (multiple regression, discriminant analysis, and partial correlation) minimized the likelihood of obtaining spurious relations between variables. That is, the likelihood of "third variables", in which a correlation between

two variables could be caused by another variable (third variable) was minimized. Two time frames were used (one year and 3 years and 9 months). In the one year perspective, students were classified as persisters or dropouts depending on their enrollment status one year after the surveys. In the longer time perspective, enrollment status in June 1987 was used to determine whether a student was considered a dropout or persister. Considerable care was taken to not confuse dropouts with transferees. From a Fishbein vantage, because intentions are thought to be the direct antecedents of volitional behaviour, it is important to understand their determinants. Thus, intentions served as a third dependent variable. To reiterate, several approaches (expectancy-value, Ajzen-Fishbein, and stepwise) were pitted against one another in explaining three criterion variables (intentions, enrollment after one year (Outyear1) and enrollment after several years (OutJune87)).

II) Results: Summary

i) Univariate Results

To simplify the summary of the univariate results, differences obtained between Natives and non-Natives, between the validation and cross-validation

runs, and between the dependent variables are disregarded unless the researcher thought they were noteworthy.

The model-based and the academic factors had the largest correlations with each criterion. Among the most important of these predictors were intentions, attitudes, subjective norms, absenteeism, grade average, expected education, and desired education. Variables such as parental education, birth order, and number of siblings having dropped were less important. Counter to intuition, expectancy of success, language use, family income (as estimated by the students), family size, home modernity, and an index of the availability of household reading material were found to be irrelevant.

Parental education had more effect [1] when a dichotomous (grade 11 or less versus grade 12 or more) as opposed to a continuous form (years of education) of the variable was used. It also seemed that Natives were less adversely affected than non-Natives by low levels of parental education and unemployment, possibly because these events are common or not stigmatic among Natives. Another interesting finding was that in a partial correlation analysis, number of siblings having dropped was associated with dropout even when siblings' encouragement or lack of encouragement to continue in

school was statistically controlled. Thus, although students with brothers or sisters who had dropped were more likely to leave, their increased propensity to withdraw was probably not caused by discouragement from these siblings. Somewhat unexpectedly, there was little evidence of non-linearity or of interactions between variables except for parental education.

ii) Multivariate Results

a) Expectancy-Value Models

For each criterion, several versions of the expectancy-value formulation were investigated. The most general version employed internality and externality (expectancies) and perceived value of education, whereas the differentiated form consisted of attributions to ability, effort, context, and luck along with perceived value of education.

Expectancy-value approaches were of some utility in accounting for two (intent and OutJune87) of the three criterion variables. For these, it was shown that consideration of value of education improved the prediction based solely on the expectancies. In addition to finding support for the merit of including value, evidence was obtained for differentiating the "expectancies" into the subtypes ability, effort,

context, and luck rather than using the coarser constructs internality and externality.[2] Although the multiple correlations were not improved when the four attributional scales were used, subtypes often assumed not to be worthy of separation (e.g., ability and effort: internality) were shown to have coefficients that differed in magnitude and sometimes even in sign. This suggests that it is potentially misleading not to differentiate between the components of internality and externality.

The mediocre performance of the E-V approaches was likely caused in part by a lack of close correspondence between the predictors and the various criteria; value of education and the expectancies are quite general constructs whereas the criteria are very specific. One probably should not expect powerful prediction using such constructs. Nevertheless, these comments should not be interpreted to mean that the E-V approach should be abandoned. On the contrary, it seems worthy of future consideration and may be particularly useful when a number of criteria (e.g., enrollment, grade average, and absenteeism) are under investigation. Under these conditions, use of specific predictors such as those based on the Fishbein model might be too time consuming and impractical. (Imagine assessing beliefs, evaluations, and the other

constructs for several dependent variables.) Approaches like the E-V model, though not capable of providing high levels of prediction for a specific criterion, might be useful in affording reasonable levels of prediction for several criteria. Although the expectancy-value models performed satisfactorily, there were other approaches that were superior (e.g., Ajzen-Fishbein).

b) Ajzen-Fishbein Model

The Fishbein predictors were assessed with respect to enrollment one year after the surveys and consequently they were expected to correlate more highly with Outyear1 than with OutJune87. In fact, intentions were most strongly associated with Outyear1 (for Natives) as can be seen in Table 1.

Table 1: Correlations of intent with Outyear1 and OutJune87

	Outyear1	OutJune87
Native:	-.31[a]	-.19[a]
non-Native	-.38[a]	-.37[a]

[a] $p < .001$

Presumably, intentions about being enrolled one year later are equally predictive of both criterion variables for non-Natives because their situation is quite stable. Non-Natives, compared to Natives, are less likely to encounter obstacles to achieving their educational plans. It is noteworthy that intent, a variable which has been virtually ignored by previous researchers, is a useful predictor of educational enrollment. Given the importance of intentions, their determinants were examined.

1) Analyses of Intentions

To appreciate the basis of intentions better, analyses into their antecedents were conducted (Chapter 5). Attitudes and subjective norms, the two variables presumed to determine intentions, performed well, producing multiple correlations with the criterion in excess of .60. This value compares favourably with those reported in the literature pertaining to areas other than academic persistence. Interestingly, attitudes had larger standardized regression coefficients than subjective norms, presumably reflecting their greater importance (see Oliver & Bearden, 1985; Shimp & Kavas, 1984 on this issue). Although attitudes (A) and subjective norms (SN) were useful in accounting for intentions (I), the question of whether other variables also might be important remains. To address this issue, the internal and external mediational capabilities of the model were examined. Concerning the internal mediational capability of A and SN, analyses were conducted to determine whether the other components of the model, $\sum b.e$ and $\sum Nb.Mc$, could supplement A and SN. To test for external mediation, examination was extended to variables not included in the Fishbein model but which are correlated with intent. The analyses supported the

mediational capabilities of A and SN. That is, consistent with Fishbein's model, no other variables supplemented A and SN in the prediction of intent. However, the analyses used to investigate the determinants of attitudes and subjective norms (rather than I) were less supportive. Although, the sum of the normative belief-motivation to comply products (i.e., $\sum$Nb.Mc) was an adequate predictor of SN, it was shown that the model-based predictor of attitude, the sum of the belief-evaluation products (i.e.,$\sum$b.e.), should be disaggregated. In other words, when the 15 b.e product terms were represented by two factor-based scales (utility and affect) instead of$\sum$b.e, the prediction of attitude improved.

2) Analyses of Behaviour

In view of the fact that some previous investigators (see Chapter 6) have found evidence that attitudes and subjective norms supplement intent, this research examined whether A and SN were redundant with I. As expected from a Fishbein view, there was little evidence that A and SN supplement I. However, it was anticipated that variables external to the Fishbein model could improve the prediction based on intent alone. For both Outyear1 and OutJune87, particularly

the former, it was important to consider variables in addition to intent. Although intent enabled prediction of Outyear1 with 72% accuracy, consideration of other variables such as absenteeism, age, number of failures, and expected socioeconomic status increased the hit rate by 10%, to 82%. Consistent with expectation, some of these additional variables (e.g., number of failures) represent what might be considered constraints to the fulfillment of intent. Intent to continue in school was less likely to translate into persistence when students had weak academic performance (a constraint).

Researchers investigating attrition and other topics should always be aware of factors that are relevant to whether attitudes and intentions are ultimately reflected in behaviour. For example, Liska (1984) notes the importance of "resources" (e.g., ability or money), which enable intentions to be enacted. Similarly, Triandis (1979) writes about "facilitating conditions" and others mention the importance of "enabling conditions". Ajzen's construct, "behavioral control" (see Ajzen, 1985), like these others, also acknowledges that intentions only become fulfilled under some circumstances. To make the Ajzen-Fishbein approach a model of <u>behaviour</u> rather than primarily a model of intentions, it is necessary

to consider such factors. Inclusion of variables representing constraint will expand the Fishbein model's scope so that it will be able to account not only for "volitional behaviour" but also behaviour that is not entirely volitional (probably most behaviour of importance).

3) Analyses of beliefs, evaluations, normative beliefs and motivation to comply

In Chapter 7, it was shown that dropouts and persisters place similar value on the outcomes of attending or not attending high school. For example, each group desired to eventually be employed and to obtain the career of their choice. However, dropouts and persisters differed in some beliefs concerning the association between attendance and the various outcomes. Native dropouts, compared to Native persisters, perceived education to be less likely to help them obtain career goals and to become knowledgeable. Furthermore, they thought low marks were more probable and regarded schooling as more likely to result in arguments and disagreements with teachers. However, it should be noted that even dropouts perceived arguments as relatively unlikely (M = -1.0 on a scale from -3 (unlikely) to +3 (likely)). Most students reported that they had

reasonably good relations with their teachers. Interestingly, dropouts and persisters received similar levels of encouragement (relatively high) from their referents (with the exception of sisters).

In contrast to the Native results, non-Native persisters and dropouts did not differ in the association perceived between education and the attainment of career goals. Non-Native dropouts did, however, think that arguments and disagreements, boredom, and low marks were more likely. Parents and sisters of dropouts were revealed as providing less encouragement to persist.

III) Implications for Prevention

As mentioned earlier, many dropouts regret having discontinued. Furthermore, attrition adversely affects both the dropouts and society. Dropouts experience higher unemployment, and significantly lower wages, not to mention lowered self-esteem. Society loses in terms of increased illiteracy, discontent, and social assistance expenditures. That dropouts represent much wasted talent becomes apparent when one realizes that many, if not most, dropouts have the ability to complete high school (Elliott & Voss, 1974).

In view of this, it makes sense to try to prevent such academic attrition.3

The research reported in this thesis shows that dropouts can be identified with considerable accuracy years before their departure. Thus, it would be possible to target prospective dropouts for participation in dropout prevention programmes. By identifying those at risk, limited resources could be directed to where they are most needed. However, precautions would have to be taken to ensure that those students at risk are not stigmatized or further disadvantaged by being identified as potential dropouts. In this regard, it would be helpful to avoid labels suggestive of dropout. Frankness about the possibilility of misidentifying persisters as dropouts (i.e., false positives) also might help to prevent damage to the targeted students. Furthermore, it probably would be wise to include some non-dropout prone adolescents who might serve as role models and who would make the nature of the groups less obvious. Of course, effort also would have to be devoted to ensuring that these "good" students were not adversely affected in any way.

Unfortunately, less is known about how to prevent dropout than how to predict who is at risk. Orr (1987) has noted the methodological weaknesses of

research designed to assess the effectiveness of various prevention programmes:

> Only one program evaluation used a comparison group. None randomly assigned students to the program or a comparison group (which is very difficult politically for schools to do). In several cases, preprogram and postprogram evaluation information was collected only from a nonrandom portion of the participants, making it difficult to generalize the findings to the entire population. Only four postprogram follow-up surveys were done and three of these were conducted three to six months after the program, when only a short-term impact was measurable.... (p. 199)

Because of these limitations (some of which are very difficult to overcome as noted by Orr), it is not easy to identify programmes that are working well and to determine which aspects of them are responsible for decreasing dropout. Nevertheless, in what follows, I try to draw prescriptions based on this literature and on my own research.

i) Improving Attendance

In view of research findings showing that dropouts have worse academic performance and attendance than persisters as early as elementary school (Lloyd, 1976, 1978), early remediation is important. Attendance could be encouraged by providing rewards for not missing classes and by emphasizing the link between attendance and grade average. Possibly both individual and class attendance should be stressed. In the individual-based approach, students with good attendance are rewarded whereas in the class approach, rewards are contingent upon class (aggregate) attendance levels. The classroom focus might be more effective because it would produce peer pressure to attend. The rewards that might be effective likely would vary by age group but these could be determined by allowing children to choose among several alternatives (e.g., field trips, movies, etc.). Although reduction of absenteeism would be conducive to improved academic performance, educators should realize that attempts to eliminate non-attendance might be counterproductive. For example, encouraging children with the flu or other contagious diseases to attend school would worsen attendance problems. Allowance

would have to be made for absenteeism due to illness, religious holidays, or other legitimate reasons.

ii) Improving Academic Performance

Although better attendance likely would result in improved grade averages, other more direct means of improving learning and performance should be considered as well. Head Start type programmes and interventions aimed at the development of fundamental skills such as fluency in English should be encouraged since some research has shown that they can reduce dropout (Royce, Darlington, & Murray, 1983). Furthermore, students' vision and hearing should routinely be checked so that any problems that might interfere with learning can be corrected.

Academic performance also can be boosted through the use of tutors, especially those with some training (Cohen, Kulik, & Kulik, 1982). Capable students often are willing to help their peers, but nevertheless this potentially useful resource is rarely used. In addition to assisting with substantive material, tutors can help their charges to develop better study habits and strategies. Although the gratification obtained from helping others often is sufficient reward for most tutors, teachers (if they

desired) could reward these aides in more tangible, but not necessarily expensive ways (e.g., notation of tutoring experience on their resumes). It is noteworthy that tutoring has cognitive and affective benefits both for the tutors and the tutored (Cohen et al, 1982).

Teachers could improve students' performance and attendance by making their classes and discussions as interesting and relevant as possible. One approach is to occasionally show students the value of what they are learning. This might be particularly important in teaching about subjects that most students perceive as too abstract and removed from their everyday concerns. For example, many youths regard English nuances as a waste of time and not essential to convey meaning. Of course, it is easy to provide examples that counter this view by demonstrating that weak grammar often results in faulty communication.

Another means of promoting good performance is to ensure that students take courses and have workloads commensurate with their past performance and their ability. Students should be allowed to take fewer courses if they are having difficulty with the traditional course load when putting forth a concerted effort. Individuals who excel at trades rather than at courses which are designed for university or college

preparation should be encouraged to develop those skills. However, these students should be trained to useful levels of proficiency as occurs in such countries as West Germany and France, instead of to the inadequate levels which predominate in North America. Knowledgeable counsellors are important to tailor programmes to students' needs and capabilities.

Dropout might also be reduced if students valued education more for its own sake rather than simply as a means to reaching career objectives. If learning itself is viewed as important, students might choose to continue even when their marks are low. Thus, teachers should try to encourage a "love of learning."

iii) Increasing Parental Encouragement

From the current research, it seems that fostering encouragement from the students' important persons (e.g., parents) may be yet another way of reducing the prevalence of dropout. Admittedly, it would be difficult to influence this encouragement, but the task is not futile. Newspaper articles stressing the importance of education might help. However, television programming or specially prepared videotapes showing the problems associated with dropout and the

benefits of persistence might be among the best means of reaching an audience that probably reads less than average. These media could positively influence both students and their parents. Parents also might become more encouraging if they had more contact with the school system, possibly in terms of input into the curriculum, as teacher aides, or as coaches of school teams. Native parents, in particular, would probably have more favourable views toward education if they had more than token influence on matters such as curriculum. Input from Natives would help to reduce the current Native perception that participation in the current educational system is like being a passenger on someone else's boat (see Brooks, 1975). Taking the notion of parental input one step further, some individuals have recommended that Natives take complete control of the education of Indians. Because Native control would ensure that courses reflect Native interests and values, it might be conducive to academic persistence. Indeed, there is some preliminary evidence (see Frideres, 1983, 1988, p. 178; York, 1983) that local control (Native control) results in less attrition. However, if local control is pursued, it will be important to ensure that the curriculum prepares students for society at large and for post secondary education. Otherwise, improvements in

graduation rates or in marks may be worthless. As recognized by Burnaby (1980):

> Under Native control or even otherwise, schools could make radical changes to accommodate culturally very different subject matter and learning styles. However, the greater the difference from ordinary majority culture schools, the greater is the chance that the standards of the Native school would not be considered equal to the majority ones. (p. 125)

Of course, credentials are worthless if they are thought to signify little of importance (Reeves, 1986, p. 348). Another concern is that under Native control, the Federal government might decrease its financial support of Native education (Abate Wori Abate, 1984). Clearly, the issue of Native control is complex (see Gibbins, 1986) and its resolution will depend, among other things, on Natives deciding the relative importance of maintaining their culture and being able to be a part of an increasingly technological society.[4]

iv) Teaching about the Consequences of Dropout

Previous research has shown that answering questions about potential courses of action can improve decision making (see Mann, 1972; Mitchell & Beach, 1977). Consequently, simply having students systematically consider the consequences of attrition

(self-generated ideas) might help to reduce dropout.5 A more explicit intervention in which students are taught about the relations between education and employment, and between education and wages also would likely help to decrease dropout. Data concerning wages, likelihood of unemployment, and happiness could be used to show the importance of education. In addition, this approach might be supplemented by testimonials from dropouts who have regretted their decisions and from persisters who are glad that they persevered. It is well known that case studies often have an inordinate influence on behaviour (Alcock, Carment, & Sadava, 1988, p. 88).

v) Removing Financial Barriers

Although finances seem to be of little relevance to dropout in this generation ("Boredom Drives," 1987; Borus & Carpenter, 1984; Ekstrom, Goertz, Pollack, & Rock, 1986; Elliott, 1984; Rumberger, 1983), there are no doubt individual cases where a lack of money is an impediment. Ensuring that all students with the requisite ability have sufficient financing to complete at least high school should be a government priority in view of the deleterious effects of dropout. Programmes to assist students in financial

need should not be viewed as handouts. Instead, the expenditure should be viewed as an investment with the potential to yield substantial "dividends".

Clearly, dropout has multiple contributing factors, many of which are not amenable to manipulation (e.g., family intactness). Nevertheless, levels of attrition can be decreased. Prevention efforts should be directed not only at the student and his family but at the school system as well. Together, early detection of medical problems, pre-school education, the use of peers as tutors, interventions to reduce absenteeism, interesting course material at an appropriate level of difficulty, increased parental encouragement, and adequate financing might go a long way toward improving academic performance and stemming academic attrition. As will be discussed shortly, much more research is needed to learn in what ways schools could be changed to promote retention.

Chapter 8 Notes:

[1] Stating that parental education had an effect is not meant to imply that causation was definitively established. It is acknowledged that it is next to impossible to establish causation from correlational data. Terms like effect are simply used to prevent always having to write that variable A was correlated/associated with variable B.

[2] Ability, effort, context, and luck are really attributional tendencies rather than expectancies. However, attributions are known to influence subsequent expectancies (Weiner, 1985).

[3] For some students (e.g., low ability), dropping out may be the appropriate course of action (Ekstrom et al., 1986; Elliott & Voss, 1974; Rumberger, 1987; Wehlage & Rutter, 1986). Rather than trying to attain goals that they can not reach and encountering frustration, these students would be better off leaving a hopeless situation. Employment (if obtainable) or alternative training might serve them better.

[4] At present, Native groups across Canada are pressing for their children to learn aboriginal languages. In fact, many groups have initiated programmes in which children are taught exclusively in the Native tongue in Kindergarten through the early elementary grades. It is believed that this approach will improve Natives' feelings of self-worth and knowledge of their heritage. Although these goals are commendable, it is likely that they can be achieved more effectively through other means that will not further exacerbate the well documented low levels of English proficiency characteristic of Native groups (Berry, 1966). It seems implausible that proficiency in Native languages is necessary for cultural understanding. It also is misguided to assume that learning Native languages will increase self-esteem. If students from immersion programmes are retarded in their acquisition of English, the transition to a curriculum based on English will be difficult. Many years will be required to overcome the initial deficits in English. Students who are not studious and those with only average ability may never catch up. Nevertheless, high ability students and those from homes where the parents have a good command of English may be able to surmount the initial difficulties and they may even eventually benefit.

There is little good quality research to justify the substantial risks associated with Native language immersion. Arguably, the data concerned with French immersion in Canada are of little relevance to the Native situation. The students who have been exposed to French immersion are typically from professional, upper class families which have the resources (financial and otherwise) to offset some of the disadvantages of not learning English initially. Such families are capable of helping their children when they encounter difficulty and have the means to hire private tutors if necessary. Unfortunately, most Native families can not afford tutors. Policy makers will have to decide whether the potential benefits of language immersion programmes to a small number of students offset the risks to the majority.

5 It is possible that studying dropout decreased its prevalence in this investigation. Since students were asked to consider the consequences of attrition in a thorough fashion, they may have made better informed decisions.

Chapter Nine

DIRECTIONS FOR FUTURE RESEARCH

i) General Methodological Prescriptions

Subsequent research should use methodologically strong designs (e.g., longitudinal with multivariate statistical analyses), which are best at elucidating the causes of dropout and how variables exert their effects. Researchers would be well advised to include in their investigations those variables that have been shown previously to be associated with dropout. Knowing that a variable is important is insufficient grounds for not studying it further. In fact, ignoring variables strongly associated with dropout results in misspecified equations and can yield biased estimates of the influence of the variables that are included. Effort should be devoted to gaining additional insight into how variables "work". In this vein, it would be useful to know how siblings who have dropped increase a students' susceptibility to drop. Also, researchers should examine whether established variables can mediate the effects of new variables. Investigators

should be alert to the possibility of interactions and non-linearity (e.g., threshold effects). The merit of dichotomizing parental education should be examined further. From the research reported in this thesis, it is apparent that the Fishbein framework is useful in understanding attrition. It affords good prediction, and accounts for the effects of many external variables. Future research should incorporate the model with a view to addressing unresolved issues.

ii) Aspects of the Fishbein Model in Need of Investigation

The measurement of some of the Fishbein constructs remains somewhat contentious. At present, there is little consensus as to whether motivation to comply should be assessed as a general (e.g., In general I want to comply...) or a specific (e.g., Concerning academic matters, I want to comply) construct. Further research also is needed to determine the best order in which to assess the Fishbein variables. Presumably, some sequences (e.g., intent first) are less reactive than others, so that early responses have little influence on subsequent responses.

There also are a number of conceptual issues worthy of investigation. One such concern is whether

pilot studies reveal all the beliefs that contribute to an individual's attitude as is typically assumed. It seems likely that the answer is no. Certain beliefs, notwithstanding their importance, may rarely be put forward. In this thesis, Natives may have been reluctant to state that education might erode their lifestyle. Nevertheless, such a belief may have contributed to their attitudes and intentions. Future research should consider the possibility that factors rarely articulated by subjects might be important. As mentioned, disaggregation of the b.e and Nb.Mc products often is informative. Researchers need to delineate the circumstances where disaggregation is necessary. Work by Schlegel and DiTecco (1982) has provided a useful point of departure on this concern. These suggestions about what the outstanding issues concerning the Ajzen-Fishbein model are merely the "tip of the ice-berg". Sources such as Alcock, Carment, and Sadava (1988), Liska (1984), and Shimp and Kavas (1984) discuss other aspects of the framework that merit attention.

iii) Consideration of Additional Variables

In addition to studying the traditional variables in the context of theoretical frameworks such as the Ajzen-Fishbein model, future research should examine variables that have as yet received little attention. For example, dropouts, compared to persisters, may feel that they are a burden to their parents. It would be interesting to design items to test whether dropouts feel like "free-loaders". Another potentially important factor is cognitive complexity (e.g., Jackson, 1977, pp. 66-67), a facet of which is the tendency to prefer the abstract rather than the concrete. Educational practice, being largely of an abstract nature, might be more suited to those students who prefer abstract thought, and might contribute to dropout among the students who have a more concrete orientation.

Among Natives and other minorities fear of losing one's identity, and planned place of residence (e.g., reserve/non-reserve) might be relevant. In addition, the type of primary school attended by Natives (e.g., integrated or Native) could affect the likelihood of Native attrition in high school. Native students with early exposure to non-Natives, compared to their peers without such experience, might be

expected to do better at the secondary level, which is typically integrated if not predominantly non-Native. Non-Native primary school children also would be enriched by early exposure to another culture. Interaction between Natives and non-Natives at an early age, before stereotypes and prejudices are firmly established could, under the right conditions, result in better relations between the groups (see Brown, Chapter 17). If integration were to occur at the elementary level, however, it would be important that the lessons and texts present the Native lifestyle in a positive manner so that Native children could be proud of their heritage.[1] Such a curriculum would help to contribute to Natives' self-esteem, a factor that is important to many types of coping, including doing well in school.

Ogbu (1986) claims that some Black students in the United States drop out even though they value education because they perceive schooling to be less instrumental for their group than for Whites. Whether similar beliefs contribute to Native dropout should be investigated. Future research also needs to examine characteristics of schools (e.g., size) as noted in the next section.

iv) Aggregate Level Analyses

Virtually no empirical data exist on the effects of numerous potentially important school variables. A few such factors worthy of attention are the ethnic composition of the student body and of the teachers, teacher qualifications (e.g., B.A. vs. M.A.), semestering, and pupil to teacher ratios. Native students might be more inclined to persist in schools with at least some Native teachers or a certain proportion of Native to non-Native teachers. Furthermore, schools that offer Native courses might have less Native attrition. In addition to these educational factors, the local unemployment rate also would be expected to be related to dropout, with dropout being less frequent when unemployment levels are high. To examine such potential influences, researchers will have to conduct aggregate-level analyses, in contrast to the individual-level approaches, which have prevailed. Aggregate analyses will require the use of information from many districts. Not only does this involve the co-operation of many Boards of Education, it also depends on each district reporting accurate dropout rates. Unfortunately, accounting practices in recording dropout vary greatly (Hammack, 1986; Morrow, 1986) and

use of the current figures could prove highly misleading. Standardization in terms of what constitutes dropout, accurate reporting, and computerization of records would be a boon to researchers, enabling them to conduct research on factors that, for practical reasons, have largely been uninvestigated. Perhaps this new generation of research will spawn changes in educational practice that will create equal societal opportunity through equal educational opportunity.[2]

Chapter 9 Notes:

[1] Hirschfelder (1982) provides a good overview of the coverage of Natives in elementary and high school textbooks. Both biased and balanced works are discussed.

[2] Some researchers (e.g., Fine, 1986; Weisbrod, 1965) have argued that there will always be a certain amount of unemployment (i.e., a floor) regardless of educational attainment.

APPENDICES

Appendix A: Instructions to Elicit Students' Salient Outcomes and Important Referents

Thanks for the introduction Mr Collins.

As Mr Collins has stated, I am a member of a McMaster University research team that is studying academic decision making. To help us learn about these processes, you will be completing a short questionnaire consisting of two parts. The first part will be completed today and the second more interesting part will be finished next week.

Please note that you have not been selected to participate for any particular reason. Your names were chosen on a lottery basis and therefore you were selected by chance. You also should realize that your responses will be kept completely confidential.

Before we begin, please let me briefly describe today's task. You will be asked to respond to six short statements concerning your beliefs about attending high school next fall. It is important that you read these questions carefully and that you respond honestly. When answering the questions concerning the consequences of attending or not attending high school next fall, be sure to consider long term (future) consequences in addition to any immediate effects.

Please feel free to answer in short form but try to write neatly.

This exercise should not take long. Please turn your sheets face down when you are finished and wait quietly for permission to leave.

We are ready to begin now.

(Students were given time to complete the task and when they were finished, these instructions were given.)

Please put your name on all of the sheets before you. After doing this, please pass your sheets to the person at the end of your aisle. If you have borrowed any pens or pencils, please return them to their owner. I would appreciate if you would bring an Hb pencil and an eraser to the next session one week from now.

Thanks for your cooperation. You may leave now.

Elicitation Statements

1) List (in point form) the advantages of your being in high school next fall.[a]

2) List the disadvantages of your being in high school next fall.

3) List the advantages of your not being in high school next fall.

4) List the disadvantages of your not being in high school next fall.

5) List the people who would approve of your being in high school next fall

6) List the people who would disapprove of your being in high school next fall.

[a] The word your was used so that students gave their personal beliefs rather than merely generally held views.

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Wm. DOWDELL, B.A., M.ED.
PRINCIPAL

A. McEACHERN, B.A.
VICE-PRINCIPAL

Dear Parent:

The Board of Education for the County of Haldimand has given permission to Professor D.W. Carment and Ph.D. Candidate P. McCoy of McMaster University to administer a short questionnaire to students enrolled in grades 9 to 11.

The questionnaire will assess interests, goals, and expectancies as a step towards achieving a better understanding of academic choices. We anticipate that this knowledge will ultimately be of value to students as an aid to academic counselling. It is understood that all information concerning individual students will be kept completely confidential.

If you do not wish your son/daughter to participate in this study, please sign and return the form below by Wednesday, November 2nd, 1983.

Thank you for your help.

D.W Carment,
Professor

W. Dowdell,
Principal

(Please tear off and return)

Date: _____

This will inform you that I do not want _____
(Name)

to participate in the study conducted by McMaster University.

_____
(Parent's Signature)

Appendix C: Instructions used in the Main Study

Good morning. My name is Patrick McCoy. I am part of a McMaster University research team interested in student decision making. You represent a random sample of students from (School Name). Please note that you have not been selected for any particular reason. Your names were chosen by chance. You also should realize that this is not a test! Turn your envelopes (contains the questionnaire, instructions, and answer sheets) over now and do the following:

a) Print your school name in the middle of your envelope and place the date underneath.

b) Print your name in the top right corner of the envelope.

Please open your package and place your name at the top of all sheets having a space labelled name (pause).

Try to locate the ditto (blue) labelled Contents & Order. If you are missing this sheet, please raise your hand (distribute copies as necessary). This sheet indicates what the package should contain and the order in which you are to complete the questionnaire. Please check to make sure that you have all of the parts listed on this sheet.

RESPONSE TYPES

- Darkening a circle on a red & green answer sheet

Example 1:

GDS Answer Sheet

	T	F
6.	1	●

This means I think question 6 is false (F)
T = True
F = False

Example 2:

MMCS V Answer Sheet

	A	B	C	D	E
17.	●	2	3	4	5

1 = I agree
2 = I mildly agree
3 = I agree and disagree equally
4 = I mildly disagree
5 = I disagree

*Use this key when answering the MMCS V

- Filling in blanks

Example: Name Patrick McCoy

- Using check marks (✓)

Example: Do you like cats? ✓ yes ____ no

- Using rating scales

Example: Dogs are

smart ____ ✓ ____ ____ neither ____ ____ ____ dumb

- Answering using % (percent)

Example: What percent of the time do you win at cards? 60%

- Circling a number

Example: How would you rate the intelligence of cats as compared to other animals?

1. extremely far above average
2. very far above average
3. far above average
4. above average
5. average
6. below average
7. far below average
8. very far below average

Be sure to check both sides of each page because the back side sometimes is printed on. Place a check mark beside each part on the Contents & Order list when you find it in your package (pause).

Is anyone missing anything?

Before we begin, I would like to briefly describe the types of answers you will be giving today. Please find the blue ditto labelled Response Types. As you can see from this sheet, you will be required to respond in 6 different ways:

I) Darkening a circle on an answer sheet

Example 1 (SDS Answer Sheet).

	T	F	Please find your SDS answer sheet
6.	A	B	and compare it to this diagram on
	1	2	the Response Type ditto

Please note:

1) For the SDS answer sheet, column 1 (i.e., A) is used to represent true (T) and column 2 represents false (F).

2) In the case of the MMCs answer sheet, all 5 columns will be used; this will be discussed shortly

If you look at Example 1 on your Response Type ditto, you will see that 2 has been carefully darkened. This means that I think that question 6 is false. If I thought it was true, I would darken 1.

If you look at Example 2 concerning item 17, you will see that 1 has been darkened. This means that

I agree with item 17. If I disagreed with the item, I would darken 5. The numbers between 1 and 5 (2,3,4) are used to represent less extreme responses as shown on the answer sheet.

II) A second type of response you will be making is filling in blanks. Example:

Name_____.

III) A third type of response is placing checkmarks ( ) in blanks. In the example, if you like cats you would place a check in the yes blank

IV) A fourth response mode involves using rating scales. In the example, if you think dogs are quite smart you would place a check in the second box from the left. If you think they are neither smart nor dumb you would place a check in the center or fourth blank. If you think cats are dumb you would place a check in the blank at the extreme right.

V) A fifth response you will be using is answering in terms of percent. For example, if you were asked what percent of the time do you win at cards you might respond 60%. A really good player might state 90%.

VI) A final response mode is circling a number. For example, if you think cats are above average in intelligence, you would circle 4 in response to the final item on the Response Type Sheet.

As you can see, your task is quite easy, but it is important that you read the instructions carefully so that you will know how to respond. We are not interested in any individual's responses. Instead, we make group comparisons (e.g., males versus females). It is important that you answer all of the questions and that you answer them honestly. Please do not leave any blanks. You also should realize that your answers will remain completely confidential.

Please note that half of the students who are here will complete the questionnaire in order 1 whereas the others will complete it in order 2. Therefore you should not pay any attention to the work of the person seated beside you. Be sure to answer the questionnaire in the order given on the Order and Contents sheet.

Are there any questions concerning anything that I have said so far (pause). If any questions arise while you are filling out the questionnaire, please raise your hand and someone will assist you.

When you have finished, place you materials face down in a neat pile and wait quietly. It would help if you would double check that you have completed everything.

Thank you for you cooperation. You may begin now.

Name: _____ _____

Appendix D:

CONFIDENTIAL

HIGH SCHOOL SURVEY

Please fill in the blanks or use a (✓) as appropriate

1. Name _____ 1a. Birth Date _____
Year Month Date

2. Grade (✓)
Nine _____
Ten _____
Eleven _____
Twelve _____

2a. Sex (✓)
Male _____
Female _____

3. Name of High School _____

4. Are you living at home? (✓) Yes _____ No _____

5. Please indicate how many of each of the following persons are living with you. (Example: If you are living with your mother and 2 brothers you should put a 1 beside mother, a 2 beside brothers and 0's in the other blanks)

Brothers	_____	Mother	_____	Aunts and Uncles	_____
Stepbrothers	_____	Stepmother	_____	Grandparents	_____
Sisters	_____	Father	_____	Cousins	_____
Stepsisters	_____	Stepfather	_____	Others	_____

6. How many brothers and sisters do you have and what are their ages? (Please separate their ages with commas)

Number of brothers _____ Ages of brothers _____

Number of sisters _____ Ages of sisters _____

7. a) Have you been living with both of your parents? (✓)

Yes _____ No _____

b) If no, at what age were you separated from your parent(s)? _____

c) Please indicate (✓) the reason for being separated.

_____ death of mother divorce _____

_____ death of father other (please specify) _____

d) If you were not raised by both your parents, by whom (✓) were you raised primarily?

_____ your mother father and stepmother _____

_____ your father a close relative _____

_____ mother and stepfather other (please specify) _____

Name: _____

13. What job would you like to have when you finish school? (Please be specific; Example: Chartered Accountant)

First choice _____

Second choice _____

14. Please estimate (✓) the total yearly income of your family.

Less than $8,000		$23,000 - 27,999	_____
$8,000 - 12,999	_____	28,000 - 32,999	_____
13,000 - 17,999	_____	33,000 - 37,999	_____
18,000 22,999	_____	More than 38,000	_____

15. Please estimate (✓) the highest amount of schooling completed by your parent(s) and/or your stepparents(s). If you do not have stepparents, please leave the stepmother and stepfather columns blank.

Mother	Stepmother		Father	Stepfather
_____	_____	None	_____	_____
_____	_____	6 Grades or less	_____	_____
_____	_____	9 Grades or less	_____	_____
_____	_____	12 Grades or less	_____	_____
_____	_____	Some Community College or University	_____	_____
_____	_____	Completed Community College	_____	_____
_____	_____	Completed University	_____	_____
_____	_____	Graduate or Professional School (Example: Law School)	_____	_____

Indicate (✓) whether these people have received an apprenticeship (technical training)

YES	YES	YES	YES
NO	NO	NO	NO

Name: _____

18. a) If you have brothers(s) or sister(s) who have dropped out of school, please indicate how many have dropped. Place a 0 in the space if none have dropped and proceed to question 19.

Number of brothers who have dropped _____

Number of sisters who have dropped _____

b) At what grade level did they drop out? If more than one has dropped, please separate the grades with commas.
(Example: Gr.11, Yr. 2 University)

Brother(s)' grade level(s) at time of dropping _____

Sister(s)' grade level(s) at time of dropping _____

19. What job are you likely to have when you finish school? (Be specific (Example: High School English teacher)

Most likely job _____

Second most likely job _____

20. Please indicate (✓) the religious tradition in which you have been raised.

Catholic _____ Protestant _____

Jewish _____ Other (please specify) _____

Longhouse _____ None _____

21. What are your present religious beliefs? (✓)

Catholic _____ Protestant _____

Jewish _____ Other (please specify) _____

Longhouse _____ None _____

22. What is your racial background? (✓)

Oriental _____ North American Indian _____

Black _____ White _____ Other _____ (Please specify)

23. Which of the following items does your household have? (✓)

Telephone _____ A Newspaper on a daily basis _____

Encyclopedia _____ Car _____

Dictionary _____ Gas,Oil,Electric,or Solar Heating _____

Medical Book _____ Electricity _____

Magazine Subscription(s) _____ An indoor toilet _____

Name _____

P V E SCALE

Place a (✓) in the space which comes closest to your viewpoint
(do not place (✓)'s between spaces)

Example: Cats are:

smart	___	✓	___	___	___	___	___	dumb
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	

(1) very smart

(2) quite smart — This means cats are quite smart.

(3) a little bit smart

(4) neither smart nor dumb

(5) a little bit dumb

(6) quite dumb

(7) very dumb

Education is:

good	___	___	___	___	___	___	___	bad
useless	___	___	___	___	___	___	___	useful
necessary	___	___	___	___	___	___	___	unnecessary
interesting	___	___	___	___	___	___	___	boring
beneficial	___	___	___	___	___	___	___	harmful
unimportant	___	___	___	___	___	___	___	important
undesirable	___	___	___	___	___	___	___	desirable
worthless	___	___	___	___	___	___	___	valuable
pleasant	___	___	___	___	___	___	___	unpleasant
feminine	___	___	___	___	___	___	___	masculine
awful	___	___	___	___	___	___	___	nice
helpful	___	___	___	___	___	___	___	unhelpful
easy	___	___	___	___	___	___	___	difficult

Name _____

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A & F SCALE

1. I intend to be in highschool next Fall.

strongly agree ___ : ___ : ___ : ___ : ___ : ___ : ___ strongly disagree

2. I do not intend to be in highschool next Fall.

strongly agree ___ : ___ : ___ : ___ : ___ : ___ : ___ strongly disagree

3. My being in highschool next Fall would be:

good ___ : ___ : ___ : ___ : ___ : ___ : ___ bad

wise ___ : ___ : ___ : ___ : ___ : ___ : ___ foolish

harmful ___ : ___ : ___ : ___ : ___ : ___ : ___ beneficial

4. My not being in highschool next Fall would be:

good ___ : ___ : ___ : ___ : ___ : ___ : ___ bad

wise ___ : ___ : ___ : ___ : ___ : ___ : ___ foolish

harmful ___ : ___ : ___ : ___ : ___ : ___ : ___ beneficial

5. My getting into arguments and disagreements with other students is:

good ___ : ___ : ___ : ___ : ___ : ___ : ___ bad

6. My getting lower marks than desired is:

good ___ : ___ : ___ : ___ : ___ : ___ : ___ bad

7. My getting into arguments and disagreements with teachers is:

good ___ : ___ : ___ : ___ : ___ : ___ : ___ bad

8. My eventually getting a job is:

good ___ : ___ : ___ : ___ : ___ : ___ : ___ bad

9. My being able to get additional (higher) education is:

good ___ : ___ : ___ : ___ : ___ : ___ : ___ bad

10. My participating in enjoyable school activities is:

good ___ : ___ : ___ : ___ : ___ : ___ : ___ bad

23. My being in highschool next Fall would reduce my chances of having a job during the school year.

likely ___ ___ ___ ___ ___ ___ ___ unlikely

24. My being in highschool next Fall would be boring.

likely ___ ___ ___ ___ ___ ___ ___ unlikely

25. My being in highschool next Fall would result in arguments and disagreements with teachers.

likely ___ ___ ___ ___ ___ ___ ___ unlikely

26. My being in highschool next Fall would enable me to get additional (higher) education.

likely ___ ___ ___ ___ ___ ___ ___ unlikely

27. My being in highschool next Fall would help me learn skills and habits which will be useful in later life.

likely ___ ___ ___ ___ ___ ___ ___ unlikely

28. My being in highschool next Fall would help me to become a knowledgeable (intelligent) person.

likely ___ ___ ___ ___ ___ ___ ___ unlikely

29. My being in highschool next Fall would help me to get the career of my choice.

likely ___ ___ ___ ___ ___ ___ ___ unlikely

30. My being in highschool next Fall would result in me getting lower marks than desired.

likely ___ ___ ___ ___ ___ ___ ___ unlikely

31. My being in highschool next Fall would help me to eventually get a job.

likely ___ ___ ___ ___ ___ ___ ___ unlikely

32. My being in highschool next Fall would result in arguments and disagreements with other students.

likely ___ ___ ___ ___ ___ ___ ___ unlikely

33. My being in highschool next Fall would restrict (reduce) my social life.

likely ___ ___ ___ ___ ___ ___ ___ unlikely

34. My being in highschool next Fall would reduce my spare (free) time.

likely ___ ___ ___ ___ ___ ___ ___ unlikely

45. I usually want to do what my parent(s) (step-parent(s)) think I should do.

strongly agree ___ : ___ : ___ : ___ : ___ : ___ : ___ strongly disagree

46. I usually want to do what my aunt(s) and uncle(s) think I should do.

strongly agree ___ : ___ : ___ : ___ : ___ : ___ : ___ strongly disagree

47. I usually want to do what my brother(s) think I should do.
(If you have no brothers, write none)

strongly agree ___ : ___ : ___ : ___ : ___ : ___ : ___ strongly disagree

48. I usually want to do what my friends think I should do.

strongly agree ___ : ___ : ___ : ___ : ___ : ___ : ___ strongly disagree

49. I usually want to do what my religion suggests I should do.

strongly agree ___ : ___ : ___ : ___ : ___ : ___ : ___ strongly disagree

50. I usually want to do what my sister(s) think I should do.
(If you have no sisters, write none)

strongly agree ___ : ___ : ___ : ___ : ___ : ___ : ___ strongly disagree

51. I usually want to do what my teachers think I should do.

strongly agree ___ : ___ : ___ : ___ : ___ : ___ : ___ strongly disagree

52. I usually want to do what my grandparent(s) think I should do.

strongly agree ___ : ___ : ___ : ___ : ___ : ___ : ___ strongly disagree

Please do not write on this page

S D S SCALE

Listed below are a number of statements concerning personal attitudes and traits. Read each statement and decide whether you think the statement is true or false by carefully darkening the appropriate number on the SDS answer sheet.

1 = True
2 = False

Example: 1. A ● B 2 C 3 D 4 E 5 (ignore) This choice means item 1 is true.

1. I'm always willing to admit it when I make a mistake.
2. I always try to practice what I preach.
3. I never resent being asked to return a favour.
4. I have never been angered when people expressed ideas very different from my own.
5. I have never deliberately said something that hurt someone's feelings.
6. I like to gossip at times.
7. There have been occasions when I took advantage of someone.
8. I sometimes try to get even rather than forgive and forget.
9. At times I have really insisted on having things my own way.
10. There have been occasions when I felt like smashing things.

Please do not write on this page

M M C S V INSTRUCTIONS

The statements in the MMCS V express opinions on a number of issues. You may find yourself agreeing strongly with some of the statements, disagreeing just as strongly with others and perhaps feeling uncertain about others. Your reactions reflect your own opinions and obviously in a belief survey there are no right or wrong answers. Whether you agree or disagree with any statement you can be sure that there are many people who feel the same way you do.

Indicate on the separate answer sheet (labelled MMCS V) how much you agree or disagree with each statement by darkening ● one of the following numbers:

1 = I AGREE

2 = I MILDLY AGREE

3 = I AGREE AND DISAGREE EQUALLY

4 = I MILDLY DISAGREE

5 = I DISAGREE

If you have mixed feelings about an item, decide whether you lean slightly more to one side than the other. Try to avoid the middle response. Remember that the best answer is whatever your personal opinion is and this is usually best reflected in your first reaction to an item, rather than after long debates with yourself over particular experiences.

M M C S V continued

20. Sometimes I feel that I have to consider myself lucky for the good grades I get.

21. I can overcome all obstacles in the path of academic success if I work hard enough.

22. When I get good grades, it is because of my academic ability.

23. Some low grades I've received seem to me to show that some teachers are just stingy with marks.

24. Some of my bad grades may have been due to bad luck, being in the wrong course at the wrong time.

Name _____

E S C SCALE ANSWER SHEET

Items 1 - 9: Place a number from 0 to 100 in the blank

0 5 10 . . . . . 50 . . . . . 90 95 100

Never All the time

Examples:

1. 90 This means almost all the time
2. 50 This means about half the time

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____

Items 10 & 11: Circle the appropriate number

10.
1. Extremely far above average
2. Very far above average
3. Far above average
4. Above average
5. Average
6. Below average
7. Far below average
8. Very far below average

11.
1. Extremely low
2. Very low
3. Quite low
4. A little bit low
5. A little bit high
6. Quite high
7. Very high
8. Extremely high

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