SENIOR SECONDARY SCHOOL PERSISTENCE AND ATTRITION:
TESTING A THEORETICAL MODEL USING A LOGIT ANALYSIS

by

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ABSTRACT

This paper explores the reasons why students decide to continue or discontinue their studies during the post-compulsory school years. This exploration involves the development, testing, and validation of a comprehensive theoretical model. The model portrays a causal sequence consisting of eleven constructs which leads to a decision to persist with or withdraw from senior secondary school studies. The constructs are drawn from similar studies of both tertiary institution and secondary school students and are labelled individual attributes, family background, school commitment 1, goal commitment 1, academic integration, social integration, needs accommodation, expectation versus reality, school commitment 2, goal commitment 2, and intention. The relationships among, and the relative importance of, these constructs that influence this decision over time are highlighted.

A sample of students from ten New South Wales rural and metropolitan secondary schools was surveyed three times over a thirteen month period to collect data on each of the constructs. A logit analysis was carried out to test and validate the developed theoretical model. The results of the logit analysis confirmed that the theoretical model was both adequate and appropriate in explaining and predicting senior secondary school persistence and attrition.

INTRODUCTION
Greater numbers of students throughout Australia are now staying on to complete post-compulsory schooling. In fact, between 1967 and 1992 the national retention rate in the post-compulsory school years more than trebled, with particularly sharp rises over the last decade. Despite these retention rate increases, considerable numbers of senior secondary school students still leave school before completing Year 12 (Department of Employment, Education and Training, 1991). This is an unsatisfactory situation which warrants consideration. If more students are to participate in post-compulsory education, it is critical that attention be paid to the decision-making process of those students who fail to complete this form of education. Also, if school systems are to retain students until the completion of Year 12, then various policies and services may need to be reviewed to ensure that the needs of all students are met. Although there is a wealth of literature on secondary school persistence and attrition (Coppell, 1986; Rumberger, 1987; Weidman and Friedmann, 1984), many questions about the developmental processes that guide students in their decision to either continue or discontinue secondary schooling remain unanswered (Finn, 1989, 1991). This situation has resulted largely from three phenomena: first, an overemphasis on the part of researchers on gathering isolated, descriptive data (Apps, 1981; Catterall, 1986); second, a tendency for researchers to focus investigations on the individual and ignore school processes and the interactions that take place between students and teachers (Stone and Wehlage, 1982); and third, an apparent lack of concern and urgency by researchers, including sociologists, psychologists, economists, and educators, to find common theoretical ground and to develop theoretical models which might more accurately explain and predict the secondary school persistence and attrition process (Weidman and Friedmann, 1984). A call made by Rumberger (1987: 111) for "... a more comprehensive, causal model of the dropout process" and a statement from Braithwaite (1987: 22) that "... the development of a coherent conceptual framework to explain the dynamics operating in the process of staying at school or leaving has not been outstandingly successful ..." highlight an obvious gap in the literature. Since the appearance of these two publications, evidence of theorising about the secondary school persistence and attrition process has come to light only on a very small scale.

Ainley, Foreman, and Sheret (1991) have made an important contribution by developing and testing a causal model using data from 3,000 Year 8 students gathered in 1987. However, this causal model was not strongly linked to the research literature relating to the development of theoretical models describing
factors which influence student persistence and attrition in secondary schools.

The aim of this study is to develop and test a more comprehensive, causal model of the senior secondary school student dropout process.

LITERATURE BACKGROUND
The tertiary institution persistence and attrition literature, in contrast to the secondary school persistence and attrition literature, is both theory-driven and theory-dominated and boasts a series of different conceptual models, including those of Aitken (1982), Bean (1982), Kember (1989), Stage and Richardson (1985), Voorhees (1987), Webb (1989), and Winteler (1986). It has been argued that such theoretical models and their constituent constructs, have the potential to help explain and predict the secondary school persistence and attrition process (Catterall, 1986). To date, however, only three studies (Apps, 1981; Catterall, 1986; Pittman, 1991) have attempted such an adaptation. Both Apps (1981) and Catterall (1986) modified the theoretical models developed by Spady (1970) and Tinto (1975); and, Pittman (1991) grounded his study in the work of Tinto (1975). The work of Apps (1981) and Pittman (1991) was deficient in so far as they relied on testing a sample at a single point in time rather than assessing the theoretical model longitudinally. Catterall's (1986) approach is also deficient in the explanation/prediction of the secondary school persistence and attrition decision-making process because he did not test the theoretical model he developed. Nevertheless, all these studies indicated that borrowing certain ideas from the tertiary institution persistence and attrition literature could be beneficial.

THE THEORETICAL MODEL OF SENIOR SECONDARY SCHOOL PERSISTENCE AND ATTRITION
It was suggested to earlier that an explanatory, predictive theoretical model of senior secondary school persistence and attrition might be derived from constructs and approaches found in studies of tertiary institution persistence and attrition. For this to occur, the constructs and approaches applicable to the tertiary sector had to be modified to suit the secondary school environment and also to accommodate the results of studies dealing with secondary school dropouts. This was the starting point for the development of the theoretical model used in this study.
This theoretical model is based mainly on the writings of Tinto (1975, 1982, 1988) but also recognises the contributions of three other researchers: Bean (1980, 1982) who showed that student intention to withdraw can be a strong predictor of college dropout behaviour; Winteler (1986) who demonstrated that student intention can be affected significantly by a student's study expectations; and, Neumann and Finaly-Neumann (1989) who established that if a student is to persist with his/her studies, then personal needs will need to be fulfilled.

The theoretical model, as represented in Figure 1, depicts the senior secondary school persistence and attrition process as a series of repeatedly modified interactions between the student and his/her environment at different times of the student's progress through Years 10, 11, and 12. The student's background characteristics including personal attributes and family factors combine to modify both high school and goal commitments which then affect the manner in which the student interacts with the high school's academic and social environments (see Tinto, 1975). The process is also marked by difficulties relating to the student's transition from junior (Year 10) to senior (Year 11) high school. In the early part of Year 11, the student contemplates whether or not his/her academic and social needs are being met appropriately (see Neumann and Finaly-Neumann, 1989) and, as well, if he/she is coping with the shift from one stage of schooling to another stage. In other words, is the reality of senior secondary school study similar to or different from his/her expectations (see Winteler, 1986)? These influences lead to a further assessment of high school and goal commitments (see Tinto, 1975) which in turn create an intention to leave or stay on at high school (see Bean, 1982), eventually resulting in a decision. Although all the constructs of this theoretical model can be traced to the tertiary institution persistence and attrition literature, it will be shown that the constructs are applicable, with some modifications, to a secondary school situation.

Definition of Variable Sets of the Model

The theoretical model, as shown in Figure 1, links 11 different constructs in a causal sequence which leads to a decision to persist with or withdraw from senior secondary school studies. In order to increase both the reliability and validity of the data relating to a particular construct, it is necessary to select a large number of variables (Apps, 1981). Where such
variables form logical and coherent groups, they are termed a variable set. In this study there are 12 variable sets, each of which is defined and described in terms of typical items that were used to collect data.

Individual Attributes.

Students' individual attributes such as age, gender, and locus of control influence their decisions about the future. As well, Year 10 Reference Test results provide a measure of academic achievement, a critical factor in this variable set.

Family Background Students' family background characteristics are factors affecting their future options. Questions seeking responses from students about the degree of parental encouragement they receive and sources of financial support tap information appropriate to this variable set.

School Commitment 1 Students maintain to varying degrees, a commitment to the ideals and principles of their school. Students with a strong commitment to their high school are more likely to continue their association with their school. Measures which tap school responsibilities and the degree of satisfaction with schooling experiences are key indices of the first school commitment variable set. This variable set is given the number 1 as it is the first of two measures. The following two questions provide a means of measuring school responsibilities and school satisfaction respectively.

Do you have (or do you expect to have) any special responsibilities at school this year (e.g., prefect, school council, or library duties)?

How satisfied are you with your schooling in Years 7 to 10?

Goal Commitment 1 Students who set short- and long-term goals relating to education and a vocation and then make a firm commitment to a specific goal, are more likely to realise that goal. The degree of goal commitment is an important factor in future success and is determined by asking questions such as:

What is the highest academic qualification that you think you will receive?
Realistically, what jobs do you expect to be able to do?

Academic Integration  Academic integration is determined primarily by the students' perception of their academic performances and level of intellectual growth. Students who believe that both their school work competence and study skills competence are high show a greater tendency to persist with their education.

Social Integration  Social integration is essentially a function of the extent and quality of peer-group interactions and of student exchanges with high school personnel. Responses to the following three questions provide an indication of social integration.

How would you rate your social life within this school?

How often do you contact teachers out of class about your outside-of-school activities?

Since starting high school, how often have you talked to the school counsellor about your personal problems (non-school work)?

Needs Accommodation Needs accommodation refers to the extent that students' perceived academic and social needs are seen to be met by their high school. Answers to the following two items indicate the degree to which this is perceived to occur.

To what extent have you been able to study subjects that you wanted this year?

To what extent do you find that you can meet and mix with other students (e.g., at lunchtime) to suit your needs?

Expectation versus Reality  The extent to which students' expectations match their perceived reality is a gauge of how well they are coping with the transition from junior high school to senior high school. The following two measures tap this notion.

I am coping with the amount of school work in Year 11 ... much better than expected - better than expected - as expected - worse than expected - much worse than expected

I am getting on with other students in Year 11 ... better than in Year 10 - about the same as in Year 10 - less well than I did in Year 10
School Commitment 2  Students revise their initial commitment to their school (school commitment 1) as a result of experiences gained during both Year 10 and Year 11. The following two measures tap this variable set.

If you could begin your secondary schooling again, how likely would it be that you would choose this school?

How much loyalty do you feel toward this school?

Goal Commitment 2  Students also revise their commitment to high school graduation and future plans (goal commitment 1) as a result of experiences within the academic and social context of Year 10 and academic and social experiences during both the Year 10 and Year 11 transition period and the latter part of Year 11. This variable set is measured by seeking answers to questions such as:

How important is it to you to complete Year 11?

How important is it to you to complete Year 12?

Intention  The intention to stay at or leave high school is the penultimate step in the high school dropout decision-making process. The following measure is used to tap this variable set.

To what extent do you agree with this statement -- I often think that I would like to leave school before finishing Year 12?

Decision  A measure of student intention is a good indicator of senior high school persistence and withdrawal. These two behaviours represent the final variable set, namely, decision to persist or withdraw, a decision verified by checking students' high school enrolment records.

METHOD
In order to achieve the aim of developing and testing a theoretical model which explained the decision either to continue or discontinue secondary school study, a research design that allowed for periodic review of the student decision-making factors was required. For this reason a longitudinal design was adopted. Although longitudinal studies can be expensive, time-consuming, and plagued by the problem of attrition, they have been recognised as the best approach to assess developmental changes in subjects (Beck, 1987).
Sample

The Hunter and Riverina regions are two of the ten designated administrative regions of the New South Wales Department of School Education. These two regions are characterised by a variety of settings including rural and metropolitan locations and, as a consequence, were selected for this study by using a non-random sampling procedure (Smith, 1973). Ten state co-educational secondary schools from these two regions were selected randomly to form three different secondary school subpopulations, namely, metropolitan, rural-urban, and rural-isolated subpopulations. This combination of sampling procedures constituted a mixed sampling method (Smith, 1973).

The New South Wales metropolitan secondary school population, as described by the Education Commission of New South Wales (1984), comprises students who attend secondary schools in the Sydney-Newcastle-Wollongong conurbation. Three secondary schools near Newcastle (Hunter region) make up the metropolitan subpopulation in this study. The state's rural-urban secondary school population, as defined by Boylan (1991), includes those students attending a secondary school at least 50 kilometres from the Sydney-Newcastle-Wollongong conurbation and within 100 kilometres of a provincial city with a population of 20,000 or more persons. Three secondary schools situated within the Riverina region formed the rural-urban subpopulation in this study. Students attending secondary schools in areas more than 100 kilometres away from a population centre of 20,000 or more persons make up the state's rural-isolated secondary school population (Boylan, 1991). Four secondary schools located within the Riverina region formed the rural-isolated subpopulation in this study. The metropolitan, rural-urban, and rural-isolated subpopulations were pooled to produce a sample of New South Wales state co-educational secondary school students. Since one of the intentions of this study was to follow longitudinally a cohort of Year 10 students through to the beginning of Year 12, only 1991 Year 10 students from the ten selected secondary schools participated in the study.

Instrumentation

Two data collection instruments were used, namely, questionnaires and a student database. The questionnaires were designed to
gather data on a broad range of variables dealing with junior and senior secondary school students. The main purpose behind the student database was to monitor the progress of the sample and to determine which students had remained in the same secondary school, and thus were available for future survey. Each of the data collection instruments, and its uses, are discussed in detail below.

Questionnaires. There were three questionnaires. Questionnaire #1 sought information about six of the twelve variable sets: Individual Attributes, Family Background, School Commitment 1, Goal Commitment 1, Academic Integration, and Social Integration. Questionnaire #2 sought information on two variable sets, namely, Needs Accommodation and Expectation versus Reality. Questionnaire #3 was designed to seek information about three other variable sets, namely, School Commitment 2, Goal Commitment 2, and Intention.

A variety of question formats was utilised including items requiring a dichotomous response, Likert scales, and open-ended questions. These questions were drawn largely from the sources listed in Table 1.

Table 1: Sources for Questionnaire Items

<table>
<thead>
<tr>
<th>Source Focus of Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Ainley, Batten, and Miller (1984) Secondary school persistence and attrition</td>
</tr>
<tr>
<td>3. Ashkanasy and Gallois (1987) Locus of control scale construction</td>
</tr>
<tr>
<td>5. Bean (1980) Tertiary institution persistence and attrition</td>
</tr>
</tbody>
</table>

8. Fox (1986) Tertiary institution persistence and attrition


10. Lefcourt, von Baeyer, Ware, and Cox (1979) Locus of control scale construction


15. Pascarella, Duby, and Iverson (1983) Tertiary institution persistence and attrition


17. Winteler (1986) Tertiary institution persistence and attrition

The school principal attached to each of the ten secondary schools was sent a letter during May 1991 about the general purpose of the study. Several weeks after this posting date, a follow-up telephone call was made to check that the letter had been received and to clarify and finalise details of the study. All the principals were supportive of the study and committed the necessary resources for the duration of the project. During September 1991, 900 copies of Questionnaire #1 were distributed amongst the ten secondary schools together with a
covering letter detailing how these questionnaires were to be administered. Each principal (or his/her delegate) supervised the questionnaire administration with the school's Year 10 student cohort. This task and the task of returning the completed questionnaires were to be executed within a four week period, and all school principals/delegates met the timetable set. This specified timetable was necessary to ensure that all sampled students completed the questionnaire at approximately the same time of the school year. A total of 844 questionnaires was returned but 27 could not be used for a variety of reasons (N=817). The two most common reasons for these rejections were that no name/identification was provided or only several pages had been completed. At this time, the principals/delegates also provided a complete set of English, Mathematics, and Science Year 10 Reference Test results which were added to the Questionnaire #1 data file.

Only those Year 11 students who had completed Questionnaire #1, and were still enrolled at the same secondary school, were asked to respond to Questionnaire #2. Each school principal/delegate had earlier advised the researcher of this number of students. Copies of Questionnaire #2 and a covering letter were sent to the participating secondary schools during April 1992. Once again, the school principals/delegates administered and then returned the completed questionnaires by post within a specified period of four weeks. A total of 574 questionnaires was returned within this specified period and all of these questionnaires were useable.

Approximately six months later the ten secondary schools were forwarded sufficient copies of Questionnaire #3 with a covering letter. The same cohort of Year 11 students was asked to respond to this questionnaire. The school principals/delegates supervised the administration of this questionnaire and then returned the questionnaires during late October 1992. A total of 484 questionnaires was received by the specified time and again all questionnaires were useable.

Student Database Following an assessment of Questionnaire #1 returns at the end of 1991, a student database was created to monitor the progress of each of the 817 students in the study. This database was updated three times to determine whether students had transferred secondary school, had left secondary school, had repeated a school year, or had continued to study with the same student cohort. School principals/delegates updated their student databases during May 1992 and October 1992 and then made a final revision during March 1993. Unfortunately,
the progress of a number of the students could not be recorded fully and, as a result, these students were deemed 'missing'. This student data loss occurred because a school-based student coding system was lost subsequent to the retirement of the school principal who maintained the student database. The progress status of the students in the study is provided in Table 2.

Table 2: Progress Status of Sample as of March 1993 Status Frequency Per cent Cum. Per cent

<table>
<thead>
<tr>
<th>Status</th>
<th>Frequency</th>
<th>Per cent</th>
<th>Cum. Per cent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Left School</td>
<td>194</td>
<td>4.4</td>
<td>29.7</td>
</tr>
<tr>
<td>Repeated</td>
<td>304</td>
<td>30.4</td>
<td>33.1</td>
</tr>
<tr>
<td>At School</td>
<td>494</td>
<td>60.5</td>
<td>90.6</td>
</tr>
<tr>
<td>Missing</td>
<td>78</td>
<td>9.4</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>817</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

A timetable denoting when and how data were gathered throughout the study is presented in Table 3.

Table 3: Data Collection Timetable Date Instrument Used

<table>
<thead>
<tr>
<th>Date</th>
<th>Instrument Used</th>
</tr>
</thead>
<tbody>
<tr>
<td>September 1991</td>
<td>Questionnaire #1</td>
</tr>
<tr>
<td>May 1992</td>
<td>Questionnaire #2</td>
</tr>
<tr>
<td>First Database Revision</td>
<td></td>
</tr>
<tr>
<td>October 1992</td>
<td>Questionnaire #3</td>
</tr>
<tr>
<td>Second Database Revision</td>
<td></td>
</tr>
<tr>
<td>March 1993</td>
<td>Final Database Revision</td>
</tr>
</tbody>
</table>

Questionnaire Data Screening

Data from the three questionnaires were coded and computer analysed using the SPSS programs titled LIST and FREQUENCY (SPSS,
The LIST procedure was used to check that the raw data matched the computer printouts, and the FREQUENCY analysis permitted a screening of the data to detect any out-of-range values and to check the plausibility of the means and standard deviations. Additionally, the coefficient of variation (i.e., the standard deviation divided by the mean) was calculated to determine whether it was greater than 0.0001 for all measured variables (Tabachnick and Fidell, 1989). These preliminary analyses showed that the data had been entered accurately and that there were no obvious signs of 'suspect' data. Those respondents who did not respond to pertinent questionnaire items were excluded, in most instances, from particular analyses requiring the inclusion of those data (Tabachnick and Fidell, 1989). In some cases where there were missing responses to core items in the questionnaires, these respondents were excluded from the study; for example, subjects who did not respond to items concerned with the intention to leave or stay on at high school. However, where missing values occurred for less important items, for instance, mother's occupational status, these cases

A two-group discriminant analysis could have been employed, in preference to logit analysis, if the ratio of the dichotomous dependent variable was lower than 80:20 (Pascarella et al., 1983).

One-tailed values of $t$ were used because the direction of the relationship between measures was hypothesised as yielding a positive $r$. 