

RESEARCH ON RETENTION AND ATTRITION

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EXECUTIVE SUMMARY

What is attrition?

In carrying out examinations of retention and attrition it is important to recognize that students withdraw from colleges and universities in different ways:

- Those who leave and tell the institution.
- Those who leave without telling the institution.
- Those who are required by the institution to leave.
- Those who do not return to progress from one year to another of a multi-level program.
- Those who take a break from studying but intend to return.
- Those who move from one institution to another to continue their studies.

How high is attrition and who leaves most?

Information from both the United States and Canada indicates that roughly 20 to 25 per cent of all first-year students do not proceed to a second year of study. An additional 20 to 30 per cent leave the institution in which they are enrolled in subsequent years. Many students who leave colleges and universities return and complete their studies at a later date.

How much does attrition cost?

The costs of attrition are borne by the student in terms of lost potential, by the university in terms of lost revenues and by society in terms of lost productivity. One Canadian study estimated that because of recruitment costs, each student who left before completion cost the institution \$4,230.

Theories of attrition

The main paradigm in research on attrition and persistence is Tinto's "student integration" model. In it, attrition is seen as a function of pre-entry characteristics, initial goals and commitments, academic and social integration, and final goals and commitments. With varying degrees of success, the model has been applied to the study of residential and commuter students in two- and four-year colleges and universities in the United States. The model is most useful when it is expanded to include the idea that events outside of the post-secondary context can also affect attrition.

Adult students

The attrition rate of adult students is higher than that of younger students. As the life circumstances of adult students are different from those of traditional, mostly full-time students, it was originally thought that the student integration model might be inapplicable to adults. However, once the model was expanded to include the possibility that events outside of the college or university could affect attrition, it was found to be of use in the study of adult student attrition.

Minority students

Similarly, the student integration model was inapplicable to minority students until it was modified to account for external factors.

Research limitations

Despite the general utility of the student integration model, research using the model is often characterized by inadequate conceptualization and operationalization, small sample size, low response rates and the utilization of inappropriate statistical techniques.

Canadian research on attrition

There has been very little Canadian research on attrition. The limited amount of research that has been carried out can be divided into atheoretical institutional studies and research based on the student integration model, which has demonstrated findings similar to the American research.

Who leaves and why?

American research on attrition has shown that understanding who leaves and why they leave varies by institution. In some institutions specific variables linked to the student integration model explain attrition, in others they are of no consequence. As a result, it is difficult to formulate generalizations. Perhaps the best that can be said is that most students leave in their first year, that academic integration has been found to be of particular importance in explaining retention in commuter colleges and universities and that the intention to persist is the best predictor of actual persistence.

Retention strategies

A number of individual strategies, such as mentoring programs, have been found to increase retention. It has been argued, however, that retention is best achieved by a total institutional commitment to the objective. In this scenario retention becomes the responsibility of all parts of the college or university and is not isolated to specific sections of the institution.

INTRODUCTION

This report is concerned with:

- Knowing the different theoretical perspectives that can be brought to bear on the issue of attrition.
- Knowing when students are likely to leave post-secondary education and if they return.
- Identifying which students are most likely to leave post-secondary education and what they have in common.
- Identifying the most effective strategies available to prevent students from abandoning their studies.

The report focuses on these and other important post-secondary attrition issues; however, because of overlap among these concerns, rather than taking each and dealing with it separately, these concerns guide discussion in various sections of the report. A brief synthesis of findings relevant to each area of concern is provided in the Conclusion.

Unfortunately, while there is a great deal of research on attrition in the United States, there is little in Canada. As a result, in this report, considerable information will be presented from American studies. It is important to note, though, that there are differences in the post-secondary systems between the two countries. For example:

- The United States has far more residential colleges than Canada.
- Fee structures vary more in the United States than in Canada.
- In comparison to the United States, Canada has few private post-secondary institutions.
- The racial composition of American society is different from that of Canadian society.
- Canadian students are more likely than American students to enrol at their local university.
- There is more diversity in the quality of post-secondary institutions in the United States than in Canada.
- The structure of post-secondary education in the United States is more varied than in Canada – e.g., two- and four-year colleges.

For these and other reasons it would be mistaken to believe that the conclusions of studies conducted south of the border can be applied uncritically to the Canadian context. Such studies can, however, sensitize Canadian researchers and policymakers to some of the main issues in research on attrition.

WHAT IS ATTRITION?

It is important to note that there are different forms of attrition. As pointed out by Nichol and Sutton (2001, page 11), students withdraw from post-secondary education in different ways:

- Those who leave and tell the institution.
- Those who leave without telling the institution.
- Those who are required by the institution to leave.
- Those who do not return to progress from one year to another of a multi-level program.
- Those who take a break from studying but intend to return.
- Those who move from one institution to another to continue their studies.

In the published research on attrition it is not always possible to distinguish among these groups of institutional leavers. This is regrettable because students who fall in one category or another may differ from one another in academic and personal characteristics. Also, although they are dealing with the same general issue, some researchers focus on attrition while others deal with retention. In the current report, rather than attempting to convert discussions of retention to discussions of attrition, attention will focus on the attrition or retention side of the coin as decided by the researcher whose work is under review.

HOW HIGH IS ATTRITION AND WHO LEAVES MOST

AMERICAN EVIDENCE

From 1983 to 1999 there was very little change in the first-year attrition rate in the United States. During this period, for institutions offering a Ph.D., first-year attrition fluctuated between 23% and 27% (ACT, 2000). Over the same time period, however, graduation rates decreased from 58% to 52% (ACT, 2000).

In the United States, on an annual basis, the Consortium for Student Retention Data Exchange (CSRDE) collects information on retention from 407 colleges and universities (including McGill University and the University of Toronto in Canada). Its most recent data show that of the 1999 first-year cohort, 20% of students did not return for a second year of study at the same institution in the year 2000. There were, however, important differences based on race, the number of part-time student enrolments, institution size and the entering qualifications of students.

By far, the highest attrition rates were for American Indians (33%), followed by Blacks (25%), students of Hispanic origin (24%), “Non-resident aliens” (22%), Whites (20%), and students of Asian origin (13%) (CSRDE, 2001a). Rates also varied by the number of part-time enrolments. Institutions with fewer than 10% part-time students reported attrition rates of 15% while those with more than 20% part-time students had attrition rates averaging 27%. Large institutions, with 18,000 students or more, reported first-year attrition rates of 17%, while those with fewer than 5,000 had an average attrition rate of 28%. Finally, institutions with the highest admission requirements had low attrition rates (13%) while those with the lowest entrance requirements reported

high attrition (31%). When examining figures such as these, it is important to bear in mind that reported rates of attrition might bear a stronger relationship to measures not cited than to the characteristics of the institutions reported by CSRDE. For example, it is likely that students attending institutions with high entrance requirements come from homes with relatively good incomes in which they would have been exposed to advantages denied students from low-income families.

While CSRDE does not supply information on the rate of attrition beyond the first year, it does provide six-year graduation rates. For the 1994 entering cohort the six-year graduation rate was 54%. Those most likely to graduate after six years were Asian students (61%), while American Indians had the lowest graduation rates (36%). Institutions with 10% or fewer part-time students had a graduation rate of 66.3% compared to only 39% for colleges and universities with more than 20% part-time students. Large institutions graduated 60% of their 1994 cohort while the graduation rate for those with fewer than 5,000 students was only 46%. Not surprisingly, institutions with high entry requirements had graduation rates of 67% compared to only 33% for those with low entry requirements (CSRDE, 2001b).

It is important to note that the trends reported above do not always characterize experiences at particular universities. For example, at the University of Hawaii (Manoa), among the 1995 entering cohort, the lowest rates of first-year attrition were reported for

From 1983 to 1999 there was very little change in the first-year attrition rate in the United States.

students of Japanese and Chinese origin (10%), and the highest for Whites (32%) (University of Hawaii, 1998, page 3). Findings such as these indicate that local circumstances may result in atypical attrition patterns.

In recognition of this possibility Astin (1997) developed a formula based on high school grades and SAT scores, gender, and race that can be used by American universities in measuring a "natural" retention rate. If attrition is greater than normal, improvements can be attempted. Overall, in regression analyses, Astin shows that high school marks are by far the best predictor of attrition for all groups with the exception of students of Puerto Rican origin (the lower the marks, the greater the probability of attrition). Unfortunately, no similar formula has been developed for Canadian colleges and universities although, as will be seen later, the relative effect of race on attrition has been studied at one university.

From the foregoing it is evident that considerable information exists on rates of first-year attrition and on the number of students who complete degrees over a five- or six-year period; unfortunately, global rates of attrition between second and third, and subsequent years are hard to come by. As noted above, however, the most recent U.S. research indicates an average first-year attrition rate of 20% and a six-year graduation rate of 54%. In essence, assuming a small completion rate after six years, nearly one half of attrition occurs between first- and second-year, and the remaining half occurs over the following four years. Studies of individual institutions confirm that most attrition occurs between first and second year.

Research conducted at a large urban university examined all undergraduate students who were enrolled in the fall of 1992 and who did not return for the spring term in 1993 (Ahson, Gentemann, & Phelps, 1998). An examination of these students carried out in 1997 showed that the number of students

who returned to the university was related to their study level in 1993. Among those who were in their first year, only 19% returned. For second, third, and fourth years the figures were 28%, 36%, and 55% respectively (page 7). In other words, the more advanced the student when leaving the university, the greater the probability of return at a later date.

Similar findings were found in a study at Oregon State University, where it was shown that the probability of retention of domestic students at the end of the first year was .82. At the ends of years two and four the probability decreased to only .72 and .61 respectively (Murtaugh, Burns, & Schuster, 1999, page 362). This same study showed that of the 1995 cohort who did not return in 1996, 26% re-enrolled in 1997 (page 358).

The findings of a study conducted at the University of Wisconsin of all Spring 2000 undergraduates who did not re-enrol in any term in 2001 (Matross and Huesman, 2002) were consistent with those at Oregon State. Among students in all years who left the university, 47% stated that they intended to return. Forty-three per cent said that they would not return (page 7). The remainder were not sure. The number of first-year students who planned to return was 52%. The comparable figures for second, third and fourth years were 39%, 51% and 70% respectively. While the relationship is not linear, these findings again suggest that in general the probability of return is greater for students who have already spent a substantial amount of time at the university. Importantly, of students who did not intend to return to the university, 56% were enrolled at another higher education institution (page 9). The information gained from these studies clearly indicates that simply examining an institution's attrition rate may paint a misleading picture of the number of students who leave higher education.

CANADIAN EVIDENCE

Regrettably, the amount of published data on attrition in Canadian universities and colleges is limited. In a study of all Ontario university students enrolled between 1980 and 1993, Chen and Oderkirk (1997) found an attrition rate of 30%. In a background paper for the Commission of Inquiry on Canadian University Education, Gilbert (1991, page 11) estimated that after five years the attrition rate (defined as the number of non-completers) for university undergraduates who entered university in 1985 was 42%. This figure is close to the six-year attrition rate of 46% for the 1994 cohort reported by CSRDE for U.S. colleges and universities (CSRDE, 2001b). Gilbert found that five-year attrition varied by major field of study as follows (page 12):

TABLE 1

FIELD OF STUDY	5-YEAR ATTRITION RATE
Fine and Performing Arts	47%
Science	44%
Arts	42%
Education	36%
Engineering	36%
Human Kinetics/Physical Education	34%
Business/Management/Commerce	31%
Health Sciences	23%
Law	23%

As in the United States, attrition is lower in professional fields than in arts and science, and institutions with high entering averages have lower attrition than less selective institutions. For example, for universities with the highest entering averages in 1985 the attrition rate over five years ranged between 15% and 48%. For universities with low entering averages the range was from 37% to 68% (page 9). Five-year attrition rates were highest for part-time students (from 63% to 89%).

Unfortunately, Gilbert did not report on first-year attrition. In a study of 13 universities, however, Wong (1994a) found an average first-year attrition rate of 24%, with a range from 12% to 44%. This average is slightly higher than the 20% first-year attrition rate reported by CSRDE (2001a) for its 1999 cohort. Overall, however, long-term degree completion and first-year attrition rates for both Canada and the United States are comparable.

Combining the findings from both Gilbert's and Wong's research we see that as in the United States, approximately one half of all student attrition occurs between first and second year. Similar conclusions derive from an analysis of all students entering undergraduate programs in Ontario universities from 1980 to 1984. By 1993, 68% had graduated from a university program. Of those who did not graduate, 51% left university after one year, 19% after two years, 10% after three years and 20% left after four or more years (Chen and Oderkirk, 1997).

The limited number of Canadian institutional studies are consistent with the findings of Gilbert and Wong and Chen and Oderkirk. A study of Scarborough College, University of Toronto, showed that in the 1970s the average first-year attrition rate was 20%. The cumulative second-year rate increased slightly to 25% (Ungar, 1980, page 59). At Dalhousie University, Day, Murphy, and Marriott (1987) found a first-year attrition rate of 25%. A full 40% of entrants did not graduate. Again, arts and science programs lost more students than professional programs.

Attrition rates found at Okanagan University College were higher than those reported so far for large universities. Although little change in overall attrition rates were found between 1990–91 and 1995–96, on average, in the first term, the College lost 22% of its Arts students; a further 31% left after the

second term. These figures represent an average first-year attrition rate of 53%! Similar results were found for students enrolled in the sciences. Importantly, students who achieved low grade point averages were more likely than others to leave the College (Okanagan University College, 1996).

Unfortunately, little is known of the attrition rates of various racial groups in Canadian post-secondary institutions. In a study of the 1994 cohort at York University, however, it was found that the first-year attrition rate was highest for Black students (33%) and lowest for students of Chinese and “other non-European” origins (16%). The rates for students of South Asian and European origins were 19% and 21% respectively. If the number of students who involuntarily left the university are examined, a slightly different picture emerges. The greatest number of involuntary leavers were found among Black students (16%); the fewest (3%) among students of “other non-European origin.” Eleven per cent (11%) of Chinese origin students left the university because they had no choice, as did 9% of European origin and 10% of South Asian origin students. Differences among ethno-racial groups were statistically significant (Grayson, 1998, page 331).

CONCLUSION

Overall, information collected on attrition in the United States and Canada leads to a number of conclusions:

- In both countries, first-year average attrition rates are about 20% to 25%.
- In both countries, long-term average completion rates are about 60% of an entering cohort.
- In both countries, average attrition and completion rates appear to vary with the entering marks of students.
- In both countries, there are substantial variations in first-year attrition and long-term completion rates from institution to institution.
- The largest single percentage of attrition occurs between first and second year.
- While there are fluctuations from year to year, overall attrition rates appear to be relatively stable in both Canada and the United States.
- Large numbers of students who leave an institution of higher education return at a later date or enrol in a different institution.

HOW MUCH DOES ATTRITION COST?

There are two costs associated with attrition from college or university. If we exclude from consideration students who simply do not have the academic ability to benefit from post-secondary education and therefore drop out, attrition has a cost to the student in terms of unfilled potential and to society in terms of potential loss of future productivity.

Attrition has additional costs. For example, in Britain, the Audit Commission estimated that the cost of attrition of 16- to 19-year-olds was £5,000,000 a year (Fielding, Belfield & Thomas, 1998). In the United States, according to Bean and Hossler (1990), a student who stays with the institution for four years generates the same income as four new students who leave after one year. At the University of St. Louis in the United States it is estimated that each 1% increase in the first-year retention rate would result in approximately \$500,000 in additional revenue by the time students graduate (Nicol & Sutton, 2001, page 6). In Canada, at the Okanagan University College, researchers estimated that because of recruitment costs the College lost \$4,230 for each student who did not proceed to second year (Okanagan University College, 1996).

While attrition results in potential costs to the student, the institution, and, ultimately, taxpayers, it should not automatically be viewed as a bad phenomenon. For some, leaving post-secondary education, for various personal reasons, may be the right thing to do. Moreover, many students who leave post-secondary education return to college or university at some point in the future (Smith & Saunders, 1988).

THEORIES OF ATTRITION

THEORY DEVELOPMENT

An examination of theories of student attrition is best seen in connection with Thomas Kuhn's (1996) notions of pre-paradigmatic, normal and revolutionary science. As noted by Andres and Carpenter (1997, page 5), until the nineteen-seventies, research on attrition was largely descriptive and atheoretical. For example, in a study of the University of Chicago at Chicago Circle, Zaccaria and Creaser (1971) merely examine the relationship between grade point average and attrition. Findings on this and other relationships were not integrated into a systematic theory, in large part because the relevant theories of attrition per se had yet to be developed. This period, in which research lacked real theoretical focuses, corresponds to Kuhn's pre-paradigmatic period.

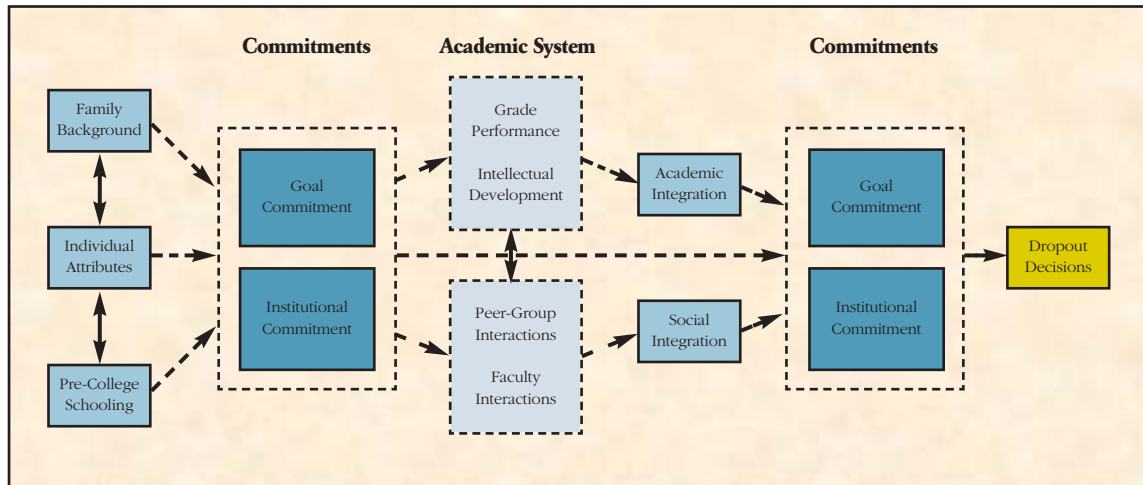
As pointed out by Andres and Carpenter (1997, page 5), the early seventies saw the emergence of a number of psychological theories focusing on attrition (Fishbein & Ajzen, 1975; Attinasi, 1986; Ethington, 1990). In essence, research on student attrition began to have a theoretical focus, thus marking the end of a pre-paradigmatic stage. Despite this development, psychological models have been criticized for the limited amount of variance in attrition that they can explain. This limitation aside, the emergence of such models marked a stage in which different theories of student attrition began to compete with one another.

STUDENT INTEGRATION MODEL

The main model of student attrition to emerge in this period, and the one that is still taken to account in most current research, is Tinto's (1975; 1993) model of "student integration." As pointed out by Braxton (1997, page 93), "Tinto's interactionist theory possesses near paradigmatic stature in the study of college student departure given that citations to this theory have numbered more than 400 and 170 dissertations have referenced or used it." The main aspects of this model are found in Figure 1.

As seen from the diagram, Tinto postulated different sets of factors that affect student attrition. Students enter university with various *pre-entry characteristics*, such as

advantages or disadvantages associated with having a relatively affluent or low-income family background, varying degrees of high school preparation, and individual skills and abilities. Factors such as these are related to the *initial goals and commitments* that students bring with them to their studies. Such goals and commitments can be further divided into career and education goals, and commitment to the particular institution in which students are enrolled. It might be expected that, for example, students with good high school grades might have more well-defined career goals than their peers with low levels of high school achievement.

FIGURE 1: STUDENT INTEGRATION MODEL (TINTO, 1975)

Once enrolled, students begin to have various institutional experiences in the *academic system* that include grade performance and intellectual development, and interactions with faculty and peers. Each represents academic and social integration respectively. Importantly, interactions with faculty and peers can be of consequence for grade performance and intellectual development.

What can be viewed as *emerging goals and commitments* include the student's career and education goals, and commitment to the institution, as potentially modified by institutional experiences. For example, students may come to university with high education goals; however, if they fall in with a "bad crowd" such goals may be seriously compromised. Overall, if there is an affinity between the student's initial goals and commitments and the types of activities he or she engages in on campus (i.e., institutional experiences), he or she can be expected to maintain his or her goals and commitments and continue in his or her studies. A lack of congruity is more likely to result in either transfer or dropout (system leavers). The most important aspect of Tinto's theory is that persistence can be associated with what goes on inside a higher education setting. As

a result, policies can be introduced in colleges and universities that maximize the possibility of students continuing with their studies.

A major concern of empirical investigators working with Tinto's theory was that his insights derived primarily from analyses of white, middle-class students who lived in residence on campus. Would his propositions be helpful in the study of the attrition of non-white, less affluent students who commuted to university? In the United States, what about students who go to two-year as compared to four-year colleges? What about mature students who might be taking only a few classes a year? Consistent with Tinto's own model, the pre-entry characteristics, initial goals and commitments, institutional experiences, emerging goals and commitments, and consequent educational destinations of these groups could be considerably different from the groups on which he based his theory. As will be seen, research based on an integration of Tinto's and others' models is gradually providing answers to questions such as these.

In the early eighties, a number of studies were conducted in which the intent was to test the propositions embedded in the students integration model. Activities like these constitute "normal" science in Kuhn's conceptualization, in that the model's

theoretical propositions were subject to testing and extension by other individuals. Some of these early studies confirmed that institutional experiences as conceptualized by Tinto did indeed have major impacts on the re-enrolment decisions of first-year students living in residence (Pascarella & Terenzini, 1979). The attrition patterns of non-traditional students (e.g., those who did not live in residence) were also studied. As the vast majority of students in Canadian colleges and universities do not live in residence, it is worthwhile examining the results of this research in some detail.

In a study of first-year attrition in commuter university, the University of Illinois, Chicago Circle, Pascarella, Duby, Miller, & Rahser (1981) employed a number of ideas either implicit or explicit in Tinto's model, however, their operationalization was incomplete as, apart from grades, they did not include, for example, measures of institutional experiences. Nonetheless, they did look at the influence of pre-entry characteristics and goals and commitments in a systematic way.

Among other things they found that in this setting, different factors explained persistence, stop-out and dropout behaviour. Persisters "tended to be younger, to have higher levels of secondary school achievement, to perceive themselves before enrolment as less likely to dropout temporarily, and to be more likely to expect to transfer to another college" (page 346). By comparison, the characteristic stop-outs were black men and women who had relatively high levels of high school achievement and who fully expected to temporarily interrupt their education. While we do not know if dropouts left the university voluntarily or involuntarily, what most characterized them from the other two groups were their relatively low high school performance and first-year grades (page 347). Overall the variables in their model correctly classified 48% of persisters, stop-outs and withdrawals (page 345).

An analysis of students entering four-year colleges based on the National Longitudinal Study of the High School Class of 1972 conducted by Munro (1981) also employed some of the ideas embodied in Tinto's model. In this instance it was found that most of the variables under study had effects consistent with predictions based on the student integration model. Overall, however, the model explained only 14% of variation in withdrawal behavior (page 139).

A full application of the student integration model to first-year students in a commuter university, with a focus on persistence and voluntary withdrawal, was undertaken by Pascarella, Duby, and Iverson (1983). The overall conclusion they reached with respect to the efficacy of the model was that, "certain parts of the model function effectively in non-residential institutions" (page 96). More specifically, academic, but not social, integration, contributed to retention for a second year. Indeed, after sex and expressions of intent to continue for a second year, academic integration had the greatest impact on actual persistence. Surprisingly, in view of its status in the student integration model, social integration had an impact of equal magnitude predisposing students to withdrawal. Neither institutional commitment nor commitment to graduation affected persistence. The variables in this model correctly identified 82% of persisters and withdrawers (page 94).

Research on the degree to which Tinto's model was equally applicable to two four-year residential colleges, four-year commuter colleges, and two-year commuter colleges was carried out by Pascarella and Chapman (1983). One of the important aspects of this study was that two-year U.S.

Some of these early studies confirmed that institutional experiences as conceptualized by Tinto did indeed have major impacts on the re-enrolment decisions of first-year students living in residence.

colleges might be viewed as comparable to most Canadian community colleges. The students involved in the study were drawn from 11 two- and four-year colleges. The focus of the research was on persistence to second year and voluntary withdrawal.

Overall the researchers found that the amount of variance in attrition explained by the model was 17% for four-year residential colleges, 13% for commuter four-year colleges, and 17% for two-year colleges (page 94). For all three types of institutions the variance explained by the model was low. Moreover, it is evident that the model is as efficacious for four-year residential colleges as for two-year commuter institutions. Importantly, in all three cases, the theoretically important variables of academic and social integration contribute little to the overall variance. Consistent with previous studies, however, social integration negatively affected attrition in the residential settings while academic integration negatively affected attrition in the commuter institutions. Overall the authors conclude that, "persistence in primarily commuter institutions will be more likely to be directly influenced by student background traits, while the influence of such student traits in residential institutions is more likely to be mediated by the actual experience of college" (page 99).

While the previous study gave some credence to Tinto's model, research based on students in two- and four-year colleges drawn from the National Longitudinal Studies Program came to more qualified conclusions

(Williamson & Creamer, 1988). Using students who were enrolled during the 1980-81 academic year, the authors of the study found that the model explained 17% of the variance in persistence for students in four-year colleges and 11% for students in two-year colleges. These amounts of explained variance are similar to those found in other studies. In this study, however, it was found that social and academic integration explained less of the variance in attrition than background characteristics. The authors hypothesize that as dropouts were defined as those who did not return to school after a 20-month absence (in most previous studies dropouts were those who did not return immediately for a second year — they could have re-enrolled later), the impact of social and academic integration on attrition declines over time. By contrast, under circumstances such as these, the importance of background characteristics in explaining attrition increases.

Clearly, Tinto's student integration model generated a considerable amount of systematic inquiry into attrition, particularly from first to second year. Overall, empirical research based on the model: (1) was able to explain limited amounts of variance in attrition, (2) found that the importance of various factors in the model explaining attrition varied from one institution to the next, and (3) showed that despite the claims of some critics the important explanatory variables in the model were useful in explaining attrition in both commuter and residential institutions and in both two- and four-year institutions.

STUDENT ATTRITION MODEL

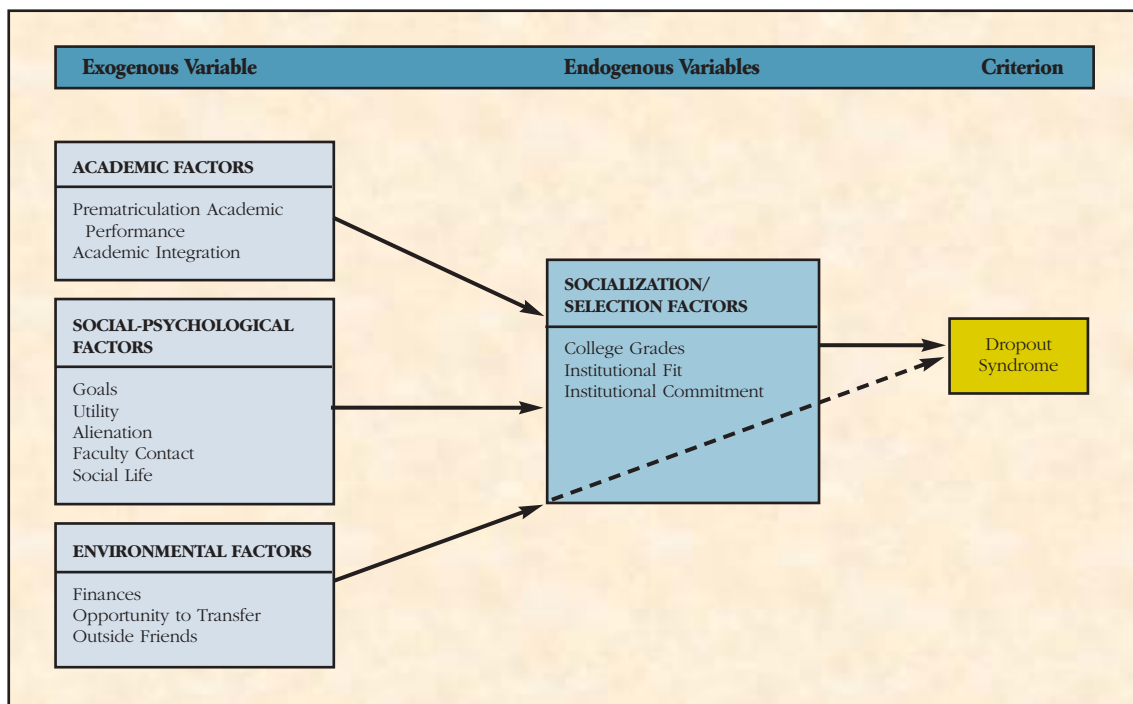
Despite the fact that empirical research in general profited from adoption of the student integration model, it was not without its critics. Most important in this regard were Bean and Metzger (1985) who included in their “student attrition model” factors not included by Tinto. In view of subsequent developments, chief among these were factors external to the post-secondary context, such as finances and the influence of friends. The main elements of Bean and Metzger’s conceptualization can be found in Figure 2.

As can be seen from the figure, Bean and Metzger divide exogenous factors that can affect attrition into *academic*, *social-psychological* and *environmental* elements. The factors included in the academic category are consistent with Tinto’s conceptualization. Among the factors considered social-psychological, the concepts goals, faculty contact and social life are also consistent with Tinto’s

model. Utility and alienation are only remotely suggested by Tinto. All three factors considered environmental (finances, opportunity to transfer and outside friends), are not included in Tinto’s model. The factors included in the socialization/selection category (college grades, institutional fit and institutional commitment) are also consistent with Tinto’s model. Having said this, it must be stressed that even where there is overlap between Tinto and Bean and Metzger, the concepts are utilized differently in each model. For current purposes it is not necessary to explore these differences in depth. In view of later developments in attrition theory it is sufficient to highlight the emphasis placed by Bean and Metzger on external factors.

Despite the fact that Bean and Metzger employ some of the same concepts as Tinto, returning to Kuhn’s conceptualization, it is fair to say that their model represents a paradigmatic challenge to the student integration

FIGURE 2: STUDENT ATTRITION MODEL (BEAN AND METZGER, 1985)



model. As will be seen later, however, toward the late 1980s, researchers began to show that a synthesis of the two models yielded valuable results.

In the introduction to a study that compared the utility of both models on the same group of students, Cabrera, Castaneda, Nora, and Hengstler (1992) point out that:

Both models regard persistence as the result of a complex set of interactions over time. The two models also argue that pre-college characteristics affect how well students subsequently adjust to their institution. Further, the two models argue that persistence is affected by the successful match between the student and the institution... Unlike the Student Integration Model, the Student Attrition Model emphasizes the role factors external to the institution play in affecting attitudes and decisions. Whereas the Student Integration Model regards academic performance as an indicator of academic integration, the Student Attrition Model regards college grades as an outcome variable resulting from social-psychological processes (page 145).

They also point out that empirical research on the student integration model indicates that academic integration, social integration, institutional commitment and goal commitment have the greatest impact on retaining students. By comparison, research based on the student attrition model indicates that the intent to persist, attitudes, institutional fit and external factors like family approval, encouragement of friends, finances and perceptions about opportunity to transfer elsewhere affect decisions to stay or leave the institution.

The analysis of Cabrera, Castaneda, Nora, and Hengstler based on the 1988 entering class in a "large southwestern urban institution [mainly commuter]" focused on the amount of variance in attrition explained by each model. While the student attrition model (Bean and Metzger) explained 44% of the variance in persistence, the student integration model explained only 38% (page 152-153). This said, the student integration had more of its hypotheses validated than the student attrition model. The authors conclude that the student attrition model assists in revealing the importance of external factors on attrition and urge research that would combine the insights of both models.

MODEL INTEGRATION

A major step in the direction of combining both models was taken by three of the authors of the 1992 study (Cabrera, Nora & Castaneda, 1993). Using the same sample as in their previous research they examined the effects of Tinto's model when combined with the ideas of encouragement from family and friends and financial attitudes as found in Bean and Metzger's model. They discovered that the largest total effect on persistence was exerted by intent to persist followed by grade point average, institutional commitment, encouragement from family and friends, goal commitment, academic integration, attitudes toward finances (e.g., satisfactory) and social integration. Overall, the model accounted for 45% of the variance. As seen above, the student attrition model itself explained 44% of the variance. In essence, combining the insights of both models had only a marginal effect on predictive power over the student attrition model; however, the integrated model more realistically identified the ways in which factors internal and external to the university affected attrition.

Building on the work of Tinto, Bean and Metzger, and Cabrera et al., Sandler (2000) adds the concepts of "career decision making self-efficacy (CDMSE)" "perceived stress," and "financial difficulty" to the evolving model. CDMSE is defined as "the degree of confidence students express about their competency or ability (self-efficacy) to embark on informational, education, and occupational goal planning activities" (page 538). Sandler tests the integrated model on a sample of adult students in what is described as a "private urban research university."

Overall, the model explained 43% of the variance in persistence (page 561). This amount is comparable to that found in other studies. While some of the findings of the

research appear to be counterintuitive, for current purposes it is important to note that financial aid had a positive effect on retention.

There are three important conclusions to be drawn from Sandler's research: First, as will be seen later, concerns were originally expressed about the ability of models based on research of traditional undergraduate students

(young, in residence) to explain the behaviour of non-traditional students, such as commuters, adults and minorities. Sandler's study clearly shows that extensions of the original Tinto and Bean and Metzger models can assist in the explanation of attrition among adults. Second, financial aid has a positive impact on retention. Third, although Sandler's model explains no more of the variance in attrition than less developed models, it more adequately addresses the complexity of processes leading to attrition than its predecessors.

STUDENT INVOLVEMENT

Before leaving this section on theoretical approaches to the study of attrition it is important to briefly discuss Astin's notion of "student involvement" as embodied in his *input-process-output* model. According to Astin (1984, page 297), "student involvement refers to the amount of physical and psychological energy that the student devotes to the academic experience." In general, the greater the involvement, the more positive the educational outcomes, such as retention. Although a considerable body of research makes use of Astin's ideas, as Pascarella and

Although Sandler's model explains no more of the variance in attrition than less developed models, it more adequately addresses the complexity of processes leading to attrition than its predecessors.

Terenzini (1991, page 51) point out, “whether Astin’s propositions constitute a ‘theory’... is open to question.”

Research establishing the importance of involvement to retention includes recent work by Berger and Milem (1999). The importance of their research stems from the fact that they integrate the notion of involvement into a model based to a degree on Tinto’s conceptualization. As they point out, most of the research testing Tinto’s model has “focused on the perceptual components of academic and social integration while ignoring measures of actual behaviours” (page 642). In their research they remedy this limitation by asking students entering a “highly selective, private, residential research university” in 1995 questions operationalizing Tinto’s model as well as questions on how involved they were with faculty and peers and with various aspects of campus life. Importantly, through questionnaires administered early and late in the first year, they were able to examine attitudes and behaviors just after the start of the first term and late in the second term.

The results of the research indicate that in both the first and second terms involvement with faculty had positive consequences for persistence. Involvement with peers in the first term also had positive implications for eventual persistence. In both terms non-involvement in campus activities had the largest single negative effect on persistence. Third in negative effect on persistence was being Black. Social integration had a moderate positive effect on persistence while the effect of academic integration was both positive and relatively large.

The authors believe that among the most important of their findings is that behaviours early in the first year predict retention behaviour between first and second year. As they note, “the pattern of positive direct effects suggests that early involvement with faculty increases the likelihood that students will have

positive perceptions of institutional support and subsequent institutional commitment, and persistence” (page 658).

There is a great deal of research into attrition in the United States; however, the works chosen for inclusion in this report represent those, like Tinto, that have paradigmatic status. As argued above, Tinto’s work has been extended by the inclusion of concepts relevant to events outside of the educational setting. What has not received attention is the vast amount of research that replicates or extends in minor ways ideas embodied in the synthesis of Tinto’s and other models (e.g., Bogdan & Bean, 1994; Thomas, 2000). This work, that is valuable but not path-breaking, falls into the category of what Kuhn describes as normal science. It does not lead to a fundamental change in the direction established by Tinto.

CONCLUSIONS

There are a number of conclusions that can be drawn from the preceding analysis of theories of attrition.

- Tinto’s student integration model has achieved paradigmatic status in the realm of research on attrition.
- Tinto’s model has been applied with varying degrees of success to examinations of residential and commuter students and to students in two- and four-year colleges.
- The best understanding of attrition is provided by an integration of the student integration model and the student attrition model of Bean and Metzger.
- Although Astin’s notion of student involvement is applied in examinations of attrition, it does not constitute a theory.

ADULT STUDENTS

Relatively little research has been carried out on the attrition of adult students from colleges and universities. The research that has been conducted has largely worked with assumptions relevant to traditional undergraduate students (Kasworm, 1990). This approach may be misleading for two reasons. First, the life circumstances of adults are different from those of traditional students. While a large number of the latter work, most do so on a part-time basis, while many adult students have full-time jobs and families. As a result of job and family commitments, many adults may have less time than traditional undergraduates to devote to their studies. As a result, when adults enrol in programs of post-secondary education, they may not intend to complete their studies without interruptions (Kerka, 1995). Second, given the academic paths of many adult learners, the notions of attrition and retention that are applied to traditional students may have little meaning. For example, adult students taking one course at a time may easily stop-out for a term or two because of obligations in other areas of their lives. Because of possibilities such as these, a study conducted at DePaul University (Ben-Yoseph, Ryan, & Benjamin, 1999) defined its terms in the following ways:

- Retention: graduation or enrolment in any quarter within the past four quarters by students who are admitted to the undergraduate degree program.
- Attrition: lack of enrolment within the past four quarters by students admitted to the undergraduate program.
- Inactivity: lack of enrolment within the past one to three quarters by students admitted to the undergraduate degree program.

Definitions such as these, that are in keeping with the academic careers of adult students, are different from those used in examinations of traditional students.

Because of difficulties associated with examining the year-to-year attrition of adult students in the same way as traditional students, Ashar and Skeenes (1993) focused on course retention. In an examination of 25 adult learner classes they found that, consistent with Tinto's student integration model, social integration in the class contributed to retention. Academic and career integration had no effect. Although class size was not considered by Tinto, Ashar and Skeenes found that it explained a considerable amount of the variance in attrition. The smaller and more homogeneous the classes, the smaller the attrition rate. Overall, the model explained 44% of the variance in attrition. As noted above, research by Sandler (2000) also suggests the applicability of models developed initially with traditional students in mind to adult students.

As well as dealing with some concepts found in Tinto's model, a Canadian study examined adult students' educational intentions prior to their beginning of classes in first year at York University (Grayson, 1997). In this research, students entering a faculty specializing in part-time adult education in 1993 were surveyed prior to the beginning of classes and again at the end of first year. The overwhelming predictor of students not returning for a second year was their intention prior to enrolment, for various reasons (such as already having a degree), of not completing a degree. Of those who stated that their educational plans did not include a degree, 58% left the institution. Among students who prior to entry stated that they wanted to earn a bachelor's degree, only 27% left the university (page 20). This attrition

figure is comparable to the attrition rate of traditional students. Other predictors of retention were taking relatively large numbers of courses and by the end of first year having the intent to return. Students who did not return for a second year did not differ from persisters in terms of barriers to education, institutional experiences over the first year, or satisfaction with various aspects of their education.

Despite the fact that, as noted above, the life circumstances of adult students are different from those of traditional undergraduates, some of the concepts relevant to traditional student attrition are also applicable to adult retention. In applying such concepts, however, it is important to bear in mind that many adult students may not have degree completion in mind when they first enrol. As a result, institutional departure should not be viewed as a shortcoming of either the institution or the student. The same reasoning can be applied to traditional students. This said, much more research is required in order to gain a fuller understanding of adult student attrition.

CONCLUSIONS

Several conclusions can be drawn from the research on adult learners referenced earlier.

- In studies of adult attrition, it must be recognized that the life circumstances of adults are different from those of traditional students.
- Many adults enter post-secondary programs with no intention of completing a degree; therefore, their attrition should not be surprising.
- With modifications, the student integration model is helpful in understanding the attrition of adult students.

MINORITY STUDENTS

In an earlier section it was shown that some researchers initially questioned the applicability of Tinto's student integration model to the study of commuter and adult students. Controversy has also arisen over the relevance of the model to the study of minority retention and withdrawal. While the findings of some researchers in the United States suggest that the general principles of the model apply equally to both White and non-White students (Fox, 1986; Stith, 1994), other results indicate that different factors explain the retention of minority and non-minority students. For example, Tracey and Sedlacek (1984:177) emphasize non-cognitive factors in explaining Black student persistence. They found that in the United States Black students who did not have support from others, self-confidence or community involvement were the most likely to drop out. Later research by Tracey and Sedlacek (1987) confirmed this general finding. In this instance it was discovered that first-year grades were the best predictor of persistence for Whites. For Black students, however, non-cognitive factors — positive self-concept, realistic self-appraisals, preference for long-term goal and leadership — were related to persistence. Similarly, Gloria and Robinson (1994) found that Chicano(a) students with self-confidence and positive perceptions of the university environment were more likely to persist than other Chicano(a) students.

As a result of criticisms and findings such as the foregoing, in some recent studies of retention and attrition, attempts have been made to integrate into one model variables from the student integration model with measures of campus racial climates and factors external to the university (such as family support, adequate financing and

employment while going to school). This attempt is consistent with the fusing of the student integration and student attrition models discussed in the previous section. In one such attempt, Nora and Cabrera (1996:141) found that variables from the student integration model, measures of campus racial climates and events external to the university were important to an understanding of minority and non-minority retention. Moreover, they conclude that “the findings indicate that the hypothesized causal model is valid in explaining the social and academic adjustments of *both* minorities and non-minorities in college and subsequent cognitive and affective outcomes including persistence.” Overall, despite some item-to-item differences, similar factors explain the retention and withdrawal of both minority and non-minority students.

Similar to the above findings, Nora, Hagedorn, and Pascarella (1996:444) conclude in a study of first-year students in a U.S. university that variables utilized in the student integration model, as well as those focussing on forces external to the university, assist in explanations of retention and withdrawal. More concretely, “institutional experiences, academic achievement, and environmental pull factors [financial need, encouragement from others] contributed most to persistence decisions.” Importantly, the authors also argue that explanations for minority retention and attrition are *different* from those of non-minority students. From among measures of social integration, interactions with faculty, financial need, encouragement from family, etc., number of children, working off-campus, and GPA, the only factor that predicted retention of both minorities and non-minorities was GPA.

Despite some disparate findings, it can be concluded that retention can be affected by pre-entry characteristics such as:

- high school grades
- students' experiences in the university like contact with faculty, social and academic involvement, and perceptions of prejudice
- perceptions of the importance of an education
- factors external to the university such as social support and financial security
- academic achievement, and
- racial origin.

Whether or not the same factors explain retention/attrition for both minority and non-minority students has yet to be settled.

CONCLUSIONS

The foregoing discussion suggests two conclusions with respect to minority student attrition.

- Some researchers initially believed that different models were required to study the attrition of minority and non-minority students.
- Recent research that includes in the student integration model considerations of college racial climates and student financing has utility in the explanation of minority student attrition.

RESEARCH LIMITATIONS

Research conducted in the United States has indicated that a number of factors internal and external to post-secondary institutions may affect attrition. While we cannot assume that conclusions based on this research are equally applicable to Canada, when more Canadian studies are carried out, the findings of the American research will sensitize researchers to some relevant issues. This said, there are a number of limitations to the U.S. research that should be noted. First, in many instances, sample sizes are very low. As a result, it is possible to assume no relationship between variables when in fact large samples might lead to the opposite conclusion. Second, response rates to surveys are often very low. This problem may lead to conclusions based on biased samples. Third, even though researchers may purport to situate their investigations on similar theoretical bases, differences in findings may have more to do with differences in the ways concepts are operationalized than in real differences between populations under study. For example, some researchers may operationalize the concept “academic integration” by looking at the extent to which students value the attainment of academic objectives; others may operationalize it by examining the number of contacts students have with faculty. Fourth, because of the permutations and combinations of differences among institutions, it may be misleading to believe that findings of one or more institutions can be generalized even to seemingly similar institutions.

Despite limitations, there are several conclusions that can be drawn from research relevant to theories of student attrition:

- Over the past 25 years, Tinto’s model of student integration has achieved paradigmatic status.
- Research has demonstrated that with the inclusion of concepts recognizing the importance of external events on attrition, Tinto’s model is useful:
 - in the explanation of attrition in commuter and residential two and four year institutions in the United States, and
 - in the explanation of attrition of traditional and adult students.
- The amount of variance in attrition explained by Tinto’s model, or models influenced by Tinto, ranges from a low of 11% to a high of 46%.
- Research has demonstrated that, with modifications, Tinto’s model is useful in examinations of minority group attrition in the United States.

CANADIAN RESEARCH ON ATTRITION

INTRODUCTION

Before examining the limited amount of Canadian research on attrition in more detail, it is important to note that some Canadian researchers have serious reservations about U.S. research into attrition in general, and to Tinto's approach in particular. Corman, Barr, and Caputo (1992, page 16) draw attention to four major weaknesses in American research. First, they believe that American researchers have failed to delineate clearly different categories of attrition, and adequately conceptualize and operationalize concepts such as academic integration. Second, they argue that certain links in attrition models have not been specified adequately. Third, Corman, Barr, and Caputo argue that the ways in which the experiences of students have been shaped by institutional decisions, such as funding and resource allocation, have received short shrift. Fourth, the researchers note that in the American research, little consideration is given to the plight of students who are likely to drop out. Much of this criticism is valid, but it does not apply to all American research on attrition.

Criticisms are raised by McKeown, MacDonell, and Bowman (1993). More specifically, they argue that although Tinto claims to have derived some of his ideas from those of Durkheim, they question the degree to which he successfully makes the link to the theorist. In addition, McKeown, MacDonell and Bowman argue that studies of attrition should also consider the phenomenon from the students' point of view.

Consistent with the framework that was used in the analysis of U.S. research on attrition, Canadian studies can be placed in two main groups: research that is not based on theory (i.e., pre- or non-paradigmatic) and research that is theory based (paradigmatic). Chief among the former are studies that have been carried out by universities and colleges concerned with local rates of attrition. The primary objective of this kind of research is to identify attrition rates and to discover the demographic characteristics of persisters and dropouts (Jansen, 1972; Barnett, 1973; Ungar, 1980; Dolan, 1986; Saint Mary's University, 1992; MRC, 1995; Montmarquette, Mahseredjian, & Houle, 2000). The results of this work have been, or will be, more appropriately reported in other sections of this report.

THEORETICAL APPROACH

A second body of research has applied many of Tinto's concepts, and those of other theorists, to the study of attrition (Darroch, Northrup & Ondrack, 1989; Gilbert & Auger, 1988; Gilbert, Evers & Auger, 1989; Dietsche, 1990; Wong 1994b; Grayson, 1994, 1995a, 1995b, 1997, 1998). By comparison, Johnson and Buck (1995) work with concepts that are only marginally consistent with Tinto's ideas. Some of the findings of these studies have also been, or will be, discussed in other sections of the report; however, because they are theoretically based, they will be examined in more detail in this section.

Research into attrition that relies heavily on some of the concepts developed by Tinto has been carried out at the University of Guelph and at York University. One study was conducted at Humber College of Applied Arts and Technology in Ontario. Another study, based on students at Trent University, has a weak theoretical foundation.

Several publications by researchers at the University of Guelph place the discussion of attrition into a broader framework. (Gomme & Gilbert, 1984; Gilbert and Gomme, 1986; Gilbert, 1989). Other publications concentrate on the experience of attrition within the university. In a report prepared for the Department of the Secretary of State, Gilbert and Auger (1988) examined the relationship between student finances and university attrition. The study was based on, among other measures, surveys of all students entering the University of Guelph in the fall of 1986. Additional mid-winter surveys were carried out in 1986/87 and in subsequent years. Not surprisingly, it was found that the lower the socio-economic status (SES) of students, the greater the concern about funds. Moreover, the lower the SES, the less likely students were to have family financial support. Students persisting for a second year

of study had slightly higher SES backgrounds than those who left the university. Among leavers, those from relatively high SES backgrounds tended to transfer to other institutions while low SES students were more likely to stopout (i.e., re-enrol at a later date). Importantly, stopouts were found to be worried about their finances early in the year. Those who left the university expressed no concern with finances either at the beginning of their first year or later. The conclusion that is drawn from these findings is that lack of funds leads to stopping out but not to transfer or to departure from the university.

Using the same database as the previous study, Gilbert, Evers & Auger (1989) employ discriminant analysis to test the ability of two models to correctly predict students who leave Guelph for other universities, leave Guelph for community colleges, drop out, return to work or return to the University of Guelph. The first model includes many of the variables suggested by Tinto's model (academic and social integration, pre-entry characteristics, etc.) as well as measures, such as high school grades, usually available from administrative records. The second model only includes information available from administrative records (gender, age, high school grades, nationality and home province). Overall, the first model explains more of the retention/attrition behaviours of all categories of students than the second model. The model is most successful, however, in predicting the behaviour of those who leave the university. Whereas the first model correctly predicts the behaviour of 49% of those who leave, the second correctly predicts only 26%. These figures suggest that the inclusion of Tinto's concepts in the model increases its predictive power by 88% (49% - 26%/26%). Clearly, concepts from the student integration model have utility for

Canadian researchers. In interpreting these figures, however, it is very important to bear in mind that a majority of Guelph's first-year students live in residence. Some Canadian research suggests less applicability to first-year students in commuter settings (Grayson, 1998).

A number of studies carried out at York University also utilize many of the concepts developed by Tinto. One study involved an examination of students entering first year in 1984 who did not return in 1985 (Darroch, Northrup, & Ondrack, 1989). In a multi-variate model, the effects of variables such as academic commitment and effort, academic and social integration, university characteristics, and pre-entry characteristics on persistence were examined. The results of the analysis indicate that only academic commitment and a measure of academic effort had an impact on persistence. Although limited, these findings are consistent with the findings at Guelph that the concepts identified by Tinto assist in the explanation of the attrition of Canadian students.

A study conducted of students entering the Faculty of Pure and Applied Science at York in 1992 also sheds light on the utility of employing some of Tinto's concepts in the Canadian setting (Grayson, 1994). Based on information in administrative records and the results of surveys prior to entry, six weeks after entry and at the end of first year, it was found that enrolment status in second year could not be related to pre-entry characteristics or initial goals and commitments of students. While those remaining in Science tended to have high degrees of academic involvement, differences were not statistically significant. While on some measures of social involvement those remaining in Science behaved in predicted ways, i.e., had high social involvement, patterns were inconsistent and frequently not statistically significant. By way of contrast, student enrolment status in second year was significantly related to a number of goals and commitments that

emerged over the course of the first year. Although the numbers of individuals who left Science were too small to permit multi-variate analysis, in this instance, as in others, it would appear that some of Tinto's concepts may be relevant to an understanding of attrition in Canadian universities, and that others are not.

The extent to which concepts included in the student integration model were appropriate to an examination of the attrition of students in different ethno-racial groups was based on an examination of students entering York in 1994 (Grayson, 1995). In this instance it was found that the first-year attrition rate was highest for Black students (33%) and lowest for students of Chinese and "other non-European" origins (16%). The rates for students of South Asian and European origins were 19% and 21% respectively. The greatest number of involuntary leavers were found among Black students (16%). The fewest (3%) among students of "other non-European origin" (i.e., non-European background students of origin other than African, Chinese or South Asian). Eleven per cent (11%) of Chinese origin students left the university because they had no choice, as did 9% of European origin and 10% of South Asian origin students.

Overall, the results of a classification and regression tree analysis employed by Grayson suggest that the student retention model appears to be of little help in explaining enrolment statuses of students of non-European origins. This finding is consistent with some of the early research on non-White groups in the United States, but contradicts some later research. Grade point averages and beliefs in the importance of a university degree were more important for non-European origin groups. By way of contrast, the enrolment statuses of European origin students were in

The student retention model appears to be of little help in explaining enrolment statuses of students of non-European origins.

part explained by some of the variables of the student integration model, however, relationships were not always monotonic. In addition, high standing on some variables appeared to compensate for low standing on others. Finally, social involvement helped explain the enrolment statuses of neither White nor non-White students. Overall, the model correctly classified 84% of student enrolment statuses.

In a later logistic regression analysis of the same data (Grayson, 1998) it was found that, among a number of possible variables consistent with Tinto's model, only gender, perceptions of the value of a degree, a belief that students will return for a second year, and grade point average were of utility in predicting *voluntary* withdrawal at the end of first year. Contrary to findings in some American institutions, however, in this study it was found that GPA contributed to voluntary withdrawal. Variables often found to be important predictors of withdrawal, such as university social and academic experiences, contacts with faculty, etc. Perceptions of the campus racial climate and experiences outside the university were of no consequence. Most importantly, neither was racial origin.

Regarding *involuntary* withdrawal, students who said that they were likely to return for a second year were less likely than others to depart involuntarily from the university. By contrast, increased hours of employment and living in temporary accommodations contributed to involuntary withdrawal. Similarly, being Black and of "other" racial origin also had slight effects on the probability of not returning for a second year.

A study conducted of students entering Atkinson College (the part-time college at York University) in 1993 employed some of Tinto's concepts as well as others appropriate

to the study of the attrition of adult students (Grayson, 1997). Overall it was found in a logistic regression analysis that, compared to those who returned for a second year, many students who left the university never intended to complete a degree to begin with, took fewer courses, and by the end of the first year were already reasonably sure that they would not come back for a second. Students who left the university did not differ from those who returned to the college in terms of factors such as barriers to education, the type of experiences they had over the first year, and satisfaction with various aspects of their education. As a result, it can be concluded that a relatively low retention rate is more a reflection of student choices than of institutional failure.

A study carried out at Humber College of Applied Arts and Technology also made use of the concepts in Tinto's student integration model. In this case, students who entered the college in 1986 were followed through surveys and administrative records. At the end of first-year, students could be divided into four groups: Unsuccessful dropouts (e.g., dropouts who had poor grades) left because they were required to do so. Successful dropouts could have remained in their programs and chose not to do so. Unsuccessful persisters remained for a second year of study even though they did not do well academically. Successful persisters remained at the college and did well in their studies.

The study found that unsuccessful dropouts were less academically capable than successful persisters (e.g., they had lower high school grades). In addition, they were less certain than those who remained at the college of their vocational goals and future occupation. Both unsuccessful persisters and unsuccessful dropouts had relatively low levels of previous education and tended to come from general, rather than advanced, high school programs.

Increased hours of employment and living in temporary accommodations contributed to involuntary withdrawal.

Overall, it was found that persistence was mainly a function of academic integration and educational commitment. Findings similar to these were found in American studies of commuter institutions. By comparison, institutional commitment and social integration were far less important. In total, the model explained 25% of the variance in persistence.

A study of student persistence was also carried out by Wong (1994c); however, because its theoretical base was implicit but undeveloped, suffice it to say that the study found some positive relationships between measures, such as interactions with professors, that are indicative of academic integration, and persistence.

The final study to be discussed in this section was not based on concepts included in the student integration model. Instead, Johnson and Buck (1995) examine attrition at the University of Alberta leading to the development of a model in which it is assumed that retention is a function of an interplay between institutional factors and personal characteristics of students. Overall, poor performance on the part of students has the consequence of the institution initiating withdrawal. In comparison, a number of psychological variables, such as student satisfaction and stress, lead to student initiated withdrawal.

CONCLUSIONS

There are three conclusions that can be based on the limited amount of attrition research conducted in Canada:

- The concepts in Tinto's model of student integration can be used fruitfully as sensitizing concepts in Canadian research on attrition, in both residential and commuter institutions, and in universities and community colleges.
- There has been no consistency in the ways in which the concepts in Tinto's model have been operationalized in Canada.
- Very little research with a theoretical direction has been conducted in Canada on the relationship between ethno-racial origin and attrition, and on the attrition of adult students.

WHO LEAVES AND WHY

INTRODUCTION

In an early section of this report it was shown that at a national level in the United States, attrition varies according to the demographic characteristics of students and the nature of the institution in which they are enrolled. For example, high rates of attrition are displayed by American Indians and low rates are recorded for students of Asian origin. Institutions with large numbers of part-time students experience more attrition than those with mainly full-time enrollees. Large institutions have fewer dropouts than small colleges and universities. Institutions with high entrance standards have lower attrition than less selective schools.

At the national level in the United States information not referenced elsewhere in this report indicates that, of students beginning classes in 1989, 31% of males and 26% of females had dropped out by 1994. Of students coming from families with the lowest 25% of incomes, 52% had left their colleges and universities. The figure for those from families in the top 25% of income earners was only 22%. Among American students from middle-income families, 34% had dropped out of college or university (U.S. Department of Education, 1994). These figures show that attrition is not random across demographic groups and institutions of higher education. Unfortunately, similar national figures are not available for Canada.

The difficulty with dealing with figures such as the foregoing is that we do not know if, for example, the relatively high rate of

attrition for American Indians is because they come from low-income families or because of other reasons, such as discrimination. We do not know if large institutions have lower attrition because of something intrinsic to the institution or because they attract students with high secondary school grades. The only way that we can disentangle these and other effects is by utilizing multi-variate statistical techniques in analyses. Doing so would allow us to obtain a clearer picture of who leaves post-secondary education and why.

Unfortunately, research is not always presented in a way in which we can assess the so-called “net effects” of variables after adjustments have been made for all other variables that could have an influence on attrition. Even when information on the net effects of various variables is available, we must be cautious in making comparisons among studies. The research on attrition is plagued by small samples, low response rates, insufficient conceptualization and different operationalizations of similar concepts from one study to the next. As a result, it is difficult to tell if different results of various studies reflect real differences in explanations for attrition or are simply artifacts of different methodologies. Because of this major problem, it is hard to make definitive statements about who drops out and why. It makes more sense to examine findings of individual studies in their own right rather than attempting to fabricate generalizations about attrition.

STUDENT INTEGRATION MODEL—AMERICAN EVIDENCE

In examining the results of studies relevant to determining who leaves and why, it is helpful to distinguish between what Tinto has described as pre-entry characteristics (high school grades, gender, race and age), institutional experiences (academic and social integration) and commitment to the institution. It is also important to recognize that most of the research on attrition has focused on the first year and that students with different characteristics may leave for different reasons in subsequent years of study.

An early study that allows an examination of the net effects of certain variables on attrition was carried out by Pascarella, Duby, Miller, and Rasher (1981), who utilized the student integration model in their research on commuter students. When comparing persisters to those who voluntarily left the institution they found that some pre-entry characteristics of students had consequences for whether or not they would return for a second year of study. More specifically, students with good high school grades were slightly less likely than others to return for a second year ($\beta = -.13$). Females were more likely than males to return ($\beta = .26$). By comparison, race and parent's education (a proxy for income) had no effect on attrition.

Information was also collected on institutional experiences, i.e., academic and social integration. The researchers found that socially integrated students tended to withdraw ($\beta = -.25$) while academic integration inclined students to persist ($\beta = .25$). Neither goal commitment to education nor institutional commitment had a statistically significant effect on attrition; however, expressions of intention to return for a second year had a high impact on persistence ($\beta = .34$). In this research we see that students' characteristics, experiences within the institution and commitment have an impact on persistence.

Overall, males with relatively good grades who are socially integrated into the university yet do not feel that they will return for a second year of study are the most likely to leave the institution.

In addition to identifying the characteristics of students who did not return for a second year of study, the study, and others like it, show how global figures on the characteristics of institutional leavers can be misleading. In this case, for example, despite what national data might suggest, it was not individuals with poor grades who were most likely to leave. In addition, while national data indicate that, with the exception of Asian origin students, minority students are more likely to drop out than others. (In this case the net effect of race was not statistically significant).

In another study of commuter students, Braxton and Brier (1989) found that none of the pre-entry variables that are consistent with the student integration model (race, SES and gender) were of consequence for retention — neither were academic and social integration. The only variable that had a statistically significant effect on retention was the expressed intent to continue for a second year ($\beta = .30$). Unfortunately, we do not know if the nature of the commuter institution studied in this case was responsible for the differences between this and the previous study or whether it was the choice of variables, the operationalization of these variables or the sample size that led to different findings.

In a recent study of a residential institution, Berger and Milem (1999) also employed many of the variables originally contained in the student integration and attrition models. In this instance background factors such as sex and family income had no statistically significant effects on persistence;

however, being Black had a negative effect on staying for a second year ($\beta = -.20$). In addition, several variables measuring different aspects of the institutional experience had consequences for retention. For example, frequent contacts with faculty ($\beta = .13$) and other students ($\beta = .11$) in the first term had positive consequences for persistence to the second year. A measure of non-involvement in various activities in the first term had a negative effect on persistence ($\beta = -.31$). In the second term, faculty contacts remained important ($\beta = .19$) but peer contacts were not statistically significant. As in first term, non-involvement led to a greater propensity of eventually dropping out ($\beta = -.31$). Among other institutional experiences, both academic and social involvement contributed to retention (respective betas of $.10$ and $.29$). The variable with the greatest impact on retention was the expressed intent to return for a second year of study ($\beta = .38$).

In his study of adult students, Sandler (2000) also utilized some concepts originally

derived from the student integration and attrition models. In this case he found that females were very slightly more likely to stay for a second year than males ($\beta = .01$). Similarly, Whites were less likely to leave the institution than other groups ($\beta = .02$). Household income had no statistically net effect on persistence and the effect of parents' education on persistence was negative ($\beta = .07$).

Controlling for exogenous variables such as these, Sandler found that while social integration had a positive impact on persistence ($\beta = .15$), the effect of academic integration was negative ($\beta = -.17$). Oddly, students who received family encouragement were more likely to drop out than others ($\beta = -.14$), as were students who were committed to the institution ($\beta = -.20$). Cumulative GPA had a positive effect on persistence ($\beta = .09$). The variable with the greatest effect on staying for a second year was the expressed intent to persist ($\beta = .66$).

STUDENT INTEGRATION MODEL—CANADIAN EVIDENCE

Unfortunately, there are only three Canadian studies based on concepts derived from the student integration and attrition models that allow a determination of the net effects of various variables on attrition. In his study of entering students at Humber College of Applied Arts and Technology, Dietsche (1990) found that background characteristics such as gender, age, SES and high school grades had no statistically significant impact on persistence. By comparison, institutional experiences such as academic integration ($\beta = .56$) and educational commitment ($\beta = .22$) positively influenced staying for a second year. Social integration had no statistically significant effect on persistence. Not surprisingly, students who expressed reservations about returning for a second

year were less likely than others to do so ($\beta = -.32$).

In a study of adult students at Atkinson College, York University, Grayson (1997) employed measures of educational barriers, classroom experiences and academic and social involvement in an effort to explain persistence to second year. A logistic regression involving background characteristics, initial goals and commitments, institutional experiences, and final commitment to return to the faculty found that only a desire to obtain a degree, the number of courses taken, and the expressed intent to return for a second year had a statistically significant and positive effect on retention.

In a more general study of first-year students at York University, Grayson (1998)

found that pre-entry characteristics such as high school marks, gender and having a parent who completed university had no consequences for retention. Similarly, academic and social integration, racial climate on campus, and experiences outside the university (like work) had no implications for voluntary withdrawal from the university. In a logistic regression, being female, not believing that a degree was important, not believing that return for a second year was a probability and having a relatively high GPA predicted voluntary withdrawal. Statements by students that it was unlikely that they would return for a second year, working long hours for pay, being in temporary residence and being Black predicted involuntary withdrawal.

Research such as the foregoing indicates that it could be very misleading to make general statements about who drops out and why. In some situations, factors like grade point average contribute to persistence; in others they can have no impact, or a negative impact, on persistence. The only factor that probably has a consistent relationship to retention is the expressed intent of students to continue their studies in the coming year. There is also some reason to believe that, in commuter institutions, academic integration is more important in explaining persistence than in residential colleges and universities. This does not mean that we should abandon the possibility of understanding student persistence and attrition. It does mean that for the time being we should recognize that the explanations we have are institution specific.

FINANCIAL CONSIDERATIONS

This said, something more should be said about the relationship between student finances and attrition. We can begin this discussion by noting that the limited amount of Canadian research on this phenomenon indicates a weak relationship between finances and attrition. In their study at the

University of Guelph, Gilbert and Auger (1988, page 17) conclude that, "inadequate financing for students appears to lead to temporary departure from university but not to transferring to another institution nor to system departure." It must be cautioned, however, that this conclusion was based only on a series of bi- and tri-variate analyses. As a result, it is possible (but not necessarily probable) that multi-variate analyses would reveal stronger, or weaker, connections between finances and attrition. In Dietsche's (1990) analysis of persistence at Humber College of Applied Arts and Technology, multi-variate analysis revealed, however, that neither the receipt of financial aid nor concern with finances had a statistically significant relationship with persistence. Research conducted at York University similarly indicated that having financial concerns did not result in attrition (Grayson, 1998).

A study carried out in the United States in a "four year Jesuit college" followed three cohorts from the late eighties and early nineties to 1994 (Murdock, Nix-Mayer, & Tsui, 1995) in an attempt to assess the impact of financial aid on persistence. It was found that, in general, it was not the receipt of financial aid that had consequences for persistence, but the amount of unmet financial need that students experienced. Importantly, the amount of unmet need was a greater predictor of persistence in the late years, rather than the early years, of college. In addition, the receipt of financial aid and the amount of unmet need, had different implications for various ethno-racial groups.

A more comprehensive examination of the effects of financial aid was conducted at the University of Arizona (DuBrock, 2000). In this instance the 1992 cohort entering the university was followed over several years of study. In a first logistic regression model with persistence as the dependent variable and background variables (including race and sex), information on grades, whether or not

the student worked on campus, and residential location as independent variables, it was found that the receipt of financial aid increased the odds (1.93) of persisting from second to third year but for no other years. The only variables that continuously increased the odds of returning for an additional year of study were high school GPA and having a job on campus. The odds for GPA were 1.06, 1.07, 1.08 and 1.06 for each successive year and 1.58, 1.51, 1.65 and 1.64 for working on campus. Living on campus increased the odds of returning for a second and third year (1.73 and 1.38 respectively). By contrast, all else being equal, being “needy” decreased the odds of returning for a second (inverse odds = 1.19) and third (inverse odds = 1.46) year.

A second model was used by the researchers to assess the impact of the absolute amount of aid on persistence. This time receipt of financial aid was replaced by the number of aid dollars received by the student as an independent variable. All other independent variables remained the same. In this regression the number of aid dollars slightly increased the probability of retention to second- (1.04), third- (1.06) and fourth- (1.12) years of study. Overall, these findings indicate that amounts of financial aid (which in this case includes loans, work study and scholarships) contribute somewhat to persistence.

It should be noted that neither this study nor the one previously discussed included institutional experience variables such as academic and social integration. Had they been included the effects of the variables in the original model on persistence would have changed.

The relationship between working, borrowing and persistence is also examined in a U.S. national study based on the 1992–93 National Postsecondary Student Aid Study (Cuccaro-Alamin & Choy, 1998). Overall, it was found that students who have full-time jobs and attend college or university part-time

have higher attrition rates than those who work part-time and attend full-time. In addition, it was found that students who borrowed rather than worked to finance their studies were more likely to attend school full-time and to complete their degrees.

In a regression analysis, having completed a degree or still being enrolled (persistence) in the Spring of 1994 was the dependent variable, and gender, age, race, dependency status for financial aid, place of residence, SES, working status, part- or full-time attendance and having or not having borrowed were independent variables. All else being equal, 68% of those who borrowed to finance their education completed degrees or were still enrolled, compared to 62% who did not borrow. Students who were of Asian or Pacific Island origin, students living on campus, those who worked one to four hours and those who attended full-time were also more likely than others to persist. Interestingly, gender, dependency status for financial aid and SES had no impact on persistence as defined in this study.

The overall conclusion that can be drawn from the foregoing is that the impact of financial aid on persistence is difficult to assess. In the best of all possible worlds the effect of financial aid would be analyzed in combination with variables included in the student integration model. Those studies approaching this ideal tend to indicate that the net effect of financial aid is moderate at best. Studies that do not include student integration variables suggest that the net effect of financial aid is positive for retention.

Students who borrowed rather than worked to finance their studies were more likely to attend school full-time and to complete their degrees.

STUDENTS' EXPLANATIONS

It is highly unlikely that a dropout would say that his status was a result of inadequate academic or social integration.

So far discussion has focused on the characteristics and experiences of students likely to result in attrition. Understandably, these factors are not the ones students use in interpreting their behavior. To state the obvious, it is highly unlikely that a dropout would say that his status was a result of inadequate academic or social integration.

Examinations of the explanations dropouts provide for their own behavior indicate that different reasons may be provided by students at different levels of study. For example, in research on the entering cohort of 1992 in a large urban commuter university in the United States, it was found that on a multiple response list of reasons for dropping out, 46% of students who did not proceed to a second year indicated that they had difficulty in getting into the courses they wanted (Ahson, Gentemann, & Phelps, 1998, page 4). Forty-two per cent (42%) pointed to conflicts between work and school. The belief that courses were offered at inconvenient times was mentioned by 44%. Forty-one per cent stated that they were unable to afford college right now and 42% felt that the university was too expensive. The need to make money was mentioned by 40% and 39% cited the cost of parking. Only 33%, 29% and 31% mentioned difficulties in registration, family obligations and inadequate advising respectively as reasons for not returning to complete a degree. The researchers note that for students in all years of study a conflict between work and school was cited as a primary reason for not returning to school.

Using a questionable operationalization of Tinto's model, the authors of the study ran separate regressions in an effort to understand

attrition for each of four years of study. They found that freshman-year attrition was best explained by factors external to the university, such as conflict between a job and school. For sophomores, academic integration was more important in explaining attrition than it had been for freshmen. For juniors and seniors, with the exception of pre-entry characteristics, the authors indicate that the concepts in Tinto's model help explain attrition. Overall, the authors of the study emphasize that the factors that explain attrition at the end of first year are not those that are influential in later years. Importantly, students in their junior and senior years were much more likely than freshmen and sophomores to indicate that their absence from the university was temporary.

In an examination of non-returning seniors in a large American commuter university, Mohr, Eiche, and Sedlacek (1998, page 347) found that the six main reasons given for not returning were economic (27%) (e.g., getting a job and needing to pay back loans); enrolment in another institution (22%); having academic difficulties (17%); family responsibilities (10%); personal problems (7%); and poor advising and teaching (7%). Survey responses also indicated that non-returning seniors had lower GPAs, indicated more institutional alienation, and had less meaningful contact with faculty than persisters (page 349). Nearly one half of dropouts stated that they intended to return to the university at a later date to complete their degrees.

In a study conducted at York University of the 1984 entering cohort who did not return for a second year it was found that educational opportunities outside of York was mentioned by 20% as the most important reason for dropping out. Seventeen per cent (17%) stated employment opportunities. An additional 12% wanted time to review their

futures, and financial and personal/family problems were each mentioned by 10% of non-returners as the reason for their decisions. A combination of problems with different aspects of education at York were noted by the remaining 31% of respondents (Darroch, Northrup, & Ondrack, 1989).

A study of first-year dropouts at the University of Alberta found that personal and financial problems were the most frequently mentioned reasons (51%) for not returning for a second year of study (Johnson & Buck, 1995). Program/administration factors were raised by 21%. An additional 18% mentioned attitude and personality factors (e.g., loss of interest, not sure what to do).

From the foregoing it is evident that while they are not always primary, students' concerns with their academic programs and finances or jobs are prominent in their own explanations for not returning to complete their studies. While some studies treat explanations such as these as independent variables, (i.e., they lead to attrition), it should also be considered that under certain circumstances they may result from experiential factors such as those included in Tinto's model. In this situation students' own explanations are dependent variables.

CONCLUSION

A number of conclusions can be drawn from the research on who withdraws and why:

- In different institutional settings different factors explain attrition; therefore, it is misleading to make general statements about the conditions that lead to withdrawal.
- This said, evidence from some studies suggests that under certain circumstances inadequate finances may lead students to withdraw from college or university.
- Students often cite both academic and financial reasons for their withdrawal.
- Different factors likely explain the attrition of students at different study levels.

RETENTION STRATEGIES

In both Canada and the United States, most colleges and universities have practices intended to assist in the adaptation to university, first-year academic success and retention. A catalogue of such practices in the United States is provided by Adam (1999). Information on Canadian colleges and universities can be found in Gilbert, Chapman, Dietsche, Grayson, and Gardner (1997). Practices described in these documents include orientation programs prior to the beginning of classes, connecting new students to “buddies,” having students meet with advisors and the offering of special “first-year experience” courses. Research on these and other possibilities has frequently found them to be effective in enhancing persistence (Fidler & Moore, 1996; Huff, Cook & Price, 1996; Levitz & Noel, 1989) .

In many cases research focussing on the effectiveness of strategies to enhance retention simply compares a treatment to a control group. For example, Fidler and Moore (1996) compared the dropout rates of students who attended a freshman seminar in which they “learn how to be a student” to those who do not engage in such activities. In many instances it is found that the retention rates of the treatment groups are better than those of control groups. Often, however, as was the case for other research analyzed in this report, insufficient attention is given to factors other than exposure to the treatment that might explain increased retention. If highly motivated students are drawn to programs designed to enhance retention it might be their high level of motivation rather than the programs themselves that help ensure progress to subsequent years of study. In addition, it could also be that students who participate in retention enhancing programs are doing other things that have the net effect of promoting persistence. Despite these

possibilities, when carried out with the appropriate controls, research on the effectiveness of various retention strategies can be of great use in the formulation and implementation of policies designed to reduce attrition.

In recent reviews of the literature Braxton and Mundy (2001–02) and Braxton and McClendon (2001–02) have examined practices that have led to an increase in retention and have categorized them in terms of the theoretical constructs found in Tinto’s student integration model. In so doing, they make an effective link between theory, research and best retention practices. Consistent with Tinto (1993), Braxton and McClendon emphasize that attrition should be dealt with systematically throughout the university rather than through isolated policies implemented by various departments of a college or university. Overall, Braxton and McClendon examine policies, programs and practices in eight domains that can have the effect of enhancing retention and make recommendations as to best retention practices.

ACADEMIC ADVISING

A considerable body of research has shown that positive classroom experiences and social integration contribute to student retention. As a result, it is recommended that:

- Academic advisors should encourage their advisees to consider the teaching practices of faculty members in the selection of courses (page 58).
- Academic advisors should strongly encourage their advisees to make efforts to establish memberships in the social communities of their collegiate institution (page 59).

ADMINISTRATIVE POLICIES AND PROCEDURES

Research has also demonstrated that organizational effectiveness, fairness on the part of colleges and universities, and living on campus have the result of increasing retention. On the basis of this evidence it is recommended that:

- Effective methods for the communication of rules and regulations important to students should be developed (page 59).
- Rules and regulations governing student life should be enforced in a fair manner (page 59).
- Residential colleges and universities should require that all first- and second-year students live on campus (page 60).
- Commuter colleges and universities should develop social environments for students. Residential colleges and universities should develop social environments for commuter students and students who live off-campus (page 60).

ENROLMENT MANAGEMENT

Insofar as research has indicated that students are more likely to persist if a college or university is able to meet their initial expectations, and that receipt of financial aid contributes to social integration, it is recommended that:

- Recruitment activities and publications should accurately portray the characteristics of a college or university to prospective students (page 61).
- Programs and practices should encourage prospective students to visit the campus (page 61).
- Some financial aid should be given to all students who demonstrate financial need (page 62).

FACULTY DEVELOPMENT

Numerous studies have indicated that effective teaching contributes to student persistence. In recognition of this fact it is recommended that:

- The techniques of cooperative/collaborative learning should be the focus of faculty development workshops and seminars (page 62).
- Active learning should be the focus of faculty development workshops and seminars (page 63).

FACULTY REWARD SYSTEM

Through policies such as tenure, promotion and merit pay, incentives can be provided to faculty to take steps that will enhance retention. In view of the fact that faculty are in positions in which they can contribute to retention, it is recommended that:

- Some weight in the faculty reward structure should be given to faculty members who use teaching practices that foster the retention of students in college (page 63).
- The teaching skills of organization and preparation, and instructional skills and clarity should be appraised on student course and rating instruments and by colleagues conducting classroom observations (page 64).
- Student course rating forms, colleague assessments, self-reports and teaching portfolios should include indices of active learning (page 64).

STUDENT ORIENTATION PROGRAMS

Research has shown that if students participate in orientation programs they are likely to be academically and socially integrated into the institution. As a result, it is recommended that:

- Orientation programs should develop multiple opportunities for first-year students to socially interact with peers (page 65).

RESIDENTIAL LIFE

Students who live in residence are more likely to continue with their studies than those who live in other situations. It is therefore recommended that:

- First-year students should be assigned to residence halls in a manner that encourages a sense of community in each residence hall (page 66).
- Residence halls should provide opportunities for residents to interact socially (page 66).

STUDENT AFFAIRS PROGRAMMING

Various programs offered by the university can assist students in dealing with personal problems. As successfully dealing with personal problems can contribute to retention, it is recommended that:

- Student Affairs offices should conduct workshops on coping with stress (page 66).
- Student Affairs offices should conduct workshops on educational and career planning (page 67).
- Student affairs offices should conduct programs that honour the history and cultures of different racial/ethnic groups on campus (page 67).

Clearly, Braxton and McClendon provide a systematic approach to dealing with attrition in colleges and universities that goes well beyond the one shot solutions sometimes proposed by advocates of this or that retention policy. In assessing the applicability of the foregoing recommendations to any college or university, however, three things should be borne in mind.

First, most of the recommendations appear to apply to the first year of study. We do not know with certainty that the same policies would promote long term retention; however, as the major retention problem faced by colleges and universities is in the first year, the results of successful first-year measures by definition increase the probability of retention in subsequent years.

Second, even if a policy is viewed as desirable, it might be difficult to implement, particularly on unionized campuses. For example, faculty may believe that it is not the business of academic advisors to steer students into courses with positive evaluations.

Third, even if general research into attrition indicates that the enactment of certain policies may enhance retention, there is no guarantee that any given policy will have the intended effect in any specific college or university. For example, at York University, contrary to theory, it was found that, all else being equal, the academic performance of students in residence was lower than that of students living at home with parents (Grayson, 1997). As a result of possibilities such as these, before implementation of any measures designed to enhance retention, assessments should be made of the political climate of the institution, and local institutional research should be conducted into the potential efficacy of specific programs designed to increase retention.

CONCLUSIONS

There are a number of conclusions that can be drawn from an examination of strategies designed to enhance retention.

- Colleges and universities do not have to passively accept student attrition. There are steps that can be taken to reduce it.
- Best practices in efforts to reduce attrition should be based on a theoretical understanding of the reasons for attrition.
- Attrition should be addressed at the level of the institution rather than by specific departments or divisions within colleges and universities.

OVERALL CONCLUSIONS

WHAT ARE THE DIFFERENT THEORETICAL PERSPECTIVES THAT CAN BE BROUGHT TO BEAR ON THE ISSUE OF ATTRITION?

Most of the research on attrition in colleges and universities is conducted in the United States. Although in both the United States and Canada some individual institutions continue to conduct atheoretical examinations of attrition that are often based on whatever information is at hand, academic research is dominated by Tinto's academic integration model.

The main idea behind this model is that attrition can be viewed as a result of students' pre-entry characteristics, initial goals and commitments once they enter college or university, their academic and social experiences within the institutions, and emerging goals and commitments over the course of their academic career. Although this model was originally developed on the basis of the experiences of White residential students it has been found to have a certain degree of applicability to individuals in two- and four-year commuter institutions as well. After the model was expanded to recognize that issues

outside of the university, such as jobs and family expectations, could have an impact on retention, it was also seen to be of use in examinations of the attrition of adult and minority students.

Despite its popularity, the Tinto model and its applications have serious problems. First, many of the concepts in the model have been operationalized in inconsistent and questionable ways. Second, much of the research based on the model has utilized small samples, has settled for low response rates and has applied questionable techniques of analysis. Moreover, depending upon circumstances, the total variance in attrition explained by the model can be low. Despite limitations such as these, the student integration model provides the best approach to the study of college and university attrition. As such, it should be used as a diagnostic tool to guide research into the particular factors that contribute to attrition in specific institutions.

WHEN DO STUDENTS LEAVE POST-SECONDARY EDUCATION AND DO THEY COME BACK?

It is abundantly clear that students are most likely to leave post-secondary education during their first year. Thereafter, the probability of attrition in any given year decreases.

Importantly, large numbers of students who drop out return to higher education at a later date.

WHO IS MOST LIKELY TO LEAVE POST-SECONDARY EDUCATION AND WHAT DO THEY HAVE IN COMMON?

Answers to this question are best posed in terms of Tinto's framework. In other words, do school leavers have particular pre-entry characteristics, such as level of preparation as measured by high school marks, and in the United States, scores on standardized tests such as SAT? Do college and university dropouts tend to have less initial commitment to education in general and to their institution in particular than students who persist? Are dropouts students who have limited academic and social experiences within the university? Over the course of their studies do students who drop out develop the belief that they will not return for additional years of study?

The answer in all cases is that it depends. Some studies show that indices of preparation, such as high school marks, are of little consequence in explaining attrition from first- to second-year. In other studies high school marks exert a strong influence on persistence. The same is true of initial commitment. In some cases it has been found to influence persistence; in others it is of no consequence.

While many studies have shown that academic integration is important in explaining attrition, the impact of social commitment varies. When it comes to intent to return for the following year, however, the findings of the research are less ambiguous. Usually, students who believe that they will not return to school do not return.

It is also important to recognize that while the characteristics and experiences of students that contribute to attrition vary from one institution to the next, they may also vary from year to year within the same institution. Some evidence indicates that as students progress toward their degrees, the factors discussed by Tinto become even more important in explaining attrition and retention. Other research suggests that financial considerations become more important in the persistence decisions of students as they progress from one year to the next. Overall, it has been found that the provision of financial support for students contributes to retention.

WHAT ARE THE MOST EFFECTIVE STRATEGIES AVAILABLE TO PREVENT STUDENTS FROM ABANDONING THEIR STUDIES?

Research shows that there are a number of strategies that contribute to student retention. For example, students who attend orientation programs and first-year seminars are more likely to persist than others. Similarly, the persistence rate of mentored students is higher than that of students who do not have this support. Overall, however, it has been forcefully argued that the most effective strategy to prevent attrition involves a total institutional commitment to implement policies that have the consequence of keeping students in

school. The specific areas of activity in which policies fostering retention can be implemented are: academic advising, administrative policies and procedures, enrolment management, faculty development, faculty reward systems, student orientation programs, residential life, and student affairs programming.

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