

THE UNIVERSITY OF CALGARY

ADULT STUDENT ATTRITION AT POSTSECONDARY INSTITUTIONS

by

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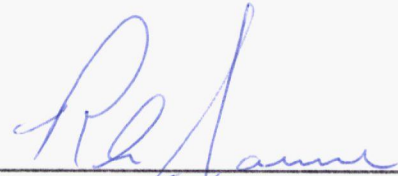
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THE UNIVERSITY OF CALGARY  
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The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies for acceptance, a thesis entitled, "Adult Student Attrition at Postsecondary Institutions," submitted by Martha F. Cleveland in partial fulfillment of the requirements for the degree of Master of Arts.



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## ABSTRACT

Adult students are increasing in proportion on college and university campuses. These adult students vary from the more traditional age students in ways that will affect student life. If dropout from postsecondary institutions is going to be fully understood, it is argued that the characteristics of adult students must be considered in light of the dropout process.

It is argued that Tinto's (1975) model of student attrition at postsecondary institutions is a less effective explanatory model for adult students than for traditional age students. This argument is based on the work of Jarvis (1987) that suggests that the differences between adult students and their younger counterparts lies not in psychological factors but in differences in social roles. It is suggested that these differences in social roles are external variations that affect the variables deemed by Tinto (1975) to be the most important to dropout decisions. This external variation may differentially affect the variables in the model according to age group.

Data were collected from a large, publically funded university comprised of a combination of resident and commuter students. Bivariate and multivariate relationships between variables were analyzed by assessing correlation coefficients, and using logistic and ordinary least squares regression analysis. All relationships were considered for the pooled sample and separately for each age group.

The findings suggest that while there are differences in the dropout process across age group, Tinto's (1975) model is in fact a more efficient representation of dropout for nontraditional age students than for traditional age students. A great deal of variation in dropout is left unexplained however and this variation, it is argued, is due to external factors. It is quite likely that the external factors that impact on the dropout process will vary across age group. Further research that verifies these findings and uncovers important external factors in terms of the dropout process is required.

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Finally, this work is dedicated to my family. It is dedicated to my daughters, June-Marie and Ashley, in the hopes that they too will strive to achieve academic excellence. It is dedicated to my husband, Stuart, both for his unfaltering support and for his friendship.

DEDICATION

To my family, Stuart, June-Marie and Ashley

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## INTRODUCTION

Research in the area of student attrition from college and university campuses has long been of interest to practitioners and administrators at these institutions. Losing students to voluntary withdrawal is of particular interest due to the loss of human potential and wasted resources. Financial constraints have put pressure on postsecondary institutions to recruit more students and to look at ways to keep the students they have. This issue has been compounded by another phenomenon. The composition of the student population in terms of age group is changing as adult or nontraditional age(1) students enroll in increasing numbers. For example, nontraditional age students now constitute 33 percent of the full-time student body and 58 percent of the part-time student body at the University of Calgary (University of Calgary 1987).

This nontraditional age student group varies from its younger counterpart in many ways. On the negative side, they may have difficulty integrating into student life and, on the more positive side, they may feel a greater sense of commitment to the goal of obtaining a

1 For the purposes of this discussion, nontraditional age students are those who are twenty-three years of age or older.

postsecondary education. These and other variations in nontraditional age student characteristics may affect the way in which dropout decisions are made for this group. If this is the case, new information on how nontraditional age students choose to persist or withdraw from student life may be translated into effective retention strategies, strategies that take into account the characteristics of both traditional age students and nontraditional age students.

Tinto's (1975) model of student attrition appears to be the most widely used model in the research literature in this area. It is a longitudinal, institutionally oriented model that is centered primarily on the concept of integration found in Durkheim's (1961) theory of suicide. For Tinto, a student's decision to persist or withdraw from campus life is based on factors that are influenced by the background characteristics that a student brings to the institution. These background characteristics have an effect on the student's success or failure at integrating into the social systems of the institution. Together these background characteristics and degrees of integration lead to a level of commitment. The influence of the student's degree of integration on dropout occurs, according to Tinto, through changing commitments, to both the goal of graduation and the institution of attendance. This level of commitment, in

turn, is the most important factor in determining which students persist and which students withdraw.

It is argued that the factors deemed to be critical in assessing the dropout process are factors that will systematically vary across age group. In other words, nontraditional age student characteristics are such that they will have an effect on the variables specified in the model. If this is the case, it may be that age must be considered as a necessary control variable in order to clearly understand the dropout process.

This research project is an attempt to substantiate this theoretical argument. Tinto's (1975) model of student attrition will be assessed in terms of its ability to fit the data of both age groups, and its ability to explain the variation in dropout decisions will be compared across age groups. It is hypothesized that this model is a better fit for the dropout process of traditional age students than for nontraditional age students.

## THEORETICAL CONSIDERATIONS

### Tinto's Model

The work of Tinto (1975) emerged from a desire to develop a theoretical model of student persistence and withdrawal "that seek(s) to explain, not simply to describe, the processes that bring individuals to leave institutions of higher education" (Tinto 1975:89). He proposed a longitudinal model that would attempt to explain dropout based on the relationships between individual attributes and the campus environment.

The model draws its base from two theories of social behavior. The first of these is Durkheim's (1961) theory of egoistic suicide, with, according to Tinto, the more recent qualifications from social psychology considered. Secondly, Tinto discusses "the theory of cost-benefit analysis" (page 97) in relation to the college career. Although Tinto does not attribute this type of analysis to any specific author, it would appear to rest on Homans exchange theory as applied to student behavior by Philips (1966).

The concept of egoistic suicide was developed by Durkheim as a partial explanation of the phenomenon of suicide. For Durkheim, egoistic suicide increases when two types of social integration are lacking in society.

The first is insufficient moral integration; the second is insufficient personal interaction leading to a lack of collective affiliation. In other words, an individual's choice to sever ties with the social system results from a lack of integration with the common life of the larger society (Spady 1970).

This latter proposition can be applied to withdrawal from postsecondary institutions based on two assumptions. The first is that postsecondary institutions have their own value and social structures; a sub-culture in the larger social system. The second is that the social conditions that affect suicide in society are analogous to the social conditions that affect dropout behavior, and that these conditions may be present in varying degrees at postsecondary institutions. More specifically, Tinto suggests that an individual's incongruence with the prevailing value system of the postsecondary institution and/or a failure to interact with others at the postsecondary institution is a factor in the process of dropping out.

For the purposes of this model, integration must be considered in two separate spheres. As postsecondary institutions are made up of both academic and social systems, integration should be considered in both. It may be possible, according to Tinto, for a student to be integrated in one system without being integrated in the

other; in fact, there may be a functional relationship between the two such that integration in one sphere may detract from integration in the other.

Tinto argues for the inclusion of individual characteristics in the assessment of the relationship between integration and dropping out based on the following argument. Durkheim's work on suicide presented a structural-functionalist perspective that considered the phenomenon of suicide through the characteristics of the social system. This did not allow for explanation, within a given characterized society, of individual differences. The explanation of intrasocietal variation may be achieved through the examination of individual characteristics. In terms of the phenomenon of suicide, for example, the psychological characteristics that predispose an individual toward suicidal responses would help explain individual differences in a society determined to be at risk for a high suicide rate based on structural factors. To this end, a model emphasizing integration to explain dropout behavior must include individual characteristics as they relate to educational persistence. These are, according to Tinto, background characteristics, expectations and motivational attributes.

For Tinto, background characteristics that influence the educational experience fall into three categories. They are a) family background, b) individual attributes

and c) pre-college schooling. In terms of family background, it is suggested that socioeconomic status, quality of family relationships and parental levels of educational expectations for their children will be related to persistence. Individual attributes affecting educational persistence are intellectual ability, personality factors and gender. Pre-college schooling allows for the effect of the high school experience and grade performance.

Educational expectations and motivational attributes are, for Tinto, encapsulated in the concepts of educational goal commitment and institutional commitment. Both types of commitment would be expected to be directly related to persistence. According to Tinto, educational goal commitment relates to the individual's psychological orientation to the college environment in that the greater the commitment, the more likely one is to do whatever is necessary to complete a desired level of education. Commitment to a given institution is important background information, particularly in view of institutional transfer.

The concept of commitment is found in two places in Tinto's model. Individuals enter a postsecondary institution with particular goals in mind and an individualistic orientation to the specific institution. Commitment then is causally placed before integration into

the academic and social systems. But for Tinto, commitments to an educational goal or a particular institution are continually being evaluated, and therefore must be considered at a later time in the model. Commitment is also placed after integration in the model.

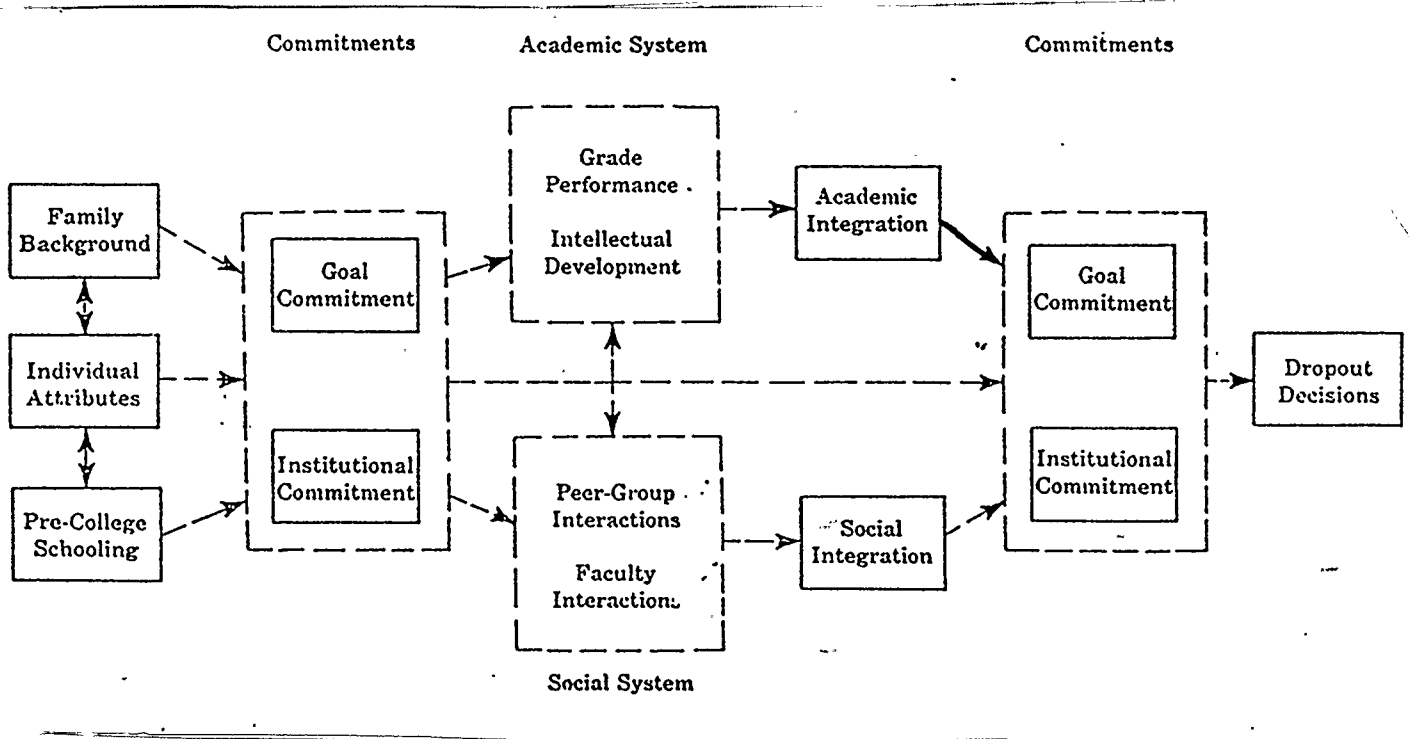
This second occurrence of commitment is viewed both in terms of the relationship with the institution and in terms of factors external to the institution. A person may withdraw from college for reasons that are indirectly related to their relationship with the postsecondary institution but rather are based primarily on events and circumstances outside the institution. Tinto suggests that the impact of these external factors is best observed through changes in commitments. These changes are said to occur through a cost-benefit analysis, which assumes that individuals direct their activities toward a maximization of the ratio of benefits to costs. In other words, an individual may withdraw from college where "he perceives that an alternative form of investment of time, energies, and resources will yield greater benefits, relative to costs, over time than will staying in college" (Tinto 1975:98).

To summarize, Tinto's model is based primarily on the concept of integration into the academic and social systems of the postsecondary institution with individual characteristics accounted for and the influence of



external factors allowed for through the concept of changing commitments. Individual characteristics, degrees of integrations and levels of commitment interact in ways that allow persistence/withdrawal behavior to vary. As sketched in the schematic model below, the decision to dropout can be seen as a process where an individual's

Tinto's model (1975)



characteristics influence interaction with the social and academic systems, resulting in a degree of integration and affecting institutional and goal commitments, which in turn leads to the decision to persist or withdraw.

The model suggests that, given particular individual

characteristics and entry level commitments, the higher the degree of social and academic integration, the stronger will be the commitment to the institution and the goal of program completion. For Tinto, it is commitment that is the deciding factor, in the final analysis, in a dropout decision. An individual with either low goal commitment and/or low institutional commitment is at risk of dropping out. As suggested earlier, low commitment may be the result of a low degree of integration or higher costs relative to benefits; in other words, where alternative forms of activity are perceived to yield greater benefits. In other words, it may be possible to have an individual with a high degree of integration who drops out anyway; according to Tinto this may be due to external factors.

Where goal commitment is high but institutional commitment is low, an individual may endure what is perceived as an unpleasant environment for the sake of program completion or may transfer to another institution. At particular levels of institutional commitment, the lower the goal commitment, the higher the risk of dropping out. However, where goal commitment is low but institutional commitment is high, an individual may remain in college for the sake of the relationship with the social system at the postsecondary institution.

It must be noted that for the sake of this model,

Tinto takes a symbolic interactionist perspective in that reality is defined by the individual and this definition of reality has real and observable effects on the actor. This means that individuals, with varying characteristics, will have different views of what is an apparently constant situation. The core concepts in the model, integration, commitment and cost-benefit analysis, all rest on the assumption that it is the perceptions of the individual that matter. The interaction of individual characteristics and the college environment must therefore be taken into account.

#### Changes in the campus population

Given this institutional model of dropout behavior, and given that individual characteristics are of primary importance when considering dropout behavior, the constitution of the student population is of primary importance. A significant change in demographics is occurring on college and university campuses with the rise in the proportion of adult students (Cross 1979, Hirschorn 1988, Hodgkinson 1983, Knox 1977, Pappas and Loring 1985).

This change in the student population can be attributed to several social trends. First, the age distribution in the general population is changing such that there is a decline in the cohort that represents traditional age students and a bulge, from the baby boom

cohort, in the early thirties to mid forties age group. Enrollments in the seventeen to twenty-two year old age range, the age range most typically attributed to the college age group, is declining at many colleges and universities (Knox 1977) while students over the age of twenty-two are enrolling at an increasing rate. The baby boom cohort is the target group for many marketing strategies; higher education is no exception. Strategies for recruiting adult students have been implemented at many postsecondary institutions (Kegel 1977). Changes in the general population then have contributed to this demographic change on college and university campuses.

Other social trends that have influenced the increase in adult students on campus deal more directly with sociocultural changes that have affected adult life. According to Hultsch and Deutsch (1981), changing technology and variation in the economy leads the average adult to change careers three to five times in their working lifetime. These career changes may involve retraining and the possibility of further education. Along with these changes, the pattern of a continuous educational career beginning at age five and ending at age twenty-two (Jones 1985) is being replaced with a more flexible pattern of education, work, retraining and leisure (Merriam 1984). Finally, Cross (1979) attributes

the rise in adult learning to the changing roles of women and rising unemployment rates. The combined effect of these changing social trends has resulted in a significant increase in the enrollment of adult students at postsecondary institutions.

#### Tinto's model applied across age groups

Assuming that Tinto's model is a useful model of student attrition, it is interesting to consider variation in the relationships in this model for different student age groups. Nontraditional age students are distinguished, for the purposes of this research, from traditional age students based on the criterion of chronological age; nontraditional age students are those students having reached the age of twenty-three and above. This division is supported in the literature (Merriam 1984) as an acceptable place to distinguish between adult developmental stages (Darkenwald 1984).

Much discussion in the literature has centered on learning related differences between adult and child learners (for example, see Brookfield 1986, Cross 1981, Darkenwald and Merriam 1982, Knowles 1980, Knox 1977). While traditional age students in a postsecondary institution setting are in the range of young adulthood, they are, for the purposes of this discussion, deemed to be closer to childhood in terms of social roles, life

experience and approaches to the learning situation. The work of Jarvis (1987) provides us with concise information about the most significant differences between nontraditional age students and traditional age students. He believes that there are no intrinsic differences in the ways that adults learn. While Knox (1980) discusses an equally efficient but qualitatively different learning process in adulthood, Jarvis' claim would appear to be supported by Dubin and Okun (1973), as they use traditional learning theory to discuss adult instruction. Other reports suggest that, academically, nontraditional age students perform as well or better than traditional age students (Greer 1980, Hirschorn 1988). For Jarvis, differences between nontraditional age students and traditional age students lie in the relationship between the teacher and the learner and in the social status of the student. Nontraditional age students bring an experiential history to the learning context and do not necessarily grant the teacher the authority that younger students will grant them. These factors translate into a different type of teacher-student relationship. In terms of social status, the role of student is the primary one for traditional age students. Nontraditional age students are more likely to carry with them other roles and responsibilities.

This latter factor is likely a most influential

factor in the educational career of nontraditional age students. Role strain, an umbrella construct suggesting a situation where one has difficulty meeting the obligations of multiple roles (Sieber 1974), is cited often as an issue for adult learners (Anisef and Ting 1985, Beal and Noel 1980, Kegel 1977 and Knox 1980). Academic study at a postsecondary institution requires meeting obligations and devoting time to classes, assignments and exam preparation. This demanding schedule, when combined with the demands of other roles, such as spouse, parent or employee, may result in some form of role strain. This role strain can be further categorized into problems of inadequate role preparation, role conflict and role overload.

Inadequate preparation for the role of student is a possibility for nontraditional age students who may have been out of the formal education system for some time and who may be participating in an academic program on a nonmatriculated basis. Study skills, background information and confidence, all critical factors to student success, may be in short supply. Clearly the degree of role preparation will make a difference in the efficiency of meeting role obligations (Horton and Hunt 1984).

Role conflict occurs where role expectations are in direct conflict, regardless of time pressures (Sieber

1974). In other words, behavior that complies with the expectations of one role violates the expectations of the other. This is likely in situations where the socioeconomic status of the individual, their family and community, is different than the primarily middle class status of individuals involved at postsecondary institutions. Behaviors, values and ways of communicating vary across levels in the social strata and new behaviors may be seen as threatening to others in the individual's community. Marital stress is particularly likely in this situation.

Role overload refers to the strain induced by time. As the number of roles increases, the number of role obligations increases, putting a squeeze on the use of available time (Sieber 1974). A similar notion is found in McClusky's (1963) power-load-margin formula. For McClusky, load relates to those aspects of an individual's life that place demands on the individual; externally through role obligations and internally imposed by life expectancies set for oneself. Power relates to the resources one can mobilize in coping with the load. External resources include physical ability, economic wealth and social contacts. Internally, the resources are found in skills and experiences. The relationship between power and load is defined as a ratio of power over load, with the net result delineated as the margin. Margin is



the resources remaining once the requirements and obligations of daily life have been met. According to McClusky, having a margin of resources is a necessary condition for application to a learning situation.

Combining this formula with Jarvis' submissions, I would suggest that this formula would be differentially applied to traditional age students and nontraditional age students. For nontraditional age students, it may be that the resources for application to the learning situation would only be found after the resources required for meeting the obligations of daily life have been expended. It also may be that their load is larger because of multiple roles, leaving no margin to meet the emergencies of life (McClusky 1963). According to Marienau and Chickering (1982) the student role remains secondary for many adult learners, squeezed in between other demands. For traditional age students, the student role is more likely to be the basis for the primary requirements and obligations of daily life. In this case, power and load relate to the functioning of student life and margin used for functioning outside this role.

Let me summarize my argument to this point. Tinto's model is being applied to student populations in an attempt to explain the attrition process. This student population is in transition and there is an increasing proportion of what we are calling nontraditional age

students on campus. These nontraditional age students differ in characteristics from traditional age students, in ways that may have a significant influence on this model's ability to predict students who withdraw. We are adopting Jarvis' (1987) view that the differences between these two student groups lie primarily in external, situational characteristics and that differences in intrinsic learning ability are not clearly correlated with age. Although many adult learner characteristics may differ from those of their traditional counterparts, many of these vary in the same direction, and only the range varies; for example, financial pressures and grade point average. I have singled out two characteristics that appear both to differentiate nontraditional age students from traditional age students and to have the potential to have a more disruptive effect on the factors that Tinto has outlined as critical to the attrition process. These characteristics are 1) the primacy of the student role and 2) the quality of the student-faculty relationship. It is with these differences in mind that this research project will explore possible differences in these factors across age groups.

To return to Tinto's model more specifically, it can be demonstrated that these nontraditional age students characteristics, in differing degrees, have the potential to make the relationship with the postsecondary

institution a different one from the traditional age students. Family background, individual attributes and pre-college schooling represent the background characteristics that Tinto places as exogenous variables in his model. Conflicting reports on the direct effects of these characteristics are found in the literature (Pascarella and Terenzini 1978; Pascarella, Duby, Miller and Rasher 1981). What does seem quite clear is that pre-enrollment characteristics influence other variables in the model, and result in indirect effects on the decision to withdraw (Pascarella and Terenzini 1978, 1979). For example, perception of faculty concern for teaching and their students (a measure of social integration) was most important to female students with low goal commitment or whose parents had relatively low levels of education. We would expect age to be just as likely to produce indirect effects, although it has not been included as a control variable in previous research.

For the nontraditional age students, these background variables may have slightly different meanings and therefore would have to be measured in different ways. Family background would have to include variables related to one's family of birth as well as the nuclear family. Socioeconomic status may have to include the individual's income and education, instead of or as well as that of their parents. Although financial pressure will be an

issue for both age groups, traditional age students are more likely to be receiving help from parents, while nontraditional age students may be more likely to have dependents to support, to be employed while studying, or may be receiving financial assistance from a spouse. It seems likely that financial pressure may have a direct and indirect effects on the decision to withdraw for both age groups, with nontraditional age students more likely to be in a position of financial constraint.

The third category of pre-enrollment characteristics, pre-college schooling, may also be qualitatively different for nontraditional age students. The amount of time since their last full-time enrollment in a formal educational institution is likely to be longer than for traditional age students. The skills required for the efficient performance of the student role are therefore more likely to be absent or unpracticed. Confounding this issue is that fact that nontraditional age students may be admitted to the postsecondary institution with fewer pre-college credentials than traditional age students. This issues may have an effect on their ability to integrate in both the social and academic systems of the postsecondary institution.

The second set of variables in Tinto's model is based on two categories of entry commitments. Institutional commitment is likely to vary in similar ways

across age groups, although it is possible that adults are more often choosing a postsecondary institution based on proximity; adults who are married, have children in school or are simply well integrated into their community will be less likely to move to attend a postsecondary institution. This may effect how committed they are to the postsecondary institution. Traditional age students, are the other hand, are more likely to be free to move to go to the school of their choice.

Goal commitment may be enhanced for adults who have been in the work force and have definite ideas about what direction they want to go both in their educational and employment careers (Greer 1980, Kuh and Ardaiole 1979). On the other hand, goal commitment may be decreased by the reality of other demands; the commitment to educational goals may have to be tentatively made. Although based on different factors, traditional age students will obviously have varying degrees of goal commitments as well.

The third set of variables in Tinto's model reflect the student's experience in the academic and social systems of the institution. Grade performance and intellectual development are the related factors in the academic system, peer-group interaction and faculty interaction relate to the social system. It is in this section of Tinto's model that the most significant differences between nontraditional age students and

traditional age students are likely to develop.

For nontraditional age students, all four of these factors may be affected by the amount of time they can devote to these requirements and their related activities. This is, of course, also true for traditional age students; however, nontraditional age students are more likely to be constrained by financial pressure and the obligations of outside roles. Grade performance and intellectual development may not vary significantly between these two groups; what nontraditional age students lack in study skills and preparation they seem to make up for in hard work.

Peer-group interaction and faculty interaction are those factors most likely to be affected by the adult learner characteristics that Jarvis (1987) suggests are most significant. The nontraditional age students are more likely to be constrained by time so that peer-group interaction will be minimized. Also, nontraditional age students are more likely than traditional age students to be socially integrated into the community outside the postsecondary institution, with friends and family that are nonstudents. This may significantly decrease the contribution peer-group interaction can make to the social integration of at the postsecondary institution.

The student/faculty relationship has been indicated in the research as vital to the student's integration

(Pascarella and Terenzini 1977a, 1977b, 1978, 1979, 1980, 1981). Jarvis (1987) tells us that the student-teacher relationship may be qualitatively different for nontraditional age students. This is supported by the work of Knowles (1980) and Brookfield (1986), who discuss effective facilitation of adult learning. Their discussions suggest implementation of teaching practices that reflect a more equal power structure between students and faculty than that found in traditional postsecondary settings; practices that are more conducive to learning for nontraditional age students. Unfortunately, the kind of student/faculty relationship suggested is time consuming and against the long standing norms of student/faculty relations (Gomme and Gilbert 1984). In terms of Tinto's model, it may be that nontraditional age students will have higher expectations for quality student-faculty interactions than traditional age students. Combined with time constraints, these expectations may decrease the contribution that faculty interaction makes to the nontraditional age students' social integration. Faculty interaction that relates to courses or intellectual matters is deemed to affect academic integration as well (Pascarella, Duby and Iverson 1983). This relationship then may affect the nontraditional age students ability to integrate academically as well.

For Tinto, the degree of academic integration leads to a level of commitment to the goal of graduation and the degree of social integration leads to a level of commitment to the institution. The strength of these commitments then leads to a decision to persist or withdraw. In other words, the greater the integration, the deeper the commitment, and the more likely a student is to persist. I question this process in regards to nontraditional age students. Commitment to the institution is more likely to be low due to low levels of social integration. Commitment to the goal of graduation is likely to be high, given the sacrifices required to attend a postsecondary institution, where grade performance is high, intellectual development is high and where overload is not acute. I would suggest that given the same low level of social integration, traditional age students are more likely to withdraw than are nontraditional age students.

#### Hypotheses

In summary, I am assuming that adult student characteristics vary from those of their traditional age counterparts in ways that affect the relationships among the variables and the dropout decision as specified in Tinto's model. Although new variables have been suggested in the discussion of nontraditional age students' dropout



decisions, this research project will remain focused on a test of Tinto's model. As a point of departure, this research project uses Tinto's model to explain dropout decisions separately for nontraditional age students and traditional age students. The main hypothesis is that Tinto's model will explain less of the variation in dropout decisions for nontraditional age students than for traditional age students. More specifically, I hypothesize the following differences across age groups:

- a. The average scores of background characteristics will not vary between nontraditional age students and traditional age students, with the exception of high school average. The mean of high school average predicted to be lower for nontraditional age students.
- b. Average integration scores will be lower for nontraditional age students than for traditional age students. Also, the model will explain less of the variation in integration for nontraditional age students.
- c. Average commitment scores will not vary across age groups. However, variation in commitment will not be explained as well by this model for nontraditional age students in comparison with traditional age students.

d. Commitment is expected to have the most significant direct effects on dropout decisions for both age groups.

## DATA COLLECTION AND MEASURES

### Design and Sample

This research project was designed based on a modified implementation of Tinto's (1975) model. Due to the constraints imposed by time and finances, data were collected twice rather than the three times suggested by Tinto's model. However, this research is consistent with the objective of understanding the relationship between the institution and the student as it contributes, in the appropriate temporal sequence, to the decision to withdraw, rather than attempting only to extrapolate this relationship from ex post facto explanations given by students who have withdrawn from a postsecondary institution. Data were collected based on the crucial constructs as suggested by Tinto's model while all respondents were still in attendance, and then compared across age groups, for persisters and those who withdrew.

The study was longitudinal with students being surveyed during the 1987 academic year and followed in their academic career for one year. A large, publicly funded university, comprised of a combination of resident and commuter students, was used as the sample population. A random sample of ten degree based courses was taken. Students in these classes were asked to complete the survey; participation was voluntary. A total of 414

surveys were collected with usable responses received from 325 respondents. A comparison with the campus population revealed that the sample was disproportionate in terms of age group. Traditional age students (22 years and younger) constituted 72% (n=233) of the 325 students while nontraditional age students made up 28% (n=92). In the population from which this sample is taken, traditional age students represent 43% of the population; nontraditional age students 57%. As age group is the primary variable for this research, the sample was weighted to represent the population for statistical analysis. Weight was applied to each group in order to maintain a constant n of 325 (.59 and 2.08 respectively).

Respondents were followed for one year to distinguish persisters from those who withdrew. According to our review of the respondents' academic records, a total of 62 were not registered in the following academic year. Of these 62, 15 were requested to withdraw for academic reasons, 2 were visiting students and 6 had completed degree requirements. As Tinto's model addresses the decision to voluntarily dropout, only the remaining 39 voluntary withdrawals were used for further analysis. This dropout rate of 12% is consistent with other research (Pascarella and Terenzini 1980). It should be noted that this assessment of dropout does not differentiate between dropout, stopout and transfer behavior (Tinto 1985).

Survey data for each group was then compared. In addition, a sample of respondents who withdrew were contacted for further information about their decision to dropout.

#### Variables and Instruments

In order to facilitate a valid comparison, this particular research project only compares variables that are operationalized without age related considerations. In other words, any variables that were clearly correlated with the control variable age were not included in this primary comparison. To do so would bias the findings toward differences across age group before the model could be tested objectively for these differences. It would also create the problems of multicollinearity in statistical analysis, causing the estimation of imprecise regression coefficients, increases in standard error, and adverse effects on tests of significance (Pedhazur 1982).

Also, using operational definitions that are consistent with other research allows for a more valid comparison to other findings. Only then can we say something useful about this model's ability to predict withdrawal for a major subgroup in the campus population. This operationalization is consistent with the work of

Pascarella and Terenzini (1980, 1981); Pascarella and Chapman (1983); Pascarella, Duby and Iverson (1983) and Terenzini, Lorang and Pascarella (1981).

The following list represents the operationalization of the main constructs of the model:

#### FAMILY BACKGROUND

Socioeconomic status, a total of:

Mother's level of education (from 1 - some grammar school to 8 - graduate degree)

Father's level of education (from 1 - some grammar school to 8 - graduate degree)

Household income (from 1 - under \$5,000 to 15 - over \$71,000)

#### INDIVIDUAL ATTRIBUTES

Gender (0 male 1 female)

Resident/Commuter (0 resident 1 commuter)

Highest degree expected to attain (0 undergraduate degree 1 graduate degree)

Choice in attending this university (1st choice to 4th choice or lower)

#### PRE-COLLEGE SCHOOLING

High school GPA (percentage)

High school participation (number of high school extracurricular activities)

#### ACADEMIC INTEGRATION

Most recently finished semester's grade point average (self-reported grades on a four point system)

Intellectual Development scale (see appendix 1)

Faculty Concern for Student Development scale (see appendix 1)

#### SOCIAL INTEGRATION

Activities on campus (number of hours spent on campus per week outside of class and study time)

Membership in campus organizations

Friendships on campus

Peer Interaction scale (see appendix 1)

Faculty Interaction scale (see appendix 1)

#### COMMITMENTS

Institutional and goal commitment scale (see appendix 1)

All scales used questions designed to tap the student's attitude toward various aspects of student life. Each item used a Likert-type fixed choice response scale (strongly agree, agree, neutral, disagree, strongly disagree) and was coded from 1 to 5. The five scales of intellectual development, faculty concern for student development, peer interaction, faculty interaction and institutional and goal commitment were replicated based on the reports of factor analysis of Pascarella and Terenzini (1980) and Terenzini, Lorang and Pascarella (1981). As a check on the reliability of these scales, a factor analysis for this sample was performed. The scales were modified slightly and four items were deleted. Modifications were made based on factor loadings and face validity. The remaining items replicated the five scales as determined by Pascarella and Terenzini (1980) and Terenzini, Lorang and Pascarella (1981). Factor loadings and reliabilities for the remaining twenty-six items are reported in Appendix 1.

To simplify statistical analysis, the variables measuring academic integration and those measuring social integration were compressed into single values. Weighting of the scores was performed where variable ranges were quite diverse to equalize the relative importance of each variable. For the variable social integration, activities on campus was weighted by .25, organizations by 10 and

numbers of friends on campus by .5.

To compare across age groups, age was measured in years and recoded into a traditional age group (22 years and younger) and a nontraditional age group (23 years and older). The value of the dependent variable, persistence/voluntary withdrawal, was derived from official university transcripts and was dummy coded 0 for persistence and 1 for voluntary withdrawal.

#### Statistical Analysis

Means and standard deviations were derived for all interval level variables in the analysis and frequency distributions were derived for nominal level variables. To assess relationships between pairs of variables, Pearson product-moment correlation coefficients were obtained for all bivariate relationships.

Multivariate analysis was performed using two methods. Because the dependent variable in this analysis is a dichotomy, the effects of the independent variables on the dependent variable are estimated using logistic regression analysis. A logit model is estimated for the pooled sample and for each age group to assess differences in the direct effects of the model across age groups.

To get some sense of the relationships within the model, a path analysis was performed for the pooled sample and both age groups, with the variables academic



integration, social integration and commitment being regressed in turn on the variables antecedent in the model. This combination of techniques is due to the variations in levels of measurement. Ordinary least squares regression is an inappropriate technique where the dependent variable is a dichotomy (Walsh 1987); therefore the model cannot be estimated in its entirety with path analysis. Direct effects on the dependent variable will be estimated using logistic regression only.

## FINDINGS

Tables 1 and 2 provide the descriptive statistics for the variables in the model. Results from analysis of the pooled sample and the two sub-groups are reported. Two points should be noted in terms of these results. Firstly, with the exception of SES, high school participation and social integration, the average scores and frequencies do not vary to any significant degree across age groups. SES was higher for traditional age students than for nontraditional age students. High school participation average scores only vary by two units but this is notable given the small numbers. The mean and the standard deviation are higher for traditional age students. It is possible that this difference is due to differences in the length of time since the student attended high school; nontraditional age students may be less able to recall the number of activities they participated in. Social integration also varies somewhat across age groups with traditional age students showing a higher average score and greater variation. This finding supports our contention that nontraditional age students are less able to integrate into the social systems of the postsecondary institution.

Secondly, because the average scores and frequency distributions, for the most part, do not vary across age group, it would appear that we have little basis for

TABLE 1

Means and Standard Deviations (SD)  
for Continuous and Ordinal Independent Variables

Variable	Pooled Sample		TA Students		NTA Students	
	Mean	SD	Mean	SD	Mean	SD
Socioeconomic Status*	14.9	(6.5)	17.2	(6.4)	13.2	(6.0)
Choice of University	4.6	(1.1)	4.7	(.7)	4.5	(1.2)
Expected Consultations with Faculty	1.8	(2.5)	1.9	(3.2)	1.7	(1.8)
High School Participation*	2.9	(3.3)	4.0	(3.8)	2.0	(2.4)
High School Average*	74.5	(9.0)	76.5	(7.8)	72.4	(9.8)
Academic Integration	59.9	(10.0)	58.7	(10.0)	60.9	(10.0)
Social Integration*	49.8	(19.8)	55.0	(22.8)	46.0	(16.4)
Commitment	16.5	(3.0)	16.5	(2.9)	16.5	(3.1)

\*significance of t for difference between means =.00

TABLE 2

Frequencies for Nominal Independent Variables~

Variable	Pooled Sample	TA Students	NTA Students
Gender			
Male	129 (43%)	58 (45%)	71 (41%)
Female	171 (57%)	71 (55%)	100 (58%)*
Aspirations			
Undergraduate degree	190 (63%)	81 (63%)	108 (63%)
Graduate degree	113 (37%)	48 (37%)	64 (37%)
Resident Status			
On-campus	28 (9%)	16 (12%)	12 (7%)
Commuter	274 (91%)	114 (88%)	160 (93%)

~chi-square insignificant for all associations

\*percentage tally >100% due to missing cases

claiming an interaction effect caused by age for the variables in the model. As we shall see, however, this homogeneity disappears when we begin to look at covariation between variables in the model across age groups.

Tables 3A, 3B and 3C report the zero-order correlations for the pooled sample, the traditional age students and the nontraditional age students, respectively. Table 3A provides us with information in two areas. Firstly, this table gives us the correlations between the control variable age and the exogenous, intervening and dependent variables in the model. In terms of the exogenous variables, the ideal situation is one where there is no correlation between the control variable and exogenous variables. In this instance, age does show a statistically significant relationship with four of the eight exogenous variables. The association is weak to moderate however, ranging from .12 to .31. It is unlikely that this is enough to create any serious problems in further analysis. There is no relationship between age and commitment and a very weak but statistically significant relationship between age and dropout. In terms of the former, it would appear that for this sample levels of commitment do not vary in any systematic way with age group. The lack of a relationship between dropout and age is not surprising; neither age group is more likely to dropout and therefore knowing which age group one falls into does not improve our chances of

predicting accurately whether they will dropout or not. It will be understanding the variation in other factors that impact on dropout in systematically different ways across age group that will improve our chances of predicting dropout behavior.

Secondly, the zero-order correlations from the pooled analysis can be compared with the correlations from each group. In many cases, the relationship between two variables changes when the sample is divided by age group. In some examples, a suppressor effect can be observed, as is the case with the relationship between aspiration and socioeconomic status. In the pooled sample, there is no relationship between aspiration and socioeconomic status (-.04). Both age groups however, indicate that as socioeconomic status increases, degree aspirations are more likely to be at the postgraduate level. (21~ traditional age students, .24~ nontraditional age students). In another example, the relationship between high school participation and SES is found to be spurious. For the pooled sample, a weak but statistically significant relationship indicates that high school participation increases as socioeconomic status increases. This relationship disappears when the sample is divided by age group (.13\* pooled, .02 traditional age students, .05 nontraditional age students).

Most often, age is found to have a mediating effect on the two variables as is the case between social integration.

TABLE 3A

Zero-order correlations - pooled sample

Variables	1	2	3	4	5	6	7	8	9	10	11	12
SES (1)												
Gender (2)	.00											
Aspirations (3)	-.04	.09										
Choice (4)	.06	-.01	-.03									
Consult (5)	.04	-.07	.13*	.02								
Resident Status (6)	-.09	-.02	-.11*	.05	-.03							
HS Participation (7)	.13*	-.05	.04	.03	.13*	-.01						
HS Average (8)	.16~	.17~	.08	.13*	.09	-.00	.15*					
Academic Integr. (9)	.05	.20~	.21~	.06	.00	-.00	-.15~	.34~				
Social Integr. (10)	.12*	-.13*	.06	.10*	.15~	-.28~	.21~	.22~	.14*			
Commitment (11)	-.11*	.00	.09	.16~	.02	-.01	-.06	-.00	.28~	.16~		
Age (12)	-.31~	.04	.00	-.12*	-.05	.09	-.30~	-.23~	.11*	-.23~	-.00	
Dropout	-.03	.01	-.06	.07	-.00	-.01	-.10*	-.07	-.21~	-.09	-.30~	.09*

\*p .05 or lower

~p .01 or lower

and resident status. In the pooled sample, social integration increases for students living on campus (-.28). This relationship increases for traditional age students (-.48) and disappears for nontraditional age students (-.03 nontraditional age students).

The relationship between dropout and academic integration is a similar example (-.21~ pooled, -.07 traditional age students, -.32~ nontraditional age students). The negative relationship indicates that the higher the academic integration, the more likely one is to be a persister. This relationship is not significant however for traditional age students. From the examples, it would appear that knowing age makes a difference in the information we derive from the relationships between the variables in the model.

Tables 3B and 3C allow us to compare both between and within the models for each age group. In terms of the eight exogenous variables, we do see some intercorrelations in each age group. The relationships are on the weak side however, ranging from .17\* to .24~ for traditional age students and .15\* to .26~ for nontraditional age students, and it is unlikely that they will cause any of the problems normally associated with multicollinearity.

In terms of the intervening variables, it would appear that there are more associations between the exogenous and intervening variables for nontraditional age students than

TABLE 3B

## Zero-order correlations - traditional age students

Variables	1	2	3	4	5	6	7	8	9	10	11	12
SES (1)												
Gender (2)	-.10											
Aspirations (3)	.21*	.02										
Choice (4)	-.00	-.04	-.05									
Consult (5)	-.00	-.10	.14	-.19*								
Resident Status (6)	.09	-.03	.06	.00	-.03							
HS Participation (7)	.02	-.00	.09	-.05	.13	-.02						
HS Average (8)	.04	.08	.17*	.05	-.04	-.01	.24*					
Academic Integr. (9)	.02	.15*	.27*	.07	.07	.04	-.03	.37*				
Social Integr. (10)	.05	-.08	.09	-.03	.06	-.48*	.19*	.11	.09			
Commitment (11)	-.05	-.06	-.02	.09	-.02	-.13	-.03	.09	.17*	.16*		
Dropout	.10	-.00	.00	-.02	-.02	-.05	-.07	-.04	-.07	-.06	-.20*	

\*p .05 or lower

\*p .01 or lower



TABLE 3C

Zero-order correlations - non-traditional age students

Variables	1	2	3	4	5	6	7	8	9	10	11	12
SES (1)												
Gender (2)	.11											
Aspirations (3)	-.24*	.15*										
Choice (4)	.03	.00	-.02									
Consult (5)	.06	-.03	.13	.17*								
Resident Status (6)	-.23*	-.00	-.26~	.10	-.02							
HS Participation (7)	.05	-.11	-.03	.04	.09	.07						
HS Average (8)	.20~	.25~	.02	.19*	.13	.05	-.08					
Academic Integr. (9)	.16*	.23*	.15*	.05	-.03	-.06	-.31~	.42*				
Social Integr. (10)	.03	-.17*	.03	.15*	.29~	-.03	.07	.27~	.23~			
Commitment (11)	-.17*	.05	.16*	.20~	.08	.09	-.10	-.08	.36~	.15*		
Dropout	-.06	.01	-.10	.12	.02	.01	-.09	-.04	-.32~	-.08	-.36~	

\*p .05 or lower

~p .01 or lower

for traditional age students. Academic integration has a weak to moderate (.15\* to .42~) and statistically significant relationship with five of the eight exogenous variables for nontraditional age students. Academic integration increases as socioeconomic status, level of degree aspiration and high school average increases. The positive relationship between academic integration and gender indicates that females are likely to be higher on academic integration. Academic integration decreases where participation in extracurricular activities increases.

In the traditional age student model, only three of the relationships are statistically significant, ranging from .15\* to .37~. There is a positive correlation between gender and academic integration, indicating again that for female traditional age students, academic integration scores are likely to be higher. Academic integration increases as level of degree aspiration and hs average increases.

Social integration has a similar showing. Traditional age students show a relatively strong negative relationship between social integration and resident status; because of the arrangement of the coding this indicates that social integration levels increase for residents. This finding is compatible with the findings of other research on integration and resident status (Pascarella and Chapman 1983; Pascarella, Duby and Iverson 1983).

Commitment has the lowest number of statistically

significant relationships with variables measuring the background characteristics specified in the model. For traditional age students, commitment shows primary very weak association with exogenous variables, none of which are statistically significant. This is not surprising given Tinto's argument the effects of the exogenous variables on commitment will be mediated by the integration variables in the model. For nontraditional age students, commitment shows a weak but statistically significant association with socioeconomic status, aspirations and choice of university. Commitment increases as socioeconomic status decreases, as degree aspirations increase and as choice of university increases.

The associations among the intervening variables are stronger for nontraditional age students than for traditional age students. The model specifies social and academic integration as antecedent to commitment and suggests the possibility of a negative correlation between integration levels. For traditional age students, there is a very weak relationship between social and academic integration (.09). Nontraditional age students show a stronger association that is statistically significant; the correlation is positive indicating the as academic integration increases, social integration increases (.23~).

Social integration shows a weak association with commitment for both age groups. Academic integration and

commitment shows a stronger association for nontraditional age students (.36~) than for traditional age students (.17\*), but both are statistically significant and positive, indicating that as social integration increases, commitment increases.

The dependent variable dropout also yields quite different associations across age groups. For traditional age students, all associations are quite weak with the exception of the association with commitment. In terms of the model, it is commitment that is the most important influence on the decision to dropout; the fact that this association is the strongest is therefore not surprising. It is not a strong association for traditional age students however, with a coefficient of  $-.20\sim$ . The negative relationship indicates that the higher the commitment the more likely a respondent is to fall into the category of persister. For nontraditional age students, dropout shows a moderate association with both academic integration and commitment and both are negative relationships ( $-.32\sim$  and  $-.36\sim$  respectively), indicating again that an increase in academic integration or commitment increases the likelihood of being the category of persister.

Although the correlation matrices did not yield any strong associations, further analysis was still indicated to determine the effects, if any, of the independent variables on the dependent variable. The correlation coefficients

provide us with information about how well the data fit the regression line. But it is the slope of the regression line that we are interested in; it provides a measure of the magnitude of the effect of one variable on another. In other words, the regression coefficients provide information about the amount of change in the dependent variable given a one unit change in the independent variable. Also, zero-order correlations do not reflect the association between two variables with all other variables in the model controlled. Regression analysis however controls for the effects of all other variables in the model and reports effects attributed uniquely to the specified variable. This may change the reported magnitude of the relationship between any two variables.

For this model, a two stage regression analysis was performed. Because the dependent variable in this analysis is a dichotomy, ordinary least squares regression was contraindicated (Walsh 1987). Instead, logistic regression was performed to determine direct effects of the variables in the model on the dependent variable. Table 4 reports the regression coefficients for the pooled sample, traditional age students and nontraditional age students.

For the pooled sample, both the variables academic integration and commitment yielded coefficient/standard error ratios greater than two. According to Walsh (1987) this number is analogous to a test of significance and deems

TABLE 4

## Logistic Regression Coefficients (1)

Variables	Pooled Sample	TA Students	NTA Students
Socioeconomic Status	.005	.018	-.034
Gender	-.044	-.046	.180
Resident/Commuter	-.274	-.290	-.604
Educational Aspirations	.064	.039	-.269
Choice of University	.114	-.015	.398
Expected Consultations with Faculty	-.012	-.025	.048
High School Average	-.003	.000	-.018
High School Participation	-.046	-.029	-.165
Academic Integration	-.023*	-.023*	-.029
Social Integration	-.006	-.007	-.005
Commitment	-.066*	-.039	-.139*

\* Coefficient/Standard Error Ratio >2

1 Chi-square goodness-of-fit test indicates non-significant differences between expected and observed distribution of cases for all three models (see Walsh 1987:181). Increment test for interaction effect of age yielded a chi-square of 21.34 with 11 degrees of freedom, significant at the level of .05.

the variable to be a useful one. The regression coefficients are interpreted as the amount of change in the log-odds of making a dropout decision for a one unit change in the predictor variable. As the significant predictor variables are continuous, the coefficients appear quite small ( $-.023^*$  and  $-.066^*$ ). In other words, where a variable with a large range of values is regressed on a dichotomous variable, it is not unusual to see a relatively small effect on the log-odds change between the two values of the dependent variable.

Splitting the sample yielded an interesting change in the results. For traditional age students, only academic integration remained as a useful predictor variable ( $-.023^*$ ). For nontraditional age students, commitment was the only useful predictor variable ( $-.139$ ). This result is not as disappointing as it seems at first glance. In terms of the model, only commitment is specified as having a direct effect on dropout decisions. Other variables in the model impact on the dependent variable indirectly; first through integration and in turn through commitment. The surprise is that nontraditional age students follow the expected pattern and traditional age students do not. For traditional age students, it is academic integration that has the only direct effect on dropout decisions.

This analysis provides us with only the direct effects of the independent variables in the model. This is not

entirely satisfactory as the model is a longitudinal, process oriented model with a specific temporal sequence of variables. The relationships between the exogenous variables and the endogenous variables, and among the endogenous variables, are also important to consider in terms of the interaction effect of age. To access this information, path analysis was employed, omitting the final step of regressing the dependent variable dropout on the other variables in the model. As was stated earlier, using the ordinary least squares regression that is required for path analysis was deemed to be an inappropriate technique as the dependent variable is a dichotomy.

Therefore, the model was estimated three times, using the endogenous variables academic integration, social integration and commitment as the dependent variables. For the integration variables, only the exogenous variables were used as predictor variables. As there is no discernable temporal sequence between academic and social integration, these variables were assumed to be correlated but not necessarily causally related. In the analysis of the variable commitment, academic and social integration were included as independent variables. Tables 5A, 5B and 5C report the unstandardized and standardized regression coefficients derived from this analysis.

For any comparison across groups, unstandardized regression coefficients can be compared. Standardized



TABLE 5A

Regression of Academic Integration (1)  
Unstandardized and Standardized (in brackets) Coefficients

Variables	Pooled Sample	TA Students	NTA Students
Socioeconomic Status	.018 (.014)	.000 (.000)	.166 (.127)
Gender	1.908*(.112)	2.210 (.125)	1.491 (.092)
Resident/ Commuter	.459 (.016)	-1.306 (.049)	2.354 (.077)
Educational Aspirations	2.747~(.159)	4.341~(.239)	2.225 (.137)
Choice of University	-.073 (.000)	1.507 (.122)	-.297 (.047)
Expected Consultations	.125 (.036)	.156 (.055)	.201 (.044)
High School Average	.254~(.240)	.350~(.296)	.219~(.221)
High School Participation	-.411~(.153)	-.335 (.141)	-.349 (.101)

~t<.01

\*t<.05

1 Increment test for interaction effect of age  $F=.831$   
with 8 and 283 degrees of freedom; insignificant at the  
level of .05.

TABLE 5B

Regression of Social Integration (1)  
Unstandardized and Standardized (in brackets) Coefficients

Variables	Pooled Sample	TA Students	NTA Students
Socioeconomic Status	.000 (.000)	.146 (.043)	-.026 (.000)
Gender	-5.857~(.150)	-2.991 (.069)	-8.529 (.252)
Resident/ Commuter	-17.429~(.264)	-30.949~(.472)	.316 (.000)
Educational Aspirations	2.394 (.060)	4.545 (.102)	3.730 (.109)
Choice of University	1.697 (.094)	-.262 (.000)	1.033 (.078)
Expected Consultations	.817 (.103)	.032 (.000)	2.478~(.259)
High School Average	.395~(.162)	.159~(.055)	.455~(.218)
High School Participation	.937~(.151)	.881 (.153)	.625 (.085)

~t<.01

\*t<.05

1 Increment test for interaction effect of age F=2.96  
with 8 and 283 degrees of freedom; significant at the  
level of .01.

TABLE 5C

Regression of Commitment (1)  
Unstandardized and Standardized (in brackets) Coefficients

Variables	Pooled Sample	TA Students	NTA Students
Socioeconomic Status	-.055 (.119)	-.019 (.043)	-.074 (.145)
Gender	-.024 (.000)	-.505 (.088)	.374 (.059)
Resident/ Commuter	.197 (.019)	-.355 (.038)	.872 (.073)
Educational Aspirations	.212 (.034)	-.469 (.079)	.592 (.092)
Choice of University	.446~(.159)	.241 (.060)	.497~(.202)
Expected Consultations	.000 (.000)	-.019 (.020)	.010 (.000)
High School Average	-.037 (.098)	.015 (.038)	-.083~(.213)
High School Participation	-.037 (.038)	-.032 (.041)	-.128 (.094)
Academic Integration	.095~(.266)	.071*(.218)	.131~(.333)
Social Integration	.026~(.170)	.021 (.159)	.025 (.138)

~t&lt;.01

\*t&lt;.05

1 Increment test for interaction effect of age  $F=.871$  with 10 and 279 degrees of freedom; insignificant at the level of .05.

coefficients are included for comparison of relative effects within groups only. For the purposes of this research, only unstandardized coefficients will be compared to consider differences across age groups.

For each analysis, results of the pooled sample is included along with the results of the sample for each age group. With few exceptions, controlling for age group changes the effect of the independent variables on the respective dependent variable. In other words, knowing age increases our understanding of the relationships between variables in this model.

Table 5A reports the results of the regression analysis using academic integration as the dependent variable. For traditional age students, educational aspirations and high school average had a significant effect on academic integration (4.341~ and .350~ respectively). For nontraditional age students, only high school average had a significant effect on academic integration, and this effect was lower (.219~). This difference may be attributed to the fact that nontraditional age students can be admitted to the postsecondary institution without the same academic qualifications as traditional age students; variation in academic integration may be attributed to other variables such as commitment and work habits.

Table 5B reports the results of the regression analysis using social integration as the dependent variable. For

traditional age students, residency status and high school average had a significant effect on social integration (-30.949~ and .159~ respectively). The effect of residency status disappears for nontraditional age students. This is not surprising given that traditional age students who live on campus are more likely to live in a dormitory and have shared accomodation and eat in the cafeteria. Nontraditional age students are more likely to live in family housing that separates each family into housing units with their own eating facilities. Nontraditional age students who live on campus, therefore, would be more like their commuting counterparts than would traditional age students.

High school average has a significant effect on social integration for nontraditional age students, and a larger effect than that found for traditional age students (.455~ and .159~ respectively). This may be a result of the amount of confidence a nontraditional age student can bring with them to the postsecondary institution. They are more likely than traditional age students to have been out of high school for a period of time. They are also able to enter university with less stringent requirements than traditional age students, given that they meet certain other requirements such a having reached the age of 21 years. The higher the average they had in high school, they more likely they are to feel confident in their preparation for the role

of student, regardless of the length of time away from a formal educational situation.

For nontraditional age students, expected consultations with faculty also had a significant effect on social integration (2.478~) while this was not a significant variable for traditional age students. This may be due to what Jarvis' (1987) suggests as a difference in the way nontraditional age students view their relationships with their instructors. They are more likely to be closer in age to instructors in a postsecondary institution and may have more reciprocal identification due to similar social roles such as parent, spouse, or employee. Therefore, they may view consultations with instructors as an important aspect of social integration into the postsecondary institution.

Table 5C reports the results of the regression analysis using commitment as the dependent variable. For traditional age students, only academic integration had a significant effect on commitment (.071\*). The lack of effect from the exogenous variables is not surprising here as effects of these variables are expected to be mediated by integration. It is interesting that social integration is significant for the pooled sample but not for either age group.

For nontraditional age students, two of the exogenous variables have direct effects on commitment. Choice of university and high school average both have significant effects on commitment (.497~ and -.083~ respectively).

Choice of university may be more of an issue for nontraditional age students due to a lack of mobility; traditional age students may be less tied to the community in which they live and may be free to attend the institution of their choice. Nontraditional age students on the other hand may be less mobile and therefore more affected by their relative choice of institution.

The negative effect of high school average on commitment is an interesting finding. Though relatively small in magnitude, it appears as though an decrease in high school average results in an increase in commitment. Perhaps the effects of poor performance in high school manifest themselves in a greater commitment to better performance now that the nontraditional age students has another chance. It may also be that poor performance in high school led to employment in a poorly paid, unskilled labour position. Dissatisfaction with this employment may increase commitment to gaining an education and improving the chances of better pay and better working conditions.

Academic integration is also a significant variable for nontraditional age students (.131~). The effect of academic integration for nontraditional age students is, in fact, larger for nontraditional age students than for traditional age students. This finding seems reasonable in terms of the potential handicaps a nontraditional age students may have; they must counteract the difficulties of inadequate role

preparation and role overload with a level of academic integration to sustain a certain degree of commitment to the goal of graduation and to the institution.

This analysis of three regression models using the endogenous variables in the theoretical model could result in the creation of path diagrams. The assessment of the diagrams can then be used to ascertain relative effects within each model and calculate indirect effects on the endogenous variables. This assessment requires the use of standardized coefficients. As this research question is the comparison of relationships in the model across age groups, standardized coefficients can not be used. This negates the usefulness of the path diagram as relative effects with the model are not the point of comparison and indirect effects can not be calculated using unstandardized regression coefficients.

Reporting the proportion of variance explained by each model, while not the equivalent to path diagrams, is an accepted method of reporting results from path analysis (Loether and McTavish 1980). These values will be compared across age groups. Table 6 reports the R squared and adjusted R squared for each of the three models, for the pooled and split samples.

In terms of social and academic integration, the model does a better job of explaining variation for traditional age students than for nontraditional age students (19.7% and



TABLE 6  
 Squared multiple correlation coefficients  
 (Adjusted R in brackets)

	Pooled Sample	TA Students	NTA Students
Regression of academic integration	.126*(.102)	.197*(.144)	.123*(.080)
Regression of social integration	.184*(.162)	.269*(.221)	.209*(.170)
Regression of commitment	.148*(.118)	.102 (.027)	.247*(.201)

\*F  $\leq$  .05

12.3% plus 26.9 and 20.9% respectively).

Commitment, however, shows a different pattern. The model explains more of the variation in commitment for nontraditional age students than for traditional age students (24.7% and 10.2% respectively). It must be noted, however, that the R squared for traditional age students is not significant at the .05 level. For this model,  $F=1.36$ ,  $significance=.2082$ .

If we combine the results of the path analysis with the results of direct effects from the logit analysis, an interesting pattern develops. For traditional age students, only academic integration has a direct effect on dropout decisions. The variables antecedent to academic integration in the model explain a significant proportion of the variance. Social integration is also explained, but does not have a significant effect on dropout. Commitment, the most important explanatory variable in Tinto's model in terms of dropout decisions, does not have a significant direct effect on dropout and is not explained by the variables antecedent in the model.

Analysis of nontraditional age students, on the other hand, shows direct effects on dropout decisions through the variable commitment. The proportion of variance in commitment explained by the model is significant and larger for nontraditional age students than for traditional age students. The proportion of variance in academic and social

integration explained by the model is also significant, but less than the amount explained for the traditional age students. Academic and social integration do not show direct effects on dropout decisions, but academic integration could be said to have an indirect effect on dropout as it has a significant effect on commitment. In other words, it would appear that more information about dropout for nontraditional age students than for traditional age students is derived from this model (2).

2 Assumptions regarding ordinary least squares regression (see Pedhazur 1985:33) and path analysis (see Pedhazur 1985:582) must be considered when interpreting these findings.

## DISCUSSION

The main hypothesis of this research project stated that Tinto's model would explain less of the variation in dropout decisions for nontraditional age students than for traditional age students. This was not upheld by the findings. Although there is not a clear comparison of numbers from one model, it would appear that the model fits the data from the nontraditional age students group better than the data from the traditional age students group.

For traditional age students, the model explains some of the variation in academic and social integration, with academic integration having the only direct effect on dropout decisions. This means the variable commitment, central to Tinto's explanation of dropout, is misspecified for this sub-group.

The nontraditional age students group, on the other hand, does not show as much explained variation of the integration variables in the model. In other words, the exogenous variables do not do the job of explaining the variation in integration scores that they do for traditional age students. From integration beyond, however, the nontraditional age students group follows the process indicated by Tinto a little more closely. Academic integration has a direct effect on commitment and

the model up to commitment explains a significant amount of the variation. Commitment in turn, has a direct effect on the decision to dropout.

Social integration does not have a significant effect on either commitment or dropout decisions for either age group. This may be due to the fact that the sample population is primarily a commuter group. Other research (Pascarella and Chapman 1983, Pascarella, Duby and Iverson; 1983 and Pascarella and Terenzini 1981) indicates that at commuter institutions, social integration is not as important a factor in dropout decisions as it is for primarily residential institutions.

More specifically, only one of the hypotheses set out at the beginning of the project was substantiated by the findings. The main hypothesis was discussed above. The average scores and frequency distributions for exogenous variables showed variation across age groups for the variables SES and high school participation, but not for high school average. For SES and high school participation, nontraditional age students had a lower average score. This finding was further supported by the significant negative correlation between age and these two variables.

It may be that high school students from lower socioeconomic status backgrounds are more likely to put off attendance at a postsecondary institution. This may

be due to a lack of financial assistance or perhaps they require more life experience before deciding on a specific career. High school participation may have an indirect effect on how comfortable a student is with the learning environment. Perhaps attendance at a postsecondary institution does not look as rewarding to students who did not participate in the activities of the school, and they put off attendance until more life experience gives them new reasons for continuing their education. Also, it may be that as nontraditional age students have been out of high school for a longer period of time it is more difficult to recall accurately all of the activities they were involved in.

The high school average mean varied only slightly across age group and the amount of variation in each age group was very similar. For this sample then, the effect of nonmatriculated admission does not seem to be important. This finding may however be related to the use of self reported high school average in that there may be a tendency for respondents to report an acceptable average regardless of the validity of such an average.

Social integration average scores varied in the predicted direction with nontraditional age students showing a lower average and less variation. Academic integration average scores did not vary in the predicted direction, rather the scores were very similar across age

groups. The proportion of variance in integration scores explained by the model was higher for traditional age students than for nontraditional age students. In other words, factors not included in the model are impacting on the variation in academic integration more so for nontraditional age students than for traditional age students, but this difference in exogenous variation is not changing the average degree of academic integration across age groups.

Average level of commitment does not vary across age group as was predicted. The proportion of variance in commitment explained by the model is higher for nontraditional age students than for traditional age students, in the opposite direction to what was predicted. It appears that while the exogenous variables do not do as well at explaining integration for nontraditional age students, the exogenous variables and the integration scores do explain commitment more efficiently for nontraditional age students than for traditional age students.

Finally, commitment is not the most important variable in terms of direct effects on dropout for both age groups. Only nontraditional age students show a significant direct effect of commitment on dropout decisions. For traditional age students, academic integration shows the only direct effect on dropout

decisions.

According to Tinto's model, integration is a critical factor in the determination of the level of commitment, which in turn influences the decision to dropout. This pattern is not substantiated for either age group, although each group has a unique deviation. For traditional age students, commitment is not explained by the variables in the model and dropout decisions are influenced only by academic integration. The model would appear to be a better fit for nontraditional age students, contrary to the hypothesized relationship across age groups. For this age group, the model explains more of the variation in commitment and commitment has the only significant direct effect on dropout decisions. The suggested influence from external factors may still be important, perhaps more in terms of nontraditional age students integration. Understanding more of the variation in integration for nontraditional age students may in turn add to the explained variation in commitment and dropout decisions.



## CONCLUSION

To establish the differences across age groups, this model had to be operationalized and tested with exogenous variables that were not highly correlated with age. To adjust the model before differences were established would have negated the objective test of differences. In other words, the differences in the relationships in the model between nontraditional age students and traditional age students had to be demonstrated to justify the development of separate models for each age group. Now that the findings have indicated an interaction effect based on age, the model should be adjusted for application to the nontraditional age student group. Family background, for example, could be changed to family situation. The operationalization of this new construct would include the individual's socioeconomic status, the number of dependents and a measure of financial pressure. Pre-college schooling could allow for a measure of the length of time since last attending a formal education program. Individual attributes could include a measure of perceived load and perceived skills in terms of the student role. For adult students who are admitted as nonmatriculated adults, some objective measure of preparation other than high school average could be used.

The variables integration and commitment appear to be

important intervening variables in the dropout decision for this age group. The factors antecedent to these variables, however, are quite likely to be factors external to the institution and need to be included in the analysis.

I submit that the major weakness of Tinto's model is his suggestion that external factors are allowed for in the incidence of changing commitments to the institution and to the goal of graduation. This assumption presents two problems. If dropout occurs based on a decrease in level of commitment, how do you determine if the decrease was due to increased costs for staying based on factors internal to the institution or increased benefits for pursuing an alternate line of activity outside the institution? In terms of effective retention practice, it is necessary to pin down factors that influence the relationship with the institution alone.

It would appear that Tinto is assuming that factors external to the institution will impact on students in random fashion, as he does not allow for the measurement of these variables. When commitment is low, we do not have information about the effect of factors external to the institution. This lack of information would not be a problem if we could assume that the effect has an equal likelihood of occurring for every student in the population. However, based on the knowledge that the

student population is changing in terms of age and based on the information that nontraditional age students vary in characteristics that will affect student life, it is quite likely that external factors will impact on the campus population in a way that will systematically bias the results of measuring institutionally oriented factors relating to dropout.

This model leaves a great deal of variation unexplained for both traditional age students and nontraditional age students. I submit that there are important variables missing in this model and that these variables are external to the institution. It is also likely that this list of external variables will vary across age groups. Role overload and inadequate role preparation are more likely to impact on nontraditional age students than on their younger counterparts. Other factors, such as financial pressure, are likely to affect both age groups, but in varying degrees.

The conclusions relating to Tinto's model are made tentatively as further research is in order. This research project has limitations that must be considered before more concrete suggestions can be made about Tinto's model. Firstly, this test of Tinto's model did not measure entry level commitment. This would provide information about changes in commitment at given levels of academic and social integration. It is also quite likely

to be highly correlated with commitment at time two; a problem that would have to be considered in terms of statistical analysis.

Secondly, the sample analyzed to test Tinto's model was weighted to represent the population in terms of age. It was weighted to maintain a constant N in the pooled sample. The split sample, however, did not have constant Ns once the sample was weighted. This changes the tests of significance and may have biased the findings in this study.

Thirdly, the F-test for the significance of the interaction effect of age group yielded an F-ratio that was insignificant at the level of .05 for the academic integration model and the commitment model. This may be related to the high degree of collinearity between the variables in the saturated model (see Pedhazur 1982:232). In light of this finding, our conclusions about the differences across age group in these models must be tentatively drawn until further investigations replicate these findings. The social integration model, it should be noted, yielded an F-ratio that was significant at the level of .01, indicating a very low probability that the differences across age group in the model are due to random fluctuations in the population. A comparable test of significance was used to test for the differences across age group for the logistic regression model. The

differences in this model are significant at the level of .05.

Fourthly, chronological age is in fact acting as a surrogate variable for what is really variation in life circumstances. It may be more appropriate to control for marital status, dependents, attitudes toward primary roles and responsibilities and attitudes toward the student-instructor relationships at postsecondary institutions. These are the factors that are influencing the most important variables in terms of dropout. This is unfortunately, a much more cumbersome way to access the type of information we need.

Finally, any research project can benefit from a combination of qualitative and quantitative research methods. Interviews with respondents who have withdraw may shed light on the relative influence of internal and external factors that impact on the dropout decision. It would also add to the probability of determining which external factors are the most important influences in terms of dropout, and how these factors may vary across age groups.

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## APPENDIX 1

Item Factor Loadings and Alpha Reliabilities  
for Scaled Items

Scale/Item	Loading	Eigen- Value	Scale Alpha
Scale 1: PEER GROUP INTERACTION		5.75	.86
Since coming to this university I have developed close personal relationships with other students.	.88		
The student friendships I have developed at this university have been personally satisfying.	.81		
My interpersonal relationships with other students have had a positive influence on my personal growth, attitudes, and values.	.78		
My interpersonal relationships with other students have had a positive influence on my intellectual growth and interest in ideas.	.74		
It has been difficult for me to meet and make with other students.	.63		
Few of the students I know would be willing to listen to me and help if I had a problem.	.52		
Scale 2: FACULTY INTERACTION		2.90	.81
My nonclassroom interactions with faculty have had a positive influence on my personal growth, values and attitudes.	.87		
My nonclassroom interactions with faculty have had a positive influence on my intellectual growth and interest in ideas.	.84		
My nonclassroom interactions with faculty have had a positive influence on my career goals and aspirations.	.80		

APPENDIX 1 (continued)  
Item Factor Loadings and Alpha Reliabilities  
for Scaled Items

Scale/Item	Loading	Eigen- Value	Scale Alpha
Since coming to this university I have developed a close personal relationship with at least one faculty member.	.59		
I am satisfied with the opportunities to meet and interact informally with faculty members.	.49		
Scale 3: INTELLECTUAL DEVELOPMENT		2.50	.81
I am satisfied with my academic experience at this university.	.80		
I am satisfied with the extent of my intellectual development since enrolling in this university.	.77		
My academic experience has had a positive influence on my intellectual growth and interest in ideas.	.74		
I have performed academically as well as I anticipated I would.	.60		
My interest in ideas and intellectual matters has increased since coming to this university.	.56		
Scale 4: FACULTY CONCERN FOR STUDENT DEVELOPMENT		1.92	.70
Few of the faculty members I have had contact with are generally interested in students.	.68		
Few of the faculty members I have had contact with are generally outstanding or superior teachers.	.65		

Appendix 1 (continued)  
Item Factor Loadings and Alpha Reliabilities  
for Scaled Items

Scale/Item	Loading	Eigen- Value	Scale Alpha
Few of the faculty members I have had contact with are willing to spend time outside of class to discuss issues of interest and importance to students.	.64		
Most of the faculty I have had contact with are interested in helping students grow in more than just academic areas.	.63		
Most faculty members I have had contact with are genuinely interested in teaching.	.55		
Scale 5: COMMITMENT		1.69	.78
It is important to me to graduate from college.	.70		
I am confident that I made the right decision in choosing to attend this university.	.69		
It is likely that I will register at this university next fall.	.68		
It is not important to me to graduate from this university.	.62		