Predicting Student Persistence: Pre-Entry Attributes that Lead to Success in a Collegiate Flight Program

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ABSTRACT

The purpose of this study was to examine student pre-entry attributes to predict student persistence and academic success in a professional flight program. The data set constructed for this study was drawn from a sample of 390 full-time, first-time students enrolled at a University, with Commercial Aviation as their declared academic major at the time of entry. The data examined the students' academic progress for the first year to the second year of enrollment. Pre-existing data were gathered from each student's institutional record and financial aid record. Multiple regression analysis was used to calculate the degree to which pre-entry attributes predicted student persistence and academic success. The study found significant relationships between pre-entry attributes in determining student persistence and academic success. Pre-entry attributes accounted for 9.6% of the variance in persistence, and 32.3% of the variance in academic success.

INTRODUCTION

Given that more students depart from their initial institution of higher education, than graduate (Tinto, 1993), the study of student persistence has been popular in higher education literature for over a half of century (Pantages & Creedon, 1978; Metz, 2005). Despite the vast amount of research and attention placed on the issue of student persistence, still more than a quarter of the students who enter four-year institutions leave after their first year of study (Braxton, 2000). This perplexing phenomenon has become known as the "departure puzzle" (Braxton, 2000). When a student decides not to persist at a particular institution, not only is the individual student affected, but the university is also impacted by the loss. A thorough understanding of all factors related to student persistence is necessary for individual student success and institutional effectiveness.

In their synthesis of over three decades of higher education research, Pascarella and Terenzini (1991, 2005) noted that numerous theoretical frameworks (eg. Spady, 1970; Tinto, 1975; Bean, 1980) have been developed to help guide and focus inquiry in the study of student persistence and the departure puzzle. Acknowledging the growing acceptance of the importance of student retention, Tinto (1993) describes an explosion of research and policy reports that have been written in order to seek a better understanding of the forces that shape student persistence.

The benefits received by students who persist to graduation are numerous. According to the United States Census Bureau (2007), the average income across all disciplines for an individual who has at least a bachelor's degree is nearly twice as much as an individual who only has a high school diploma. Besides economic gains, Pascarella and Terenzini (2005) in their meta-analysis of more than three decades worth of research cite numerous studies which demonstrate cognitive and social ways in which students who attend college are benefited.

Some students attend college with very specific professional and career goals in mind that can only be attained by receiving the education and certification at a collegiate level. For example, a student who wishes to become a medical doctor would have to graduate from an accredited medical school and pass

the national board exam for their specialty. Many other professional programs have similar requirements. Students who wish to become professional pilots and fly for a major airline, the subjects of this study, must meet certification requirements specified by the Federal Aviation Administration (FAA) as well as hold a four-year degree.

REVIEW OF LITERATURE

In an analysis of early literature and research on student persistence, Spady (1970) found that most studies were merely descriptive and lacked a theoretical framework that could be tested. Spady (1970) then developed one of the first theoretically based models of student persistence by applying Durkheim's (1951) theory of suicide and comparing it to the decision to withdraw from higher education. A student's decision to drop out of school is by no means as severe or permanent as one's decision to end their own life; however, Spady (1970) argued that this sociological theory proved a "fruitful vehicle for summarizing a large proportion of current research, and focusing future attention on the interaction between student attributes and the influences, expectations, and demands imposed by various sources in the university system" (p. 64).

To further elaborate on student departure, Tinto (1975) used Spady's (1970) model as a base and defined other variables consistent with the literature. Even in Tinto's (1975) early conceptual model of student departure he argues that the departure decision is a longitudinal process that must be analyzed in that manner. He further defined his model in a book where he incorporated social anthropology work of Van Gennep (1960), particularly his rites of passage (Tinto, 1993). By using aspects from both Durkheim's (1951) theory of suicide and Van Gennep's (1960) rites of passage, Tinto (1993) proposed a longitudinal model of institutional departure that consists of six sub-sections: pre-entry attributes, initial goals and commitments, institutional experiences, integration, goals and commitments after time, and departure outcome. These six sections run on a continuum of time, and are also influenced by the external community in which a student interacts. Figure 1 illustrates Tinto's (1993) model of student departure.

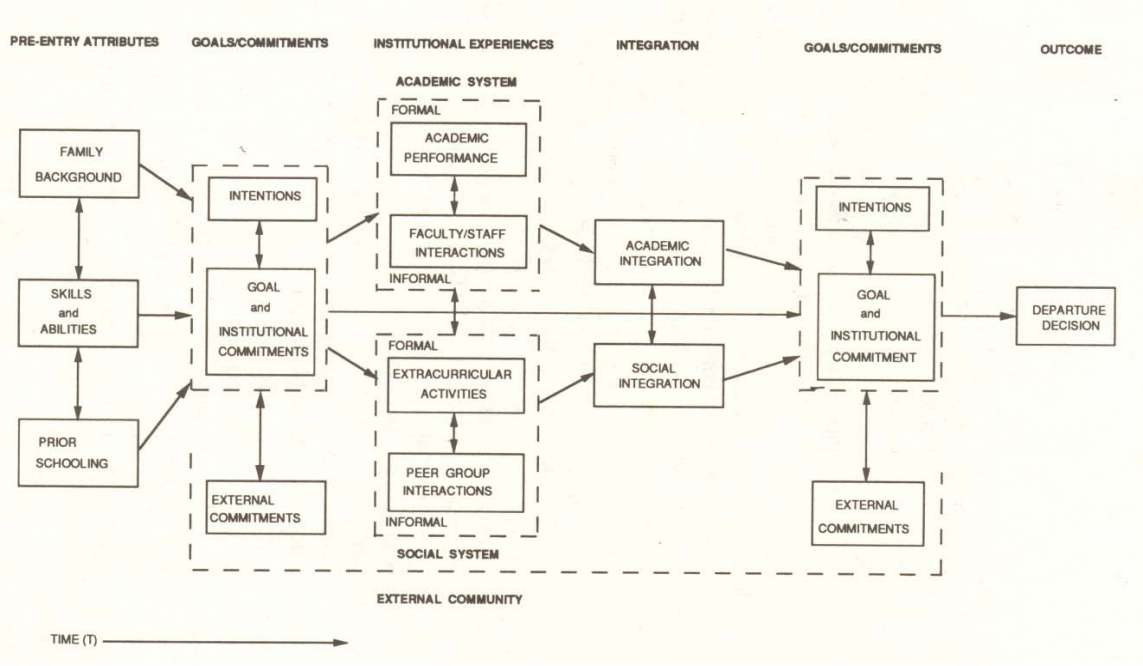

Figure 1. *A longitudinal model of institutional departure (Tinto, 1993)*

Less than half of the students who initially pursue higher education graduate from their first institution (Tinto, 1993). Given the increase in need for aviation flying professionals (Ott, 2006), and the apparent decline of interested student pilots (FAA, 2007), it is imperative that the students who initially indicate an interest in the field and have the requisite aptitudes successfully complete their degrees. Although few areas of study in higher education literature receive as much attention as student retention (Tinto, 1998), in regards to student persistence in aviation, little research exists that is focused on aviation education.

As a means to study aviation retention issues, Luedtke and Papazafiropoulos (1996) created a survey that was administered to current students, former students and alumni of one aviation program. Despite the three groups of subjects used, the sample size was relatively small, making generalizations to other programs very difficult from the results. A study conducted by Beckman and Barber (2007) attempted to analyze the factors that cause students to initially declare the professional flight major but change majors prior to completion. This research took on a unique approach in that it surveyed students just prior to graduation and asked them to reflect on when they changed majors and recount the reason for the switch. The data indicated the largest group of students did switch from professional flight to one of the other aviation majors. It was found that students stated the reason for the switch was one of three primary reasons: financial constraints, time constraints and future job prospects (Beckman & Barber, 2007). The authors posit that students initially choose the professional flight major because of the highly visible career track of a professional pilot, and that students discover more about the aviation industry while enrolled in aviation classes that causes them to change focus from flight to one of the other majors (Beckman & Barber, 2007).

This study focused on pre-entry attributes, the characteristics that a student brings with them to the institution prior to enrolling. It includes constructs such as family background, skills, abilities and prior schooling. The first set of goals and commitments is used to measure the student's intentions and dispositions prior to beginning their advanced education (Tinto, 1993). It attempts to quantify how committed the individual is to attaining their degree as well as their level of commitment to that specific institution in which they first enrolled.

Pre-entry attributes have been found to have a direct and indirect effect on student persistence and academic success (Elkins, Braxton, & James, 2000; Berger & Milem, 1999; Caison, 2007). The pre-entry characteristics most frequently cited in the persistence literature include gender, academic achievement as measured by high school rank and/or grade point average, and academic aptitude as measured by ACT and SAT scores.

Many researchers use gender as a variable when studying its effect on student persistence (Magio, White, Molstad, & Kher, 2005; Strauss & Volkwein, 2004; Braxton, Milem, & Sullivan, 2000). Gender is often found to have no significant relationship to student persistence (Herzog, 2005; Titus, 2004; Szafran, 2001; Murtaugh, Burns, & Schuster, 1999). However, gender may play an even more crucial role as a pre-entry attribute when analyzed within the context of student retention within a male dominated field of study such as aviation. In a multi-institutional study of engineering programs and persistence, gender was found to have significance in five of the eight institutions studied (Zhang, Anderson, Ohland, Carter, & Thorndyke, 2002).

There are two main ways in which researchers account for high school academic achievement: high school rank and high school grade point average. Researchers who utilize the class rank variable (Allen, 1999; Kahn & Nauta, 2001; Pascarella & Terenzini, 1980; Szafran, 2001) have found that it significantly correlates to student academic performance in college, thus it helps in predicting student persistence patterns. Murtaugh et al. (1999) found a decrease in attrition with increases in high school grade point

average. Murtaugh et al. (1999) also state that there exists a "superior predictive value of high school GPA over SAT scores" (p. 369).

Many universities assess academic aptitude by using student scores on either the Scholastic Aptitude Test (SAT) or the American College Test (ACT) when granting admission into their institutions. This pre-entry variable has proven to help predict student success and persistence (St. John, Hu, Simmons & Musobo, 2001; Maggio et al., 2005; Caison, 2007). Depending on the predominant test that students present at an individual college or university, the researcher either convert ACT to SAT (Szafran, 2001; Braxton et al., 2000) or SAT to ACT scores (Leuwerke, Robbins, Sawyer & Hovland, 2004). Researchers have also broken down the composite ACT or SAT score and analyzed the effect of the math and verbal scores on student achievement and persistence. Leuwerke et al. (2004) found that engineering students with higher ACT math scores were more likely to stay in the program. Likewise, Zhang et al. (2002) found that higher verbal SAT scores were more likely to result in student departure from an engineering program. When analyzing major specific retention it is important to use all three aptitude scores in the process.

The purpose of this study was to examine student persistence in a professional flight program. Individuals seeking a career as a professional pilot with an air carrier are required to hold four-year degrees for most airlines, thus it is imperative that students who have the initial goal and commitment to pursue an academic major in flight are successful in completing the requirements. This research is focused on determining which pre-entry attributes can best be used to predict student persistence and academic success. The research questions are derived using a framework based on Tinto's (1993) interactionalist theory of student departure.

1. What is the relationship between a student's pre-entry attributes and persistence?
2. What is the relationship between a student's pre-entry attributes and academic success as measured in cumulative grade point average?

METHODOLOGY

Setting

This study was conducted with students enrolled in a public, four-year, research-intensive university. During the Fall of 2007, there were 12,559 students enrolled in one of the 193 fields of study offered at the university. These fields of study are divided into 10 main academic divisions and range from baccalaureate to doctoral degrees. The Department of Aviation currently offers four Bachelor of Science in Aeronautics degrees: Commercial Aviation, Air Traffic Control, Flight Education and Aviation Systems Management. The department also works closely with the College of Business to offer two Bachelors in Business Administration degrees: Aviation Management and Airport Management.

Commercial Aviation is the largest aviation major at the university and consistently accounts for over 60% of all aviation majors. This degree prepares students for careers as professional pilots in either an airline or corporate setting. The Commercial Aviation degree has been accredited by the Aviation Accreditation Board International since the accrediting body's inception in 1992.

Participants

Two cohorts of students comprise the sample for this study. Each cohort consists of first time, full time freshman enrolled as Commercial Aviation students. One cohort began in the Fall of 2006, the other in the Fall of 2007. The reason for utilizing two sets of incoming students was to ensure a large enough sample size.

Data Collection

The data used in this study were obtained from two existing data sets: institutional academic records and financial aid records. The Office of Institutional Research provided the pre-entry attributes and academic record information from university records. The study utilizes a quantitative approach to predict student persistence and academic achievement. The dependent variables in this study include student persistence in the spring and following fall semester, and academic achievement measured by the term grade point average.

Pre-entry attributes collected on each student included the following variables: gender; age; ethnicity; high school grade point average; ACT scores broken down by composite, math sub score and verbal sub score; region of high school attendance; adjusted gross income; parental level of education and admitted credit hours. These pre-entry characteristic variables are consistent with previous retention research. Table 1 presents the pre-entry variables used in this study.

Table 1. *Pre-entry Attribute Variable List*

Variable Name	Variable Description	Source
GENDER	Gender	Institutional Record
AGE	Age of student when enrolled	Institutional Record
ETHN	Ethnicity	Institutional Record
HSGPA	High School Grade Point Average	Institutional Record
ACTC	Composite ACT Score	Institutional Record
ACTM	Math ACT Score	Institutional Record
ACTV	Verbal ACT Score	Institutional Record
REGION	Region of High School	Institutional Record
INCOME	Adjusted Gross Income	Institutional Record
DADEDU	Father's Education Level	FAFSA
MOMEDU	Mother's Education Level	FAFSA
ADMCH	Admitted Credit Hours	FAFSA

Procedures

Once the dataset was complete it was imported into the Statistical Package for the Social Sciences (SPSS) version 16.0. The initial analysis of the data was purely descriptive. Frequencies were reported for each pre-entry attribute. Next, means and standard deviations for independent variables were computed. Since there were numerous variables used in this study, each research question was initially examined by looking at the correlations between the independent and dependent variables. A correlation is a single number that describes the degree of relationship between two variables (Trochim, 2005). The significance for this study was set at the .05 level.

Next, multiple regression analysis was used to answer the research questions. Multiple regression analysis is used to develop a statistical model for predicting the value of a dependent variable (persistence

and academic success) based on numerous independent (pre-entry attributes) variables (Berenson, Levine, & Krehbiel, 2002). Initially, all independent variables were inserted into the regression analysis by using the enter method. This method enters in all independent variables regardless of significant contributions (Mertler & Vannatta, 2005). The second step entered the same set of variables using the stepwise forward method. The stepwise forward method enters independent variables one at a time into the model based on the magnitude of contribution to the overall prediction (Mertler & Vannatta, 2005). The process stops when the inclusion of another variable does not have a significant effect on the overall prediction. Due to the nature of the variables used in this study, it was decided to replace missing values with the mean.

FINDINGS

The sample for this study was two cohorts of entering first-time, full-time students to the university with Commercial Aviation as their declared major during the Fall of 2006 and the Fall of 2007. The reason for using two cohorts was not to run comparisons between the groups, but to get a larger more significant total sample size. The sample includes 390 students who met these criteria. Demographic information about this sample is presented in Table 2.

Table 2. *Demographic Information on Gender, Age, and Ethnicity (N=390)*

Characteristics	**N**	**%**
Gender		
Male	340	87.2
Female	50	12.8
Age		
18 and younger	322	82.6
19	62	15.9
20 and older	6	1.5
Ethnicity		
White	345	88.5
Hispanic	11	2.8
Asian, Pacific Islands	8	2.1
Non-resident, alien	5	1.3
American Indian	4	1.0
Black	2	0.5
Not Reported	15	3.8

Of the sample, there were 340 male students (87.2%), and 50 female students (12.8%). The age of the sample at the time of entry ranged from a low of 17 to a high of 29. The mean age for the sample was 18.7 with a standard deviation of 0.9. The majority (88.5%) of the sample were White, non-Hispanic with the remaining sample being represented by Hispanic (2.8%), Asian, Pacific Islands (2.1%) , non-resident alien (1.3%), American Indian (1.0%), Alaskan (1.0%), Black (0.5%), and not reported (3.8%). Due to the lack of variability in ethnic make-up, the sample was dichotomized to White and non-White for further analysis.

The frequencies in Table 3 depict the student's academic achievements in high school for the sample. The listing includes high school grade point average, ACT composite scores, ACT math scores, ACT verbal scores and how many college credit hours they had earned when admitted to the university. The high school grade point average is depicted on a 4.00 scale with the low of 2.27 to a high of 4.00 with 40

records (10.3%) missing this variable. The mean high school grade point average for the sample was 3.27 with a standard deviation of .44. The ACT composite score ranged from a low of 12 to a high of 33, the mean score was 23.53 with a standard deviation of 3.24. The ACT composite score was not available for 80 students (20.5%). The ACT math score had a range of 16 to 35 with the mean of 24.0 with a standard deviation of 3.74, while the ACT verbal score had a range of 10 to 35 with a mean of 22.2 and standard deviation of 4.40. Both the ACT math and verbal scores were missing from 100 (25.6%) of the records. The majority (56.7%) of the students were admitted without any prior college credits, however 99 students (25.4%) did have up to 10 credits at the time of enrollment, 40 students (10.2%) had between 11-20 credits at the time of enrollment, and 30 students (7.7%) had more than 20 credits at the time of enrollment.

Table 3. *High School Academic Information (N=390)*

Characteristics	**N**	**%**
High School Grade Point Average		
2.00-2.50	12	3.1
2.51-3.00	99	25.4
3.01-3.50	111	28.5
3.51-4.00	128	32.8
Missing	40	10.3
ACT Composite Score		
12-19	25	6.4
20-21	59	15.2
22-23	84	21.5
24-25	62	15.9
26-27	37	9.5
28-33	43	11.0
Missing	80	20.5
ACT Math Score		
16-19	35	9.0
20-21	45	11.6
22-23	50	12.8
24-25	68	17.4
26-27	43	11.0
28-33	49	12.6
Missing	100	25.6
ACT Verbal Score		
10-19	73	18.7
20-21	62	15.9
22-23	51	13.1
24-25	44	11.3
26-27	25	6.4
28-33	35	9.0
Missing	100	25.6
Admitted Credit Hours		
0	221	56.7
1-10	99	25.4
11-20	40	10.2

Family background characteristics are represented in Table 4. Family background characteristics include region of residence prior to college, both mother and father education levels and adjusted gross family income. The regions of residents are broken down according to the United States Census Bureau. The majority (55.4) of the students come from the Midwest. The second largest region represented by this sample is the West with 118 students (30.3%). The Northeast accounts for 24 students (6.2%), the South for 19 students (4.9%) and other accounts for 13 students (3.4%). Father's education level indicates that 193 (49.5%) had a college education, while 94 (24.1%) had a high school education and nine (2.3%) had an elementary school education. Mother's education level indicates that 208 (53.3%) had a college education, while 86 (22.1%) had a high school education. The missing records for father's and mother's education level were 94 (24.1%) and 96 (24.6%) respectively. The parental adjusted gross income ranged from a negative $39,611 to $767,182 with a mean of $92,412 and a standard deviation of 82,123. The parental adjusted gross income data was missing from 83 (21.3%) records.

Table 4. *Family Background Information (N=390)*

Characteristics	**N**	**%**
Region of Residence		
Midwest	216	55.4
West	118	30.3
South	19	4.9
Northeast	24	6.2
Other	13	3.4
Father's Education Level		
Elementary School	9	2.3
High School	94	24.1
College	193	49.5
Missing	94	24.1
Mother's Education Level		
Elementary School	0	0
High School	86	22.1
College	208	53.3
Missing	96	24.6
Parental Adjusted Gross Income		
<30,000	40	10.3
30,000-60,000	63	16.2
60,001-90,000	80	20.5
90,001-120,000	57	14.6
>120,000	67	17.2
Missing	83	21.9

As seen in Table 5, the retention rate after the first semester was 91.8%, indicating that 358 of the 390 students remained enrolled at the university for the Spring semester. The retention rate between the first and second year of enrollment dropped to 82.6%, indicating that 322 of the 390 students remained enrolled at the university after the first year. The overall retention rates between first and second year students for the university the 2006 and 2007 cohorts of first-time, full-time students was 75% and 78% respectively. Of the 390 students who initially enrolled as a flight major, 67.4% or 263 students remained

as a flight major after the first year of enrollment. Of the remaining students, 20 (5.1%) switched to the Air Traffic Control major, 6 (1.5%) switched to airport management, 33 (8.5%) remained enrolled at the initial university but switched out of the department of aviation, and 68 (17.4%) left the university all together.

Table 5. *Persistence Patterns (N=390)*

Characteristics	**N**	**%**
Retention after the first semester		
Yes	358	91.8
No	32	8.2
Retention after the first year		
Yes	322	82.6
No	68	17.4
Declared major after first year		
Flight	263	67.4
Air Traffic Control	20	5.1
Airport Management	6	1.5
Other (UND)	33	8.5
Left UND	68	17.4

What is the relationship between a student's pre-entry attributes and persistence? Two dependent variables were assessed: enrollment at the initial institution during the second fall semester, and declared major (flight or non-flight) at the beginning of the second fall semester. Since this research question assesses the relationship between numerous pre-entry variables to a single dependent variable, multiple regression analysis was utilized as the primary statistical test.

The full model analysis determined that there was a relationship between pre-entry attributes and student persistence between the first and second year. As seen in Table 6, these independent pre-entry attributes accounted for 9.6% (R=.310, R^2=.096, F=1.705, *df*=11, 176, *p*=.076) of the variance in institutional persistence after the first year. High school grade point average had the most significant relationship with student persistence after the first year.

Table 6. *Beta Weights, t Values, Significance of t, Correlation Coefficients and Significance of the Pre-entry Independent Factors with Second Fall Semester Enrollment for the Total Sample*

Factor	**Beta**	**t**	**Sig. of t**	**Corr.**	**Sig.**
Gender	-.008	-.102	.919	-.083	.128
Age	.065	.866	.388	.035	.318
High School GPA	.297	3.433	.001	.243	<.001*
ACT Composite	-.035	-.193	.847	.005	.475
ACT Math	-.032	-.278	.781	.038	.303
ACT Verbal	-.097	-.675	.501	-.003	.486
Ethnicity	-.054	-.738	.461	-.026	.360
Admitted Credit Hours	.062	.782	.435	.107	.072
Father's Education Level	.107	1.390	.166	.102	.083
Mother's Education Level	.007	.086	.931	.023	.376
Adjusted Family Gross Income	.075	1.009	.314	.042	.281
Full Model $R^2 = .096$					

*$p<.05$

Since this study is focusing on student enrollment in a professional flying degree, the same pre-entry attributes were studied in regards to maintaining the declared flight major between the first and second year of enrollment. The same regression analysis was conducted replacing enrollment in the second fall semester, with declared major (flight or non-flight) for the second fall semester. Table 7 lists the *Beta* weights for each factor, the *t* values for the *Beta* weights, the significance of the *t* values, the correlation coefficients of the independent variable with the dependent variable of declared major following the first year, and the significance of the correlation.

The full model analysis determined that there were no significant relationships between pre-entry attributes and declared major between the first and second year. These independent pre-entry attributes accounted for 7.4% ($R=.272$, $R^2=.074$, $F=1.281$, $df=11, 176$, $p=.238$) of the variance in declared major after the first year. Since no significance was found, no further analysis was completed between these two areas.

Table 7. *Beta Weights, t Values, Significance of t, Correlation Coefficients and Significance of the Pre-entry Independent Factors with Declared Major Second Fall Semester Enrollment for the Total Sample*

Factor	Beta	t	Sig. of t	Corr.	Sig.
Gender	-.024	-.299	.765	-.040	.292
Age	.052	.686	.494	.051	.245
High School GPA	.200	2.287	.023	.108	.070
ACT Composite	.047	.258	.797	-.089	.114
ACT Math	-.080	-.681	.497	-.050	.249
ACT Verbal	-.299	-1.582	.116	-.112	.063
Ethnicity	-.077	-1.042	.299	-.061	.204
Admitted Credit Hours	.044	.552	.582	.028	.353
Father's Education Level	.059	.763	.446	.065	.188
Mother's Education Level	.062	.779	.437	.045	.268
Adjusted Family Gross Income	.126	1.677	.095	.086	.120
Full Model $R^2 = .074$					

*$p<.05$

The first research question explored the relationship between pre-entry attributes and student persistence. Student persistence was defined as either enrollment at the university after the first year, as well as declared major (flight or non-flight) after the first year. The only significance was found between high school grade point average and enrollment after the first year.

What is the relationship between a student's pre-entry attributes and academic success as measured in grade point average? Since this research question is assessing the relationship between numerous pre-entry variables to a single dependent variable, multiple regression analysis was utilized as the primary statistical test. Fall grade point average was used as the dependent variable in regards to academic success.

The first analysis was conducted by placing all of the pre-entry factors into a full model regression simultaneously to determine the *Beta* weights for each factor, the *t* values for the *Beta* weights, the significance of the *t* values, the correlation coefficients of the independent variable with the dependent variable of Fall grade point average following the first year, and the significance of the correlation. Table 8 shows the results.

Table 8. *Beta Weights, t Values, Significance of t, Correlation Coefficients and Significance of the Pre-entry Independent Factors with Fall Semester Grade Point Average for the Total Sample*

Factor	**Beta**	**t**	**Sig. of t**	**Corr.**	**Sig.**
Gender	.114	1.670	.097	-.057	.217
Age	.148	2.273	.024	.091	.107
High School GPA	.545	7.275	<.001	.467	<.001*
ACT Composite	-.231	-1.490	.138	.112	.063
ACT Math	.047	.465	.643	.155	.017*
ACT Verbal	.067	.544	.587	.129	.039*
Ethnicity	-.025	-.400	.690	.023	.377
Admitted Credit Hours	.078	1.147	.253	.185	.005*
Father's Education Level	.134	2.026	.044	.172	.009*
Mother's Education Level	.136	2.009	.046	.182	.006*
Adjusted Family Gross Income	.117	1.821	.070	.082	.131
Full Model R^2 = .323					

*p<.05

The full model analysis determined that there was a relationship between pre-entry attributes and student academic success. These independent pre-entry attributes accounted for 32.3% (R=.568, R^2=.323, F=7.624, *df*=11, 176, p<.001) of the variance in academic success after the first semester. High school grade point average had the most significant relationship to fall semester grade point average.

In utilizing the stepwise forward regression (see Table 9), high school grade point average was found to have a significant impact on the variance out of all the pre-entry attributes being studied. This was followed by the mother's education level, age at entry and father's education level. These four variables accounted for 28.6% of the variance (*F*=18.366, *df*=4, 183, p=.000).

Table 9. *R^2 Change Results Based on Stepwise Forward Regression for the Pre-entry Independent Factors on Fall Semester Grade Point Average for the Total Sample*

Factor	R	R^2	R^2 Chg.	Sig. Chg.
High School GPA	.467	.218	.218	.000
Mother's Education Level	.499	.249	.031	.006
Age at Entry	.520	.271	.022	.020
Father's Education Level	.535	.286	.016	.046

Factors not in equation: Gender, ACT Composite, ACT Math, ACT Verbal, Ethnicity, Admitted Credit Hours, Adjusted Family Gross Income

DISCUSSION AND CONCLUSION

The only pre-entry attribute that had a significant relationship in predicting student enrollment after the first year was high school grade point average. It was determined that high school grade point average accounted for 5.9% of the variance in the stepwise forward regression model.

Persistence was also measured in relation to retaining students in the professional flight major. There were no significant findings in regards to pre-entry attributes and declared major (flight or non-flight) after the first year. This indicates that when persistence is studied from a program standpoint versus an institutional approach the pre-entry variables do little in predicting student persistence. These findings would suggest that admission policies and program specific policies should more greatly favor a student's high school grade point average, over standardized test scores. It seems that high school academic achievement is a better measure of a student's overall college academic performance and motivation than the test scores.

The lack of statistically significant pre-entry attribute variables that can assist in predicting student persistence in this sample of students may be another area of further research. Since this sample population consisted of students who entered into the university with the same initial major (professional flight) declared, a major that has a high cost associated with completing the degree requirements, perhaps students with similar backgrounds self-selected into this program. That would explain the lack of significance in the pre-entry attributes in their ability to predict persistence patterns both for remaining enrolled in the university as well as in the specific flight major. Further research should examine student pre-entry attributes for other specific majors in order to more fully understand student persistence patterns and the differences that may exist between academic majors.

There was a relationship with numerous significant variables to predict student academic achievement based on the pre-entry attributes. The significant variables relating to Fall semester academic achievement included high school grade point average, mother's education level, age at entry and father's

education level. These variables accounted for 28.6% of the variance in the stepwise forward regression model.

These results indicate that a student's background, both in the sense of high school academic achievement as well as parental education level, influences how well a student will perform during their first year of college academically. Parental education levels and incomes are variables typically included as a measure in socio-economic status. Since this sample consists of students with only one declared major, further analysis and research should be conducted that would compare the parental education levels for various groups of students with similarly declared majors to see patterns and similarities exist. Since the major analyzed in this study is a high cost degree, one may expect the parental education attainment to be higher in order to afford the more costly program.

It is important to note that more pre-entry variables were significant in predicting academic success than were found significant in predicting student persistence. This is just further evidence that the student persistence puzzle is more complex, and less fully understood. By empirically testing and analyzing the various components of Tinto's (1993) theory of student departure, one by one the pieces of this complex puzzle can be put into place. Through enough research and discussion about student persistence taking place in universities and specifically in aviation programs, the student persistence puzzle will take shape. Through implementing new ideas and initiatives more students will successfully persist in their aviation studies and graduate.

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