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AUTHOR Wright, Ted
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ABSTRACT

A study was conducted to examine several academic and non-academic variables in terms of their relationship to student attrition at Miami-Dade Community College (MDCC). The study sample consisted of 306 associate in arts degree-seeking students who first enrolled in fall 1981. Four groups of students, defined according to the last semester attended, were examined for differences in mean high school grade point average (GPA), high school class size, Comparative Guidance and Placement (CGP) test scores, first term GPA, credits earned, ethnicity, and gender. Study findings included the following: (1) first-term GPA and credits earned were significantly related to attrition; (2) demographic variables were not found to be directly related to attrition; (3) students who dropped out after one semester had significantly lower first-term GPA's and earned fewer credits than students who persisted longer; and (4) the significant interaction between attrition and gender with regard to high school GPA and CGP writing scores suggested that a predisposition to withdraw might be gender specific. A literature review on attrition is included. (LAL)

PRE-COLLEGE AND POST-MATRICULATION PREDICTORS OF ATTRITION AT MIAMI-DADE COMMUNITY COLLEGE

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Ted Wright

Research Associate

OFFICE OF INSTITUTIONAL RESEARCH

John Losak, Dean

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ABSTRACT

The purpose of the present study was to examine several academic and non-academic variables in terms of their relationship to student attrition at Miami-Dade Community College. The sample consisted of 306 Associate in Arts degree seeking students who began their enrollment in the Fall Term, 1981. Defined according to the last major semester attended, four groups were examined for differences in mean high school grade point average (G.P.A.), high school class size, Comparative Guidance and Placement (CGP) test scores and first term G.P.A. and credits earned. Ethnicity, gender, and age were also investigated in relation to student attrition. The findings indicated that first term G.P.A. and credits earned were significant variables to the extent that students comprising the first group (one semester persisters) reflected significantly lower means in both cases. The study also revealed a significant interaction between attrition and gender for two additional variables, i.e., high school G.P.A. and CGP Writing scores. However, an attempt to predict group membership by employing a stepwise discriminant analysis resulted in correct classification of just one-third of the sample. It is suggested that the College extend its collection of student information to include self-report data since the variables in this study were not sufficient for predicting attrition.

Pre-College and Post-Matriculation Predictors of Attrition
at Miami-Dade Community College

Attrition rates in post-secondary education have been steadily at about 45 percent for the past 100 years (Tinto, 1982). In light of declining enrollments in recent years, it is not surprising that this high dropout rate has become the focus of much attention. In fact, the literature reveals an enormous amount of research conducted in order to investigate this phenomenon. To the extent that attrition rates have remained so high, however, it might reasonably be concluded that little use has been made of the research in this area, or that the research has not revealed much in the way of explaining this continuing problem.

Several models have been developed for the study of attrition in recent years. Bean et al. (1982) describe a number of these which might be employed once the definition of dropout has been determined by an institution. According to the authors, the most frequently used model is that based on observed facts; correlations between variables are found but do not identify a causal relationship. Another atheoretical approach is described as the prematriculation model which attempts to predict attrition (or persistence) from pre-college variables that usually fall into three categories, i.e., academic, demographic, and financial. Synthetic models, on the other hand, attempt to use groups of variables to define causal relationships in attrition. Typically, four classes of variables are employed: background, organization, environmental and attitudinal.

While a research model for studying attrition may help identify important variables to consider, it is equally important to select an effective research design. Terenzini (1980) classifies attrition designs in three major categories. The autopsy design is retrospective and involves

surveying students after they drop out. Not only do responses tend to be low in this technique, but the design typically fails to provide a comparison group. The cross-sectional design constitutes a "snapshot" approach and is based on collecting data from students at a single point in their college career. This technique does not, however, allow for initial group differences. Longitudinal studies, on the other hand, involve the collection of pre-college as well as post-matriculation data on students, thus making this study the most valid of the three.

Whether a theoretical model is chosen, or an appropriate research design, all attrition research involves the examination of the relationship between certain variables and attrition. Lenning (1982) defines several main categories of variables that are used in the study of this phenomenon. Among these variables are: demographic (age, sex), academic (standard test scores, grade point average), initial aspirations (degree seeking, non-degree seeking), personality (maturity), institutional (two-year/four-year), and interaction (student satisfaction). Pascarella et al. (1981) describe these same factors as the primary predictors of attrition. However, there are not always clear relationships among these variables; thus, studies tend to show conflicting results or no significant findings at all (Liu, 1982). Defining variables across studies as well as within them may also contribute to these unclear results. Tinto (1982) points out that research in student attrition is, in many instances, a trade off, i.e., the more variables studied in attempts to explain variance, the less clear the results.

Tinto (1975) describes his model as one which has its roots in Dukheim's model of suicide in that both cite lack of integration as the causal factor. Tinto's model specifically shows the longitudinal process of two distinct types of integration, social and academic; academic stemming

from intellectual development and social stemming from peer group interactions. This is the one central theme of his theory; that is, that social and academic integration into the institution are most directly related to college student attrition. According to Tinto, it seems as though after academic ability is accounted for, it is goal commitment of the individual that is most responsible for attrition.

Tinto's model has been the framework for several other attrition researchers. Terenzini et al. (1981) attempted to test Tinto's model by employing a 34-item instrument. A longitudinal design and discriminant analysis were used to investigate the integration factors. Results based on student responses supported the construct and predictive validity of Tinto's model. Another investigator (Munro, 1981), using a multiple regression model, showed that the academic integration component of Tinto's model had a relationship to persistence, but social integration did not. Thus, the results do not fully support Tinto's theoretical model. This is an important example of the type of conflicting evidence that makes understanding and explaining the attrition phenomenon so difficult.

While Tinto's theoretical model has been the basis for a number of studies, the bulk of research has focused on variables not accounted for in his work. For example, Maudal (1974) notes that academic factors are important predicators of attrition as well. Furthermore, Morrisey (1971) shows that personality factors appear to be equally capable of distinguishing potential persisters and dropouts. However, Morrisey believes academic and personality factors are confounding; although there is a significant relationship between high school rank and grade point average, personality factors of freshmen grade point average have already been accounted for in high school rank.

Bean et al. (1973) describe academic factors as good discriminators between persisters and academic dismissals, while personality factors tend to discriminate, at least for females, between persisters and withdrawals. Interaction effects have also been investigated by Hiltunen (1965). This investigator examined age as a variable in attrition as it interacted with sex. In this case, significant interaction effects were found; 47 percent of the males and 71 percent of the females over age 23 returned for the semester following their first term of enrollment.

By and large, most research studies on student attrition have focused on the problem in four-year institutions. This is not surprising. Given the similar student profile found at many of these institutions, it would seem that once causal factors were clearly identified, they would lead to generalizations about attrition behavior which could be utilized across most four-year institutional settings. However, the problem of attrition in two-year institutions represents quite another situation.

Clearly, the diverse demographics which are represented in most two-year community college settings provide the attrition researcher with a whole new range of variables for consideration. Even Tinto (1982) has admitted that his model is not suitable for the two-year college system. Confounding this problem is the fact that attrition rates in community colleges are reported to be significantly higher than those found in four-year institutions (Smith, 1982).

Before attempting to explain attrition in the two-year college setting, one must understand that the types of students attending these institutions are, for the most part, quite unlike those attending four-year institutions. For example, the "open door" concept which is fundamental to the mission of most two-year institutions attracts many students who are

typically considered to be nontraditional. In many cases, these are individuals who have spent a number of years in the work force and are attempting to improve their skills at a reasonably low cost. Many are non-degree seekers. Furthermore, the convenience of "stopping in" and "stopping out" contributes to the complexity of understanding student persistence in these institutions.

Two-year college attrition is also unlike that found in universities in that the student body is quite reflective of the community it serves. For this reason, it is exceedingly important to isolate specific attrition factors as they relate to the local institution. Thus, it is imperative that two-year institutions conduct their own attrition research if they are concerned with stemming the high rate of student dropout in light of declining enrollments. A fair amount of research has been conducted for this purpose.

In spite of the confounding factors involved, several studies have sought to find significant variables related to attrition by examining large numbers of community college freshmen. In most cases, students were categorized as persisters or dropouts on the basis of reenrollment at the beginning of the second semester or the second academic year. Freller (1972) studied only full-time degree seeking students and employed bivariate analyses to describe the relationship between several variables and student attrition. It was found that cumulative grade point average, ACT scores, high school rank, and, to a lesser degree, size of high school class were significantly related to attrition. In this particular study, age and sex were found to have no significant impact on attrition. Clearly, this approach reveals little about the combined effects of these attrition related variables.

DiVeccio (1972) conducted a similar study to determine if certain scholastic aptitudes, academic motivation, and personality/biographical characteristics could be used to distinguish nonreturning from returning community college freshmen. In this study, a total of 26 variables were included in a multiple linear regression analysis. The results indicated that high school GPA, Comparative Guidance and Placement (CGP) test scores, and size of high school class were the most powerful predictors of student attrition. However, the 26 variables when combined only accounted for 19 percent of the variance between persisters and leavers.

Yeagle (1977) examined the relationship between certainty of vocational choice and persistence of freshmen in a liberal arts program at a public open admissions community college. The results showed, once again, that high school rank and college reading test scores were the most significant predictor variables. In this case, high school GPA was not found to be significantly related to attrition. Bacon (1977) compared students who returned for the second year of college to those who did not, while controlling for enrollment in technical programs only. Significant factors relating to the loss of these students comprised age, sex, college grade point average, and certain attitudes toward the institution. Factors found not to be related included high school GPA, ACT scores, and a need for financial aid.

In yet another attempt to link a wide range of variables to two-year college dropout behavior, Paydarfar (1977) examined relationships between family socioeconomic status (SES), mental ability, sex, race, marital status, level of educational aspiration, college grade performance, and satisfaction with institutional characteristics. This investigator controlled for sex and race while analyzing the remaining variables.

Although significant relationships were found for each of the independent variables, the most important predictors of attrition were college grade performance and educational aspirations.

Clearly, two-year college attrition has been linked with a multitude of factors. However, many of the variables examined are found to be significantly unrelated to attrition just as often as they are found to be significantly related to the phenomenon. This problem seems to be the result of one or more factors; the evident lack of experimental controls, the inconsistent definitions, and perhaps most of all, the fact that attrition studies tend to be applicable to only the institution in which they are conducted. For these reasons alone, local research becomes a necessity for investigating attrition.

The purpose of the present study was to identify variables related to attrition at Miami-Dade Community College. While controlling for the type of student most expected to persist, the investigator sought to identify important attrition factors and predict attrition in terms of the number of semesters completed by two-year college students. Only full-time, first term Associate in Arts students were studied and attrition groups were based on persistent enrollment for between one and four major semesters. The data examined comprised pre-college and post-matriculation variables.

Research Hypotheses

In order to investigate attrition group differences related to the pre-college and post-matriculation variables, the following null hypotheses were tested at the $p \leq .05$ level of significance:

Hypothesis I

For each of the four attrition groups, when categorized by gender, there is no significant difference among the mean:

A. High school grade point average

B. High school class size

C. Comparative Guidance and Placement (CGP) Reading score

D. Comparative Guidance and Placement (CGP) Writing score

E. Comparative Guidance and Placement (CGP) Computation score

F. First term grade point average at Miami-Dade

G. First term credits earned at Miami-Dade

Hypothesis II

For each of the four attrition groups, when categorized by ethnicity, there is no significant difference among the mean:

A. High school grade point average

B. High school class size

C. Comparative Guidance and Placement (CGP) Reading score

D. Comparative Guidance and Placement (CGP) Writing score

E. Comparative Guidance and Placement (CGP) Computation score

F. First term grade point average at Miami-Dade

G. First term credits earned at Miami-Dade

Hypothesis III

There is no significant difference between the number of semesters completed when examined by:

A. Gender

B. Ethnicity

C. Age Group

METHOD

Sample

The study was based on a systematic random sample of 306 students who began their post-secondary education at Miami-Dade in the fall of 1981. The number of students included represents a 50 percent sample of the total number of students meeting the selection criteria. All students in the study registered for at least 12 credits and must have attempted at least one, i.e., students had to survive the first semester regardless of the ratio of registered to attempted credits. Only local (in-state) students were investigated and all had indicated that their objective was to complete the Associate in Arts degree program. However, no one in the sample had actually achieved this objective at the time of the study.

Procedures

The study was initiated by identifying all students meeting the conditions described above. Since the design of the study was ex post facto (quasi experimental), no experimental manipulation was employed. However,

in order to control for the type of student most likely to continue their studies, selection was based on program objectives and the intent of the student as defined by the initial semester enrollment status.

Group membership was determined by the last major semester attended at Miami-Dade. This meant that the number of semesters completed by members of any given group could vary. Indeed, the enrollment patterns with regard to the number of credits taken each semester varied considerably after the first term. Group 1, whose last semester attended was also the first semester attended, consisted of 58 students (18.9 percent of the sample). Group 2, whose last semester was the second major semester following their initial enrollment, comprised 98 students and accounted for 32.0 percent of the sample. Group 3 contained 68 students (22.2 percent of the sample) while Group 4 consisted of 82 students representing 26.8 percent of the entire sample. All students must have also completed all three parts of the Comparative Guidance and Placement battery. Demographic characteristics of the four groups are presented in the results section.

The variables examined in this study as possible significant factors in student attrition warrant definition. These variables can be classified into two primary categories; pre-college variables and post-matriculation variables. Within the category of pre-college variables, there are two sub-categories; demographic or non-academic variables and academic or high school related variables. Gender, ethnic group, and age group were the demographic variables investigated in the present study. Gender obviously consisted of the dichotomous classification of male and female. Ethnic group comprised the following four categories; white non-Hispanic, black non-Hispanic, Hispanic, and other. Since it was known that the sample consisted mostly of students from the first three ethnic

categories, the "other" category was reserved for the few students who did not belong to these three. Age group was also defined as a dichotomous variable whereas students belonging to the category of age 19 or younger were contrasted with those students whose age was 20 or older. In this manner, "younger" students and "older" students could be investigated.

The high school related variables were obtained from high school transcripts and defined as follows: High school grade point average (G.P.A.) was simply the assigned grade point average of the student on the final transcript. This was acumulative average of the student's four years. All G.P.A.'s were carried out to three decimal places and based on a four point system. Size of the high school class was simply defined as the total number of students in the graduating class.

Within the post-matriculation category, several outcome measures were investigated. Comparative Guidance and Placement (CGP) test scores were examined with respect to reading, writing, and computation abilities. College grade point average was examined at the end of the first term and was based on the normal four point grading system. Credits earned were examined for the first term only. The earned credits represented the credits the student successfully completed with a passing grade. These credits counted toward the degree or credit accumulation on the student transcripts.

In order to examine differences related to the nominal variables, i.e., gender, ethnicity, and age, the dependant variable was defined as the number of persisting major semesters and, as used for determining group membership, ranged from one to four. If, for example, a student was found to have persisted four semesters, it did not necessarily mean four

consecutive semesters without a break. Thus, to some extent "stopouts" were taken into account.

Statistical Analysis

For testing the first two hypotheses, groups were treated as independent variables and the seven interval measures were used as dependent variables and subjected to a multi-factor analysis of variance. The demographic variables (Hypothesis III) were entered as independent variables and the mean number of persisting semesters defined by group membership was used as the dependent variable. A multi-factor ANOVA was also used to test for significant differences between these nominal groups. In those cases where appropriate, Scheffé Post-F tests were also employed. Subsequently, a stepwise discriminant function analysis was conducted in order to determine the combined effectiveness of predicting group membership after removing the covariance of each variable. A second discriminant analysis (direct method) was conducted using all the interval variables. The purpose of employing two discriminant analyses was to determine whether the nonsignificant variables had accounted for any more of the variance between attrition groups. For each of the analyses, the Statistical Analysis System (SAS) was employed.

RESULTS

The demographic characteristics of the total sample (n=306) are presented in Table I. Note that the distribution of male and female subjects is fairly even among each of the four attrition groups. With regard

to ethnicity, Hispanic students represented the largest portion overall (45.4%), but not necessarily in each of the attrition groups, e.g., thirty-two Hispanic students were members of Group 2 compared to forty-four white non-Hispanic students. The breakdown by age group reveals that the overwhelming majority (87.2%) of students were 19 or younger at the time they entered Miami-Dade. Nevertheless, "older" students were represented in each of the attrition groups.

Table 1

Demographic Characteristics of Sample by Attrition Group (N=306)

	Attrition Group				
Variable	1	2	3	4	Total
Gender					
Male	33	50	34	41	158
Female	25	48	34	41	148
Ethnic Group					
Black Non-Hispanic	10	19	7	9	45
White Non-Hispanic	19	44	18	37	118
Hispanic	29	32	43	35	139
Other	0	3	0	1	4
Age Group					
19 or Younger	47	83	62	75	267
20 or Older	11	15	6	7	39
Total Sample	58	98	68	82	306

Based on the analysis of variance results, several variables were found to be significantly related to attrition within Hypotheses I & II. Further, the discriminant analysis results revealed that even after removing the variance accounted for by each of the other variables, at least two of the interval variables were found to be significant predictors of group membership. No significant differences were found with regard to Hypothesis III where the dependent variable was the number of persisted semesters and the independent variables comprised gender, ethnicity and age group.

The dependent variable means examined for Hypotheses I & II are presented in Tables 2 through 4. While each of the post-matriculation variables was analyzed for the entire sample (n=306), the pre-college variables were available for only 171 students. Thus, the number students comprising each attrition group was greatly reduced with regard to high school G.P.A. and class size.

Pre-college variable results for Hypothesis I are presented in Tables 5 & 6. While no significant differences were found for any of the main effects (attrition group and gender), a significant interaction was revealed with regard to high school G.P.A. (Table 5). In other words, significant differences were only observed when both attrition group and gender were taken into account. This interaction can be seen in Figure 1. No significant differences were found for high school class size (Table 6).

Analysis of variance results for the Comparative Guidance and Placement test score means are presented in Tables 7 through 9. No significant differences were found for either of the main effect variables or the interaction between variables with regard to CGP Reading scores. However, a significant interaction was found with regard to CGP Writing scores (Table 8). Therefore, it can be said that CGP Writing score differences between attrition groups is dependent upon gender. This relationship is clearly illustrated in Figure 2. While no significant difference was found between groups with regard to CGP Computation scores, group means based on gender were found to be significantly different. According to the data presented in Table 3, the Computation mean for males was 22.94 compared to 21.64 for females.

Table 2

Dependent Variable Means by Attrition Group

	Attrition Group												Total		
	1			2			3			4					
Variable	N	Mean	S.D	N	Mean	S.D.	N	Mean	S.D.	N	Mean	S.D.	N	Mean	S.D.
High School G.P.A.	25	2.28	0.7	56	2.47	0.7	41	2.33	0.5	49	2.37	0.6	171	2.38	0.6
Size	25	588.00	243.4	56	517.28	277.6	41	582.14	233.6	49	547.61	254.1	171	551.86	225.3
CGP															
Reading	58	19.79	8.5	98	19.52	8.3	68	20.05	7.1	82	22.08	6.8	306	20.37	7.8
Writing	58	22.84	7.0	98	23.28	6.6	68	24.19	5.7	82	25.28	5.5	306	23.93	6.2
Computation	58	21.72	7.0	98	21.51	6.6	68	22.76	5.7	82	23.32	5.9	306	22.31	6.3
First Term G.P.A	58	1.34	1.1	98	2.10	0.9	68	2.25	0.8	82	2.22	0.9	306	2.02	1.0
Credits Earned	58	6.43	4.9	98	9.72	4.0	68	10.27	3.5	82	10.54	3.8	306	9.44	4.3

Table 3

Dependent Variable Means by Gender

	Gender								
	Male			Female			Total		
Variable	N	Mean	S.D.	N	Mean	S.D.	N	Mean	S.D.
High School									
G.P.A.	82	2.32	0.6	89	2.43	0.6	171	2.38	0.6
Size	82	534.17	258.6	89	568.16	252.6	171	551.86	225.3
CGP									
Reading	158	20.76	7.6	148	19.96	8.0	306	20.37	7.8
Writing	158	23.67	6.3	148	24.21	6.2	306	23.93	6.2
Computation	158	22.94	6.5	148	21.64	6.1	306	22.31	6.3
First Term									
G.P.A.	158	1.84	1.0	148	2.22	0.9	306	2.02	1.0
Credits Earned	158	8.78	4.6	148	10.14	3.8	306	9.44	4.3

Table 4

Dependent Variable Means by Ethnic Group (N=306)

	Ethnic Group														
	Black Non-Hispanic			White Non-Hispanic			Hispanic			Other			Total		
Variable	N	Mean	S.D.	N	Mean	S.D.	N	Mean	S.D.	N	Mean	S.D.	N	Mean	S.D.
High School															
G.P.A.	22	2.11	0.5	77	2.42	0.7	69	2.40	0.5	3	2.77	0.4	171	2.38	0.6
Size	22	369.22	249.5	77	561.18	251.8	69	595.02	242.4	3	659.33	169.6	171	551.86	225.3
CGP															
Reading	45	13.53	5.7	118	24.22	6.5	139	19.16	7.4	4	26.00	5.8	306	20.37	7.8
Writing	45	18.33	5.7	118	26.72	6.0	139	23.36	5.3	4	24.75	4.0	306	23.93	6.2
Computation	45	17.33	4.9	118	24.50	5.9	139	21.91	6.1	4	27.75	6.3	306	22.31	6.3
First Term															
G.P.A.	45	1.93	0.9	118	2.14	0.9	139	1.95	1.0	4	2.23	0.8	306	2.02	1.0
Credits Earned	45	8.82	4.1	118	10.25	4.0	139	8.94	4.5	4	10.00	1.4	306	9.44	4.3

Table 5

Analysis of Variance for High School G.P.A. by Attrition Group and Gender (N=171)

Source	Sum of Squares	df	Mean Square	F
Model	5.56	7	0.79	1.91
Group	0.45	3	0.15	0.37
Gender	0.01	1	0.01	0.03
Group*Gender	4.21	3	1.40	3.38*
Error	67.71	163	0.41	

*p <.05. **p .01.

Table 6

Analysis of Variance for High School Size by Attrition Group and Gender (N=171)

Source	Sum of Squares	df	Mean Square	F
Model	247,826.22	7	35,403.74	0.53
Group	163,739.30	3	54,579.76	0.82
Cender	40,446.95	1	40,446.95	0.61
Group*Gender	52,854.85	3	17,618.28	0.27
Error	10,836,707.67	163	66,482.86	

*p <.05. **p .01.

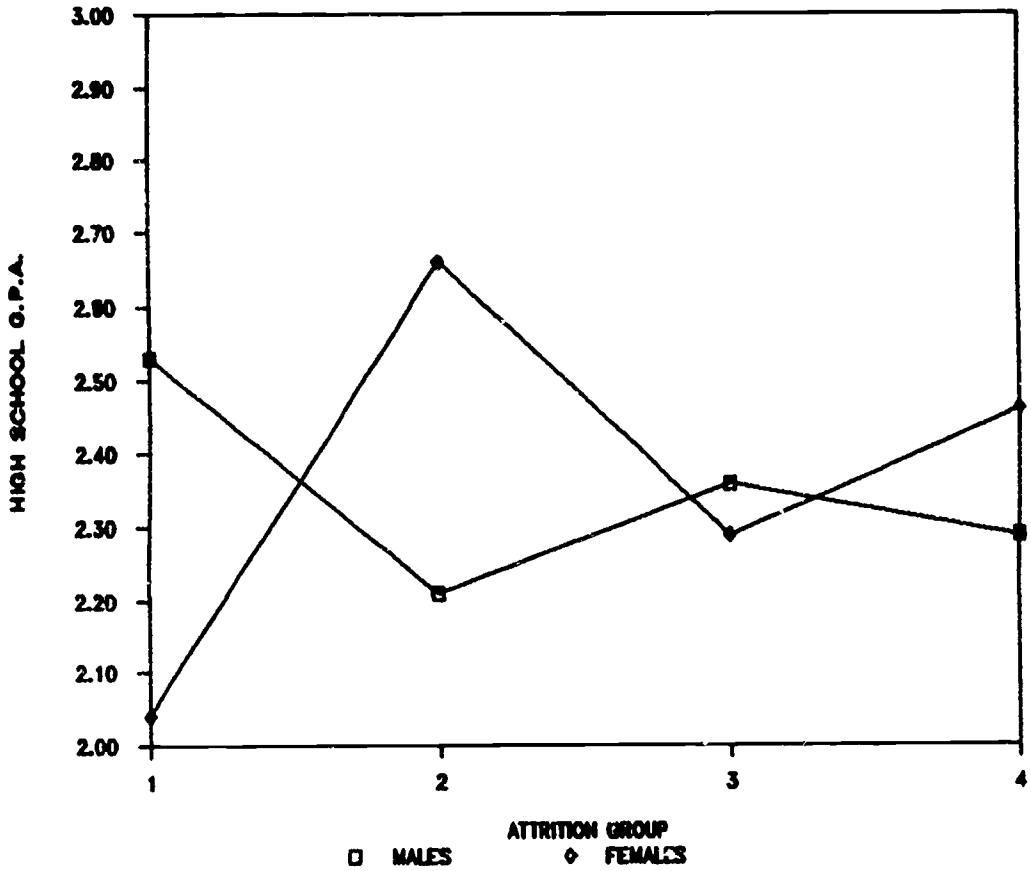

Figure 1 Graphed Interaction of High School G.P.A. Means by Attrition Group and Gender (N=171)

Table 7

Analysis of Variance for CGP Reading by Attrition Group and Gender (N=306)

Source	Sum of Squares	df	Mean Square	F
Model	539.03	7	77.00	1.27
Group	335.45	3	111.81	1.85
Gender	55.04	1	55.04	0.91
Group*Gender	146.89	3	48.96	0.81
Error	18,046.98	298	60.56	

*$p < .05$. **$p < .01$.

Table 8

Analysis of Variance for CGP Writing by Attrition Group and Gender (N=306)

Source	Sum of Squares	df	Mean Square	F
Model	629.32	7	89.90	2.35*
Group	249.68	3	83.22	2.18
Gender	4.60	1	4.60	0.12
Group*Gender	349.00	3	116.33	3.04*
Error	11,400.49	298	38.25	

*$p < .05$. **$p < .01$.

Table 9

Analysis of Variance for CGP Computation by Attrition Group and Gender (N=306)

Source	Sum of Squares	df	Mean Square	F
Model	434.54	7	62.07	1.54
Group	190.50	3	63.50	1.58
Gender	166.19	1	166.19	4.14*
Group*Gender	113.26	3	37.75	0.94
Error	11,973.70	298	40.18	

*$p < .05$. **$p < .01$.

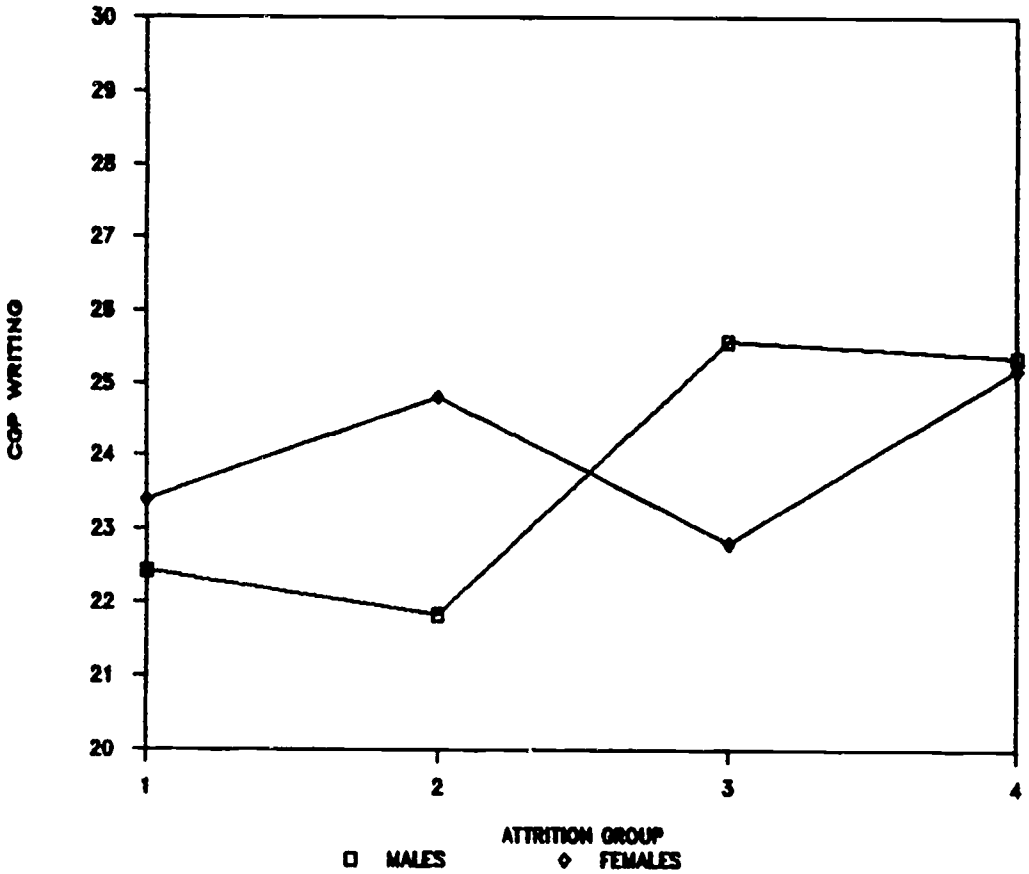

Figure 2 Graphed Interaction of CGP Writing Means by Attrition Group and Gender (N=306)

In Tables 10 & 11, the analysis of variance results for the two post-matriculation variables computed at the end of the first semester are presented. In both cases, significant differences were found for each of the main effect variables at the $P \leq .01$ level of significance. In other words, first term grade point average (Table 10) differences were found not only between attrition groups but also between males and females. Similarly, significant differences were found between attrition groups and males and females with regard to first term credits earned (Table 11). Scheffé Post-F Tests indicated that for both dependent variables, significant differences were found between attrition Group 1 and each of the other attrition groups. In both cases, attrition Group 1 means were significantly lower than the means of the other groups. Differences between males and females can be seen in Table 3 and reveal that mean grade point average and credits earned for females were significantly higher than those for males.

The data presented in Tables 12 through 18 reflect the analysis of variance results for Hypothesis II. Obviously, main effect differences between attrition groups are the similar to those reported for Hypothesis I. Hence, only results related to ethnic group differences and/or interaction effects between attrition group and ethnic group are addressed.

Table 10

Analysis of Variance for First Term G.P.A. by Attrition Group and Gender (N=306)

Source	Sum of Squares	df	Mean Square	F
Model	47.87	7	6.83	7.79**
Group	30.55	3	10.18	11.61**
Gender	9.62	1	9.62	10.97**
Group*Gender	4.38	3	1.46	1.67
Error	261.54	298	0.87	

*$p < .05$. **$p < .01$.

Table 11

Analysis of Variance for First Term Credits Earned by Attrition Group and Gender (N=306)

Source	Sum of Squares	df	Mean Square	F
Model	846.93	7	120.99	7.42**
Group	618.26	3	206.08	12.64**
Gender	119.79	1	119.79	7.34**
Group*Gender	53.01	3	17.67	1.08
Error	4,860.62	298	16.31	

*$p < .05$. **$p < .01$.

The pre-college variable results are presented in Tables 12 & 13 and reveal that significant differences between ethnic groups were found for high school class size means. Examination of class size data (Table 4) shows that the class size mean for black non-Hispanic students was dramatically lower than that of the other ethnic groups. No interaction effects were found to be significant. Similarly, results of the Comparative Guidance and Placement test scores indicated significant differences between ethnic groups in each of the three areas, i.e., Reading, Writing, and Computation. However, no significant differences were found between ethnic groups or for the interaction effects with regard to first term grade point average or first term credits earned (Tables 17 & 18).

Table 19 reflects the mean number of persisted semesters when examined by gender, ethnic group, and age group. These data were used to test Hypothesis III as presented in Table 20. This multi-factor analysis of variance indicated that no significant differences existed between the number of semesters persisted when analyzed according to these nominal variables. Further, no significant interaction effects were revealed. Thus, Hypothesis III was accepted.

The discriminant analysis results are shown in Tables 21 through 23. In Table 21, the stepwise selection statistics indicate that three variables (CGP Writing, first term G.P.A., and first term credits earned) were significant at the $P \leq .05$ level. However, while keeping the selection criteria at $P \leq .15$ (SAS default), only two variables were entered into the analysis. First term credits earned was entered first since it showed the strongest relationship with group membership. After the effects of first

term credits earned were accounted for in the analysis, first term G.P.A. was selected. This variable contributed 3.26 percent of the variance between groups beyond that accounted for by first term credits earned (9.45%). Thus, a total of 12.71 percent of the variance between attrition groups was accounted for by the two variables combined.

Table 12

Analysis of Variance for High School G.P.A. by Attrition Group and Ethnic Group (N=171)

Source	Sum of Squares	df	Mean Square	F
Model	5.22	13	0.40	0.93
Group	0.33	3	0.11	0.26
Ethnic	1.53	3	0.51	1.18
Group*Ethnic	1.98	7	0.28	0.65
Error	68.05	157	0.43	

*$p < .05$. **$p < .01$.

Table 13

Analysis of Variance for High School Size by Attrition Group and Ethnic Group (N=171)

Source	Sum of Squares	df	Mean Square	F
Model	1,473,353.74	13	113,334.90	1.85
Group	269,901.78	3	89,967.26	1.47
Ethnic	580,648.23	3	193,549.41	3.16*
Group*Ethnic	485,601.25	7	69,371.60	1.13
Error	9,611,180.16	157	61,217.70	

*$p < .05$. **$p < .01$.

Table 14

Analysis of Variance for CGP Reading by Attrition Group and Ethnic Group (N=306)

Source	Sum of Squares	df	Mean Square	F
Model	4,630.52	13	356.19	7.45**
Group	135.21	3	45.07	0.94
Ethnic	3,420.17	3	1,140.05	23.85**
Group*Ethnic	219.10	7	31.30	0.65
Error	13,955.49	292	47.79	

*$p < .05$. **$p < .01$.

Table 15

Analysis of Variance for CGP Writing by Attrition Group and Ethnic Group (N=306)

Source	Sum of Squares	df	Mean Square	F
Model	2,666.87	13	205.14	6.40**
Group	115.08	3	38.36	1.20
Ethnic	1,951.75	3	650.58	20.29
Group*Ethnic	128.70	7	18.38	0.57
Error	9,362.94	292	32.06	

*$p < .05$. **$p < .01$.

Table 16

Analysis of Variance for CGP Computation by Attrition Group and Ethnic Group (N=306)

Source	Sum of Squares	df	Mean Square	F
Model	2,158.09	13	166.00	4.73**
Group	72.07	3	24.02	0.68
Ethnic	1,837.00	3	612.33	17.44**
Group*Ethnic	187.20	7	26.74	0.76
Error	10,250.16	292	35.10	

*$p < .05$. **$p < .01$.

Table 17

Analysis of Variance for First Term G.P.A. by Attrition Group and Ethnic Group (N=306)

Source	Sum of Squares	df	Mean Square	F
Model	43.00	13	3.30	3.63**
Group	25.28	3	8.42	9.24**
Ethnic	1.43	3	0.47	0.53
Group*Ethnic	6.63	7	0.94	1.04
Error	266.41	292	0.91	

*$p < .05$. **$p < .01$.

Table 18

Analysis of Variance for First Term Credits Earned by Attrition Group and Ethnic Group (N=306)

Source	Sum of Squares	df	Mean Square	F
Model	877.76	13	67.52	4.08**
Group	441.28	3	147.09	8.89**
Ethnic	76.85	3	25.61	1.55
Group*Ethnic	92.74	7	13.24	0.80
Error	4,829.79	292	16.54	

*$p < .05$. **$p < .01$.

Table 19

Mean Persisted Semesters by Gender, Ethnic Group and Age Group (N=306)

	Persisted Semesters		
Variable	N	Mean	S.D.
Gender			
Male	158	2.52	1.0
Female	148	2.61	1.0
Ethnic Group			
Black Non-Hispanic	45	2.33	1.0
White Non-Hispanic	118	2.61	1.0
Hispanic	139	2.60	1.0
Other	4	2.50	1.0
Age Group			
19 or Younger	267	2.61	1.0
20 or Older	39	2.23	1.0

Table 20

Analysis of Variance for Semesters Persisted by Gender, Ethnic Group, and Age Group (N=306)

Source	Sum of Squares	df	Mean Square	F
Model	13.71	13	1.05	0.90
Gender	1.67	1	1.67	1.43
Ethnic	1.99	3	0.66	0.57
Age	3.35	1	3.35	2.87
Gender*Ethnic	3.65	3	1.21	1.04
Gender*Age	0.38	1	0.38	0.33
Ethnic*Age	0.32	2	0.16	0.14
Gender*Ethnic*Age	0.17	2	0.08	0.08
Error	341.34	292	1.16	

In Table 22, the classification of cases is summarized and shows the number and percentage of subjects predicted into each attrition group based on the stepwise model. As reported in the table, the percentage of cases correctly classified was 33.66 percent. Interestingly, no individual case was classified into Group 3. In contrast, the greatest proportion of cases was classified into Group 2. Note that while the analysis was based on only 171 subjects (Table 21), the classification results are based on the total 306 students since the two predicting variables were available for all students.

The classification results presented in Table 23 are based on a second discriminant analysis. This was performed by entering all seven variables directly into the analysis model available in SAS (Proc Discrim). In this case, only 171 subjects were included due to missing values. This analysis resulted in a successful classification of 42.69 percent of the cases and indicates that while the additional variables may not have been significant, the inclusion of those variables actually improved the predictability of the equation.

Table 21

Discriminant Analysis N=171 (No Missing Values)

Variable	Statistics for Entry, DF=3,167			
	R^2	F	Prob>F	Tolerance
High School G.P.A.	0.0120	0.677	0.5708	1.0000
High School Size	0.0125	0.702	0.5555	1.0000
CGP Reading	0.0379	2.193	0.0893	1.0000
CGP Writing	0.0461	2.693	0.0471	1.0000
CGP Computation	0.0145	0.817	0.4888	1.0000
First Term G.P.A.	0.0813	4.927	0.0028	1.0000
First Term Credits Earned	0.0945	5.812	0.0009	1.0000

Stepwise Selection: Summary

Step	Variable Entered	Number In	Partial R^2	F Statistic	Prob> F
1	First Term Credits Earned	1	0.0945	5.812	0.0009
2	First Term G.P.A.	2	0.0326	1.863	0.1361

Table 22

Classification of Cases Summary Based on Stepwise Results (N=306)

	Number of Observations and Percents Classified Into Group:				
From Group	1	2	3	4	Total
1	22	34	0	2	58
	37.93	58.62	0.00	3.45	100.00
2	19	62	0	17	98
	19.39	63.27	0.00	17.35	100.00
3	5	54	0	9	68
	7.35	79.41	0.00	13.24	100.00
4	8	55	0	19	82
	9.76	67.07	0.00	23.17	100.00
Total	54	205	0	47	306
Percent	17.65	66.99	0.00	15.36	100.00
Priors	0.1895	0.3203	0.2222	0.2680	

Percentage of cases correctly Classified=33.66%

Table 23

Classification of Cases Summary Based on Direct Method (N=171)

	Number of Observations and Percents Classified Into Group:				
From Group	1	2	3	4	Total
1	9	7	3	6	25
	36.00	28.00	12.00	24.00	100.00
2	4	31	6	15	56
	7.14	55.36	10.71	26.79	100.00
3	3	16	9	13	41
	7.32	39.02	21.95	31.71	100.00
4	3	17	5	24	49
	6.12	34.69	10.20	48.98	100.00
Total	19	71	23	58	171
Percent	11.11	41.52	13.45	33.92	100.00
Priors	0.1462	0.3275	0.2398	0.2865	

Percentage of cases correctly classified=42.69%

DISCUSSION

The findings of the present study only partially support the research hypotheses that there are significant differences between attrition groups vis-á-vis selected pre-college and post-matriculation variables. More importantly, the results tend to disconfirm the notion that taken together, certain academic and non-academic variables can provide a fairly reliable indication of student attrition behavior in the community college setting. While it was found that first term G.P.A. and credits earned were significantly related to attrition, combining the effects of the variables accounted for a relatively insignificant proportion of variance between the groups. Further, demographic variables were found <u>not</u> to be directly related to attrition, and only through interaction was it revealed that gender was related to the phenomenon.

Interestingly, the two variables found to be directly related to attrition in this study were both measures reflecting end-of-term achievement. Recall that it was Group 1 that was significantly lower than Groups 2, 3 and 4 with regard to these outcomes, thus suggesting that the two variables may actually reveal the effects of a very early decision to discontinue enrollment at the College. In other words, the low mean G.P.A. and credits earned might be the result of a disintegration of commitment to pursue the Associate in Arts degree. On the other hand, the significant interaction between attrition and gender with regard to high school G.P.A. and CGP writing scores cannot be attributed to the same process. In fact, these findings may be even more important to the understanding of attrition than the differences found in first term G.P.A. and credits earned. In both cases, the variables reflect differences which existed prior to the first

semester experience and suggest that a predisposition to disengage may be gender specific. The implication would seem to be a need for further study of gender specific variables as they relate to attrition at various points in time.

Inasmuch as the findings of the present study are neither entirely consistent, nor completely inconsistent with previous research cited, (Preller, 1972; DiVeccio, 1972; Yeagle, 1977; Bacon, 1977; Paydarfar, 1977), the results do suggest the need for local research in student attrition, particularly in the community college. For Miami-Dade specifically, the findings point up the need, perhaps, for student self-report data in order to determine the scope of individual reasons for attrition. Only then can the College begin to consider possible intervention and/or program modifications to meet the diverse needs of those students inclined to interrupt their studies. Given the less than promising results disclosed through the discriminant analysis approach, it is clear that attempts to predict attrition exclusively on the basis of empirical variables such as grade point average, test scores, and student demographics are not justified.

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