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ABSTRACT

The relationship between student satisfaction and performance and persistence were studied at a large midwestern, urban commuter university. A student satisfaction survey was completed by 1,643 students (out of 3,004 students), who rated their level of satisfaction with 48 specific and 5 general aspects of their college experiences. Performance was measured by the spring semester grade point average (GPA), and persistence consisted of students' reenrollment status in the fall semester. Logistic regression analysis took into account prior performance factors, student demographic characteristics, and satisfaction scales. Student satisfaction made a relatively weak contribution to predicting students' academic performance for the semester. The best predictor of performance was students' prior performance, including cumulative GPA and high school percentile rank. Among the demographic variables, students' age accounted for the largest portion of variation in spring semester GPA. Students' general academic satisfaction contributed more to the prediction of nonpersistence. Results are presented for student subgroups identified through cluster analysis. One result suggested that single, female, full-time students may give more weight than other students to their level of satisfaction when deciding whether to continue schooling. (Contains 10 references.) (SW)

When Does Student Satisfaction Matter?

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Running Head: WHEN DOES SATISFACTION MATTER?

When Does Student Satisfaction Matter?

Abstract

This paper describes a study that examines the ways in which student satisfaction is associated with important aspects of performance and persistence. Using multiple regression analyses on data from a student satisfaction survey and institutional records, student satisfaction was found to relate more strongly to retention than to performance. However, the satisfaction-performance relationship was found to differ more among subgroups of students than the satisfaction-retention relationship. The results of this study suggest that researchers and practitioners need to be sensitive to the many dimensions of students' satisfaction with the collegiate experience and important differences in how various types of students are affected by their feelings of satisfaction and dissatisfaction.

for Management Research, Policy Analysis, and Planning

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Jean Endo
Editor
AIR Forum Publications

When Does Student Satisfaction Matter?

Many efforts taking place today in colleges and universities under the auspices of program improvement or total quality management have as one of their explicit or implicit outcomes increasing student satisfaction. One assumption frequently made in this regard is that students who are more satisfied with their college experiences are more likely to perform at or beyond their potential and persist toward a degree than dissatisfied students. Despite this growing interest in satisfaction, many prominent theories of student progress, such as Tinto's (1975) theory of academic integration, and Astin's (1985) theory of student involvement, do not explicitly include satisfaction as an integral component.

Student satisfaction may have some association as either an outcome or predictor of a student's experience in college, but its relationship with student learning and persistence is certainly complex. With regard to persistence, Borden (1988) described how a student's likelihood of remaining in college may not be associated with high levels of satisfaction if he or she has poor alternatives or strong barriers that prevent leaving. Conversely, a highly satisfied student may leave college to pursue more attractive alternatives, such as an opportunity to travel abroad. And while Hayes (1977) established a relationship between dissatisfaction and dropping out, she found students' reasons for leaving were associated with different aspects of dissatisfaction Other studies that have examined persistence, like Pascarella and Chapman's (1983) multi-institutional test of Tinto's model, have suggested that the causes of student persistence vary across types of institution. The authors found that the major variables of

academic and social integration and commitment in the Tinto model interacted among themselves as well as with other background variables to either augment or compensate for those variables' effects on persistence.

Even though Pascarella and Chapman's (1983) study did not examine the role of student satisfaction on persistence, their results clearly point out the need to specify the conditions under which various predictors of retention and like outcomes operate. The literature reveals the complexity of the effect of satisfaction on the persistence of college students. Other studies show that the relationship between satisfaction and academic performance is no less complex.

In a test of a model of student retention that included both academic satisfaction and academic performance, Aitken (1982) reported that undergraduates' academic performance measured as expected semester GPA was the most important variable in determining students' satisfaction with their academic experience. Bean and Bradley (1986) discovered a more complex association between satisfaction with the student experience and academic performance in their study of traditional undergraduate students. Their work suggests that satisfaction and academic performance are reciprocally related, with satisfaction having the greatest influence on academic performance as measured by cumulative GPA. Pike (1989) initially found that the association between student satisfaction and academic performance was mostly an artifact of other variables. However, in a later study of graduating seniors, Pike (1991) confirmed the reciprocal relationship between student satisfaction and academic performance when the satisfaction measure relates to performance.

The past literature is complex and contradictory in terms of the role of student satisfaction on both academic performance and persistence. However, one important conclusion that

emerges from this literature is that the existence and magnitude of satisfaction's effect on outcomes like academic performance and persistence may depend upon other differences either across student's background characteristics or within the college or other environments that students occupy.

This paper reports the results of a study that further examines the relationship between various dimensions of students' satisfaction with college and academic performance and persistence. The first phase of this analysis assesses the relative power of student satisfaction, prior academic performance, and demographics to predict subsequent performance and persistence. The second stage employs the results of Borden's (1995) matching-type cluster analysis that were derived from an earlier study of the same student population to define student sub-groups according to demographic profiles. These previously established subgroups serve as the bases for identifying differences in the relationship between satisfaction, performance and persistence.

Method

The data for this study come from a student satisfaction survey and the institutional records of a large midwestern urban commuter university. The "Continuing Student Satisfaction and Priorities Survey" was administered to a sample of undergraduate degree-seeking students in the Spring of 1994. Completed questionnaires were received from 1,643 out of 3,004 students sampled yielding a response rate of 55 percent. The sample consisted of 65 percent females. Eighty-nine percent of the sample are white, and 31 percent are married. Sixty percent were

attending part-time in the Spring semester. The mean cumulative grade point average for the sample is 2.84, their average age is 28 years.

Students were asked to rate their level of satisfaction with 5 general and 48 specific aspects of their college experiences including academics, social experiences and opportunities, the physical environment, academic support, and student support services . The survey included a variety of other items relating to students attitudes, behaviors and demographics. Students who completed the Spring survey were tracked to the following Fall Semester to determine whether they re-enrolled.

For all satisfaction items, respondents indicated their level of satisfaction according to a four-point scale (very satisfied; satisfied; dissatisfied; very dissatisfied). The five global items were analyzed as a single scale (Cronbach's alpha = .65). Satisfaction scales were derived from the 48 specific items using a principal component factor analysis with varimax rotation. Items that loaded highest on the first six rotated factors were chosen to represent the factor and scales were then constructed using unit weightings for the chosen items. The scale items were added together, without weight, and divided by the total number of items to control for differences in number of items among the scales. As a result, the satisfaction scales, like the individual items, are based on a four-point scale. Reliability analyses of the scales yielded values of Cronhach's alpha ranging from .79 to .65. Table 1 summarizes the seven satisfaction scales that were employed for the remaining analyses.

Table 1. Global Satisfaction and Satisfaction Scales Derived from Factor Analysis of Survey Satisfaction Items

Global Satisfaction (alpha=.65)	**General Academic Satisfaction (alpha=.76)**
Academic experiences	Overall quality of instruction
Social experiences	Quality of teaching by faculty in your major
Physical environment	Quality of teaching by other faculty
Quality of faculty	Courses in your major area
Quality of academic programs	Required courses outside major
Social Climate (alpha=.79)	Info instructors give re: crse requirements
	Relevance of classes to career goals
Opp. for university extra-curricular activities	**Advising (alpha = .79)**
Opp. to attend campus cultural events	
Opp. to participate in community service	Getting courses in the sequence you need
Opp. to live in the vicinity of campus	Academic advising in major department
Opp. to meet other students	Academic advising in Ungrd Ed Center
Space for relaxing/socializing between class	Getting info about requirements in major
Recreational programs and facilities	General helpfulness of faculty
Academic Facilities (alpha=.67)	Availability of faculty outside class
	Getting through to staff on phone
Classroom environment (lighting, heating, ..)	General helpfulness of university staff
Quality of specially equipped classrooms	**Getting into Classes (alpha = .67)**
Use of technology in the classroom	
Obtaining help using computers	Overall process for registering for classes
Availability of computers in public areas	Registering for classes by phone
Co-Curricular Activities (alpha=.74)	The process of applying for financial aid
	The amount of financial aid available
Info about grad and prof programs	The process of paying for classes
Info about career and job opportunities	Recmded courses based on placement exam
Info about volunteer services opportunities	Getting books you need from bookstore
	Parking

Data regarding survey respondents' prior and subsequent academic performance were extracted from institutional records and merged with the survey responses. Two specific outcomes were identified as the focus of the present study: performance defined in terms of Spring Semester grade-point average (on a 4.0 scale) and persistence, defined as students' re-enrollment status for the Fall 1994 Semester (not enrolled vs. enrolled or graduated).

Results

Satisfaction as a Predictor of Progress and Performance

Predicting Spring Semester GPA. Students' Spring 1994 GPA was regressed on various combinations of the prior performance, demographics, and satisfaction scales. The analyses were conducted using ordinary least-squares regression with forward stepwise inclusion criteria. Each set of predictors--demographics, prior performance, and satisfaction were first analyzed as separate blocks. Next the three sets of variables were entered in blocks in the order of predictive value. Finally, the individual items were pooled and analyzed as a single block, again using the forward stepwise inclusion method.

Table 2 summarizes the results of these regression analyses, showing the order in which variables entered into the model and the resulting improvement in the overall predictive value of the model, as reflected in the R-square statistic[1]. Consistent with previous research, students' prior performance was found to be the best predictor of subsequent performance. Students' prior cumulative grade-point average entered first into the model and accounted for one-quarter of the variation in Spring Semester GPA. High school percentile rank entered next into the model, accounting for an additional 2.1 percent of variation in Spring grades. Cumulative credit hours

[1] Due to the high level of multicollinearity among these predictor variables, this analysis focuses on the improvement in the joint predictive value of the variables (R-square) and not the specific regression coefficients associated with each variable.

added another 1.5 percent to the total predictive value of the model, so that these prior performance variables together accounted for 28.5 percent of the variation in Spring Semester GPA. Students' math and verbal SAT scores were also tested in the model but neither added any further predictive value.

Table 2. Linear Regression of Spring Semester GPA on Prior Academic Performance, Demographics, and Satisfaction

			R^2 Increase	
	Order of Entry	R^2	Change	F
Separate Regressions				
Prior Academic Performance	Prior Cum. GPA	.249	.249	312.07***
	HS Pct'ile Rank	.270	.021	26.77***
	Cum Cred Hours	.285	.015	19.44***
Demographics	Age	.096	.096	99.21***
	Sex	.119	.024	25.19***
	Marital Status	.131	.012	12.83***
	Weekly Work Hours	.138	.007	7.38**
	Minority Status	.144	.006	6.56*
Satisfaction Scales	General Academic	.020	.020	18.76***
	Academic Facilities	.025	.006	5.36*
Block Regression				
Prior Academic Performance		.286	.286	74.75***
Demographics		.340	.054	10.92***
Satisfaction Scales		.344	.005	0.897
Best Items Overall				
	Prior Cum. GPA	.249	.249	312.07***
	Age	.297	.048	63.79***
	HS Pct'ile Rank	.321	.024	32.86***
	Cum Cred Hours	.325	.004	5.87*
	Marital Status	.330	.004	5.99*
	First-Gen Status	333	.003	4.53*

*p<.05, **p<.01; ***p<.001;

Table Notes

The degrees of freedom is 1/944 for the first F-statistic in each regression model. The denominator degrees of freedom decreases by one for each subsequent test within a block.

Prior academic performance variables considered: HS percentile rank; cumulative GPA; cumulative credit hours; Math SAT score; Verbal SAT score.

Demographic variables considered: Age; marital status; weekly work hours; sex; children at home (yes/no); first-generation status; college-going status.

Satisfaction scales considered: Global; general academic; social climate; advising; academic facilities; getting in classes; co-curricular activities.

Among the demographic variables, students' age accounted for the largest portion of variation in Spring Semester GPA, 9.6 percent. Adding the next four demographics--sex, marital status, weekly work hours, and minority status (minority/non-minority)--added 5 percent to the predictive value of the model, bringing the total for demographics up to nearly 15 percent. Two other demographics considered--first-generation college student status (based on parents' educational levels) and whether the student had dependent children living with them at home (yes/no)--did not contribute significantly beyond the final model shown in Table 2.

Only two of the seven satisfaction scales contributed significantly to the prediction of Spring GPA. The general academic satisfaction scale entered first, accounting for 2 percent of the variation in the performance outcome. Satisfaction with academic facilities then brought the combined R-square value up another 0.5 percent.

The middle section of Table 2 shows the improvement to the prediction of Spring GPA when entering the variables into the equation block by block, starting with the best predictors--prior academic performance. After accounting for over one-quarter of the variance with these best predictors, the demographic variables as a block added 5.4 percent to the variation accounted for in the performance outcome. In other words, the correlational overlap (multicollinearity) between the demographic and prior performance variables accounted for nearly two-thirds of the demographic variables' ability to predict Spring GPA. Taken together, the prior performance and demographic variables accounted for over one-third (34%) of the variation in students' Spring Semester GPA. Above and beyond this, the satisfaction scales added only one-half of one percent more to the predictive equation, which was not a statistically significant change.

The final section of Table 2 shows the results of a forward inclusion regression analysis based on all individual items, regardless of block. The results show that after accounting for nearly one-quarter of the variation in Spring grades using prior GPA, students' age adds another five percent. Two additional prior performance variables and two demographics bring the total variation accounted for in Spring grades up to exactly one-third. None of the satisfaction scales contributed to the prediction of Spring grades when accounting for these other student characteristics.

Predicting Persistence to the Fall Semester. As a precursor to using satisfaction and other variables to predict student persistence, persisters and withdrawers were first compared with regard to their average satisfaction ratings. Table 3 shows that the returning-graduating students were more satisfied as a group compared to the non-returning students on all seven scales, but these differences were statistically significant for only three of these scales. The largest mean difference in satisfaction was found for the general academic satisfaction scale. Smaller, but still statistically significant differences appeared for the global satisfaction and satisfaction with advising scales.

Table 3. Satisfaction by Fall 1994 Enrollment Status

	Fall 1994 Status		
	Not Enrolled	Ret/Grad	*t*
Global	2.81	2.90	3.33**
Academic	2.85	2.96	4.40***
Social	2.54	2.57	1.04
Advising	2.60	2.68	2.55*
Registration	2.58	2.62	1.36
Facilities	2.71	2.76	1.67
Co-Curric	2.53	2.57	1.14

*p< 05. **p< 01; ***p< 001

Next, a logistic regression was conducted to assess the relative predictive value of the satisfaction scales on the persistence/withdrawal outcome compared to the slate of prior performance and demographic variables considered above. Spring Semester GPA was now considered among the performance predictors. A single forward inclusion analysis was run using all variables, regardless of block. Table 4 summarizes the constructed model according to the chi-square value for the cumulative model at each point, the improvement in chi-square from the prior stage, and the success rate for predicting students' Fall Semester enrollment status based on the predictor variables.

The first three variables to enter into the model relate to student academic performance. The most immediate indication of performance, the Spring Semester GPA, enters first into the model, followed by students' Spring Semester credit hour load and then their cumulative GPA prior to Spring Semester grades. After including these three performance characteristics, the model misclassifies just over one percent of the returning students (the default value under which everyone is classified under the null model) and correctly identifies just over nine percent of the non-returning students.

Table 4. Logistic Regression of Retention on Academic Performance, Demographic, and Satisfaction Variables: Forward Stepwise Inclusion

Variables Added to Model	Model Chi-Square	Improvement Chi-Square	Percent of Re-enrollers Predicted	Percent of Non-Re-enrollers Predicted
None (Constant)	-	-	100.00	0 00
Spring Sem GPA	73 545***	73.545***	99.29	7.53
Spring Cred Hours	110.134***	36.589***	99.02	7 95
Prior Cum GPA	119.210***	9 076**	98 94	9 21
Academic Satisfaction	124 330***	5 120*	99.02	10 46

*p< 05; **p< 01; ***p< 001

Next the general academic satisfaction scale enters into the model as a statistically significant predictor ($p<.05$). It increases slightly the classification of returning students and adds 1.25 percent additional accuracy to the classification of non-returning students, bringing the total predictive value to just under 10.5 percent. No additional variables contribute significantly to the prediction of retention to the Fall Semester. Thus the final model includes no demographic variables: the general academic satisfaction scale is the only non-performance-related variable to contribute to the prediction of who fails to re-enroll for the next semester.

Table 5 summarizes the parameters of the final logistic regression model. Since logistic regression is subject to the same limitations regarding multicollinearity among predictors, the regression coefficients (B) and associated partial correlations (R) should be interpreted with great caution. The second column of Table 5 containing the Wald statistic, a chi-square distributed indicator of regression coefficient significance, illustrates the relative significance of each predictor.

Table 5. Logistic Regression of Retention on Academic Performance, Demographic, and Satisfaction Variables: Final Model Parameters

	B	S.E.	Wald	R	Exp(B)
Constant	-3.075	.639	23.142***		
Spring Sem GPA	.526	.084	39.513***	.172	1.692
Spring Cred Hours	.116	.020	34.710***	.161	1.123
Prior Cum GPA	.328	.115	8.165**	.070	1.388
Academic Satisfaction	.446	.197	5.123*	050	1 562

*p<.05; **p< 01, ***p<.001

The final column of Table 5 expresses the change in odds of students' returning based on a unit change in the predictor variable. Thus for a unit increase in students' Spring GPA (i.e., a full grade difference on average), the odds of returning for the Fall Semester, or successfully completing graduation requirements prior to the Fall, increase by a ratio of 1.6:1. It should be

noted that these are statistical odds, that is, the probability of returning or graduating relative to the probability of not returning or graduating.[2] The resulting change in odds for the general academic satisfaction item is on the order of 1.5:1. The general academic satisfaction scale is based on a four-point scale with a mean of 2.94, a range of 2.86 (1.14 to 4.00), and a standard deviation of .39. Thus a unit change in general academic satisfaction covers over 2.5 standard deviation units.

In summary, student satisfaction was found to make a relatively weak contribution to predicting students' academic performance for the semester within which satisfaction was assessed. By themselves, these two scales accounted for 2.5 percent of the variation in Spring grades. When other, stronger predictors are first taken into account, two of the seven dimensions of satisfaction considered here accounted for an additional, but insignificant, one-half of one percent of the variation in this performance outcome.

Students' general academic satisfaction contributed more to the prediction of non-persistence. It was able to account for an additional 1.25 percent of non-returning students over and above the 9.25 percent accounted for by three academic performance variables. The general academic satisfaction scale contributed to the prediction of persistence over all demographic factors considered in this study.

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[2] The term 'odds' is used more conventionally to express the probability of an event occurring relative to all possible events rather than relative to the alternative outcomes. For example the statistical odds of a flipped coin landing on its 'head' is 1:1.

Differences in the Satisfaction-Performance/Persistence Effects Among Student Sub-Groups

Borden (1995) employed a matching-type cluster analysis on demographic variables from the prior year's student satisfaction survey (Spring 1993) to identify student subgroups. This earlier analysis identified significant differences among the resulting subgroups in several dimensions of student satisfaction and their college education goals. For the present study, student subgroups were defined based on the profiles of students in the earlier clusters. Since a cluster analysis assigns group membership on a case-by-base basis, the current study had to use more explicitly defined criteria. For example, the first cluster from the earlier study was characterized as young, first-generation, single, full-time students because 83 percent of the group was aged 21 years or younger, 91 percent were first-generation college students, 97 percent were not married, and 92 percent carried full-time course loads. For the present study, the first cluster was define as all first-generation, single, full-time students who were less than 22 years old. Because the groups had to be defined in such absolute terms, nearly one-quarter of the 1994 sample did not fall into any of the eight clusters.

Table 6 summarizes the student subgroup definitions used in the present study. The table displays the size of each group and its proportion. The table also shows the relative sizes of the subgroups from the prior year's groups. The distribution of students changes notably for some groups when using the absolute criteria derived from the 1993 clusters. Most notably, the minority student cluster (M4) increased. This was largely because the definition was modified in the current study to include all minority students as a potential target group for designing

programmatic services. Among the part-time student groups, there was a notable reduction in the size of cluster M5. This loss can be attributed to using absolutes in the definition of the 1994 groups: the 1994 cluster includes only full-time workers, whereas only 70 percent of the 1993 cluster worked full-time.

Table 6. 1994 Student Sub-groups Defined Using 1993 Sample Clusters*

		Spring 1994 Sample			Spring 1993
Cluster	Criteria	N	Pct. of Total	Pct. of Classified	Comparative Percentage*
M1	Full-time student, first-generation, single & young (< 22 yrs)-excl. M4	95	5.8	7.7	9.7
M2	Single, female, not first-generation, taking at least 7 credit hours - excl M1 & M4	118	7.2	9.5	13.6
M3	Full-time student, single, seniors - excl M1, M2 & M4	125	7.7	10.1	9.0
M4	Minority student	164	10.0	13.2	6.3
M5	Part-time students, full-time worker, no children	121	7.4	9.8	22.8
M6	Part-time student, full-time worker, with children	270	16.4	21.8	22.2
M7	Part-time student, not full-time worker, married or have children	204	12.4	16.5	9.4
M8	Work at least part-time, enrolled for 6 or more credits, married or children - excl M7	141	8.6	11.7	7.0
Unclass.	All Others	405	24.7	-	
Total		1,643	100.0	-	(N=873)

Table 7 compares the 1994 student subgroups according to the two outcome variables--Spring 1994 GPA and percent who returned for or graduated prior to Fall 1994. The group

differences in Spring GPA were highly significant (F=13.494; df=7,1190; p<.001). The differences in retention rates were marginally significant (Pearson chi-square = 13.369, df=7; p=.064; likelihood ratio = 14.571; df=7, p=.042).

Table 7. Student Subgroup Differences in Performance and Retention

		Spring 1994 GPA		% Ret/Grad
Cluster	N	Mean	SD	Fall 1994
M1	95	2.82	0.81	87.4
M2	118	2.88	0.77	87.3
M3	125	3.02	0.72	92.8
M4	164	2.61	0.99	82.3
M5	121	2.80	0.95	79.3
M6	270	3.17	0.85	81 1
M7	204	3.37	0.72	85.4
M8	141	2 99	0.88	83.7
Unclass.	405	2.89	0.93	81.8
Total	1643	2.97	0.89	83.7

Generally, the first three subgroups, composed of entirely full-time students, were retained at the highest rates. Not surprisingly, the highest level of retention/graduation among these groups was found among the full-time seniors, many of whom graduated at the end of the Spring Semester. The highest levels of performance, as indicated by Spring GPA, were found among two of the groups of part-time students--groups M6 and M7. However, these two groups had relatively low retention rates, which is not surprising given family and work obligations combined with their part-time student status. Group M7, which included students with less than full-time work obligations, performed at the highest level among all groups and had the highest retention rate among part-time students. Groups M4 and M5--minority students (full- and part-

time) and part-time students with full-time jobs and no family obligations, exhibited the lowest levels of both retention and performance.

Table 8 summarizes the differences in satisfaction levels among the student subgroups. Differences are displayed as unit standard error deviations from the mean on each scale for those group means that differ at the $p<.05$ level.

Table 8. Difference in Average Satisfaction by Cluster: Standard Error Units Above/Below Mean

	Satisfaction Scales						
Cluster	*Global*	*Academic*	*Social*	*Advising*	*Getting Classes*	*Facilities*	*Co-Curric*
M1	-2.69				-3.16		
M2						+2.27	
M3							
M4	-2.82	-3.09			-2.15		
M5		-2.26		-2.84	-3.35		
M6	+3 02	+2.12		+2.09	+5.26	-2.19	
M7	+4.26	+2.33	+3.13		+3.98		+3.09
M8							

Inspection of these results shows that the two groups with the lowest levels of performance and retention (M4 and M5) show the largest negative deviations across a variety of satisfaction scales. Conversely, the best performing subgroups (M6 and M7) show the largest number of positive deviations from the mean satisfaction scores. That is, the part-time students with family obligations tend to be more satisfied with several dimensions of their collegiate experience. They also tend to perform at higher levels but are retained at lower levels than all groups of full-time students (M1, M2, and M3).

To look beyond these descriptive differences, the correlations between Spring GPA and the prior cumulative GPA and satisfaction scales were compared. Table 9 summarizes these differences, showing that the prior cumulative GPA-Spring GPA correlation remains significant among all groups but shows considerable variation. This association ranges from a high of .639 for the first subgroup (young, single, full-time students) to a low of .248 for group M6 (part-time student, full-time worker with children). In general, the correlation is higher among the full-time student groups and lower among the part-time student groups

Table 9. Significant Correlations between Satisfaction and Prior Cumulative GPA with Spring Semester GPA Overall and by Cluster

	Prior	Satisfaction Scales						
	Cum GPA	*Global*	*Academic*	*Social*	*Advising*	*Registration*	*Facilities*	*Co-Curric*
Overall	517	099	.155		.074	.069		
Cluster								
M1	639			- 210				
M2	504	192	.319		.268			
M3	560							
M4	617							
M5	419							
M6	248		142	- 147				
M7	477		174		.208			
M8	356							

Table 9 also shows differences in the correlations between the satisfaction scales and Spring GPA. For groups M3, M4, M5, and M8, none of the satisfactions scales are significantly correlated with Spring grades. And, while there are significant correlations among the other groups, they vary in terms of the scale correlates and the size of the correlation. Consistent with earlier results, the general academic satisfaction scale is most often found among the significant

correlates of Spring grades and these correlations are always positive. The advising and global scales also show some small but positive correlations. The only other scale to correlate significantly is the social climate satisfaction scale, which correlates negatively with Spring grades for both the young, full-time single students (M1) and the older part-time students with families who work full-time.

As a final analysis of the differential relationship between satisfaction and grades among subgroups, linear regressions were run separately for each group. Included in these regressions were the student prior cumulative GPA and the seven satisfaction scales. Table 10 summarizes the results of these analyses.

Table 10. Regression of Spring Semester GPA on Prior GPA and Satisfaction Scales: Overall and by Cluster

	Prior GPA R-Square	Satisfaction Scales Entering Equation	Improvement in R-Square
Overall	.270	Academic	.006
Cluster			
M1	.415	-	-
M2	.254	Academic	.056
M3	.314	Advising	.029
M4	.388	-	-
M5	.185	-	-
M6	.098	Academic Social	.034
M7	.230	-	-
M8	.127	-	-

Since the prior cumulative GPA always enters the model first, the first column of Table 10 is simply the squared values of the correlations shown in the first column of Table 9. The second column shows which, if any, of the satisfaction scales were identified as significant predictors of Spring grades, beyond prior GPA. Once again, the results show that satisfaction operates differently among the different subgroups in its association with Spring grades. The general academic satisfaction scale accounts for 5.6 percent of the variation in Spring grades over and above the 25.4 percent accounted for by prior GPA for group M2--the full-time, single, women students (22 years or older and excluding minorities). That is, for this group, satisfaction is a relatively strong predictor of performance.

The satisfaction with advising scale is a significant predictor for the senior group, although it doesn't add as much to the prediction of Spring grades as does the general academic satisfaction scale for group M2. Finally, both the general academic and social satisfaction scales enter into the equation for group M6, a group for which prior cumulative GPA accounts for less than 10 percent of the variation in Spring grades.

Unlike the performance-satisfaction relationship, the persistence-satisfaction relationship did not differ among these student subgroups. As reported earlier, retained and graduated students were significantly more satisfied with their general academic experience than withdrawn students and the identified subgroups differed in their levels of general academic satisfaction. However, the interaction between the two factors was not significant ($F=0.608$; $df=7/1216$; $p=.750$); that is, the association between satisfaction and persistence did not differ among the subgroups.

Discussion

The present study set out to explore the relative predictive value of student satisfaction on performance and persistence and to look at differences in these relationships among subgroups of students. Like past research, the present study found small but significant associations between satisfaction and performance and slightly larger associations between satisfaction and persistence. The present study also demonstrated significant and meaningful differences in the satisfaction-performance relationship among various subgroups of students. However, the analysis failed to uncover any significant differences among subgroups in the stronger satisfaction-persistence relationship.

Among the seven satisfaction scales considered in this study, one scale--students' satisfaction with the general academic aspects of their college experience (for example, quality of faculty, quality of courses in and outside their major)--had the strongest association with academic performance. However, the association between even this strongest satisfaction predictor and performance was reduced to insignificance when controlling for prior academic performance and student demographics. Other satisfaction scales, such as satisfaction with academic facilities and social climate were shown to have small but significant effects on performance among different subgroups of students.

These results suggest that satisfaction cannot be treated as a single construct in assessing its association with outcomes of student performance and persistence. For example, in the case of this commuter university, students' satisfaction with the social climate was found to have only small effects on performance. It is quite possible that the student body of a commuter college or

university is less sensitive to aspects of their campus social life than peers at residential institutions.

In examining the satisfaction-performance relationship, the present study assesses satisfaction 'in between' instances of performance. That is, students' cumulative GPA is a prior condition to this assessment and Spring grades were a subsequent outcome. Bean and Bradley (1986) and Pike (1991) have posited a reciprocal relationship between satisfaction and performance. While the present study does not attempt to disentangle the direction and relative strength of this association, the results suggest that students' continuing record of performance has a far greater effect on subsequent performance than do their feelings of satisfaction with their college experience. However, it should be noted that the current study looked at students' satisfaction with aspects of the college environment and their experience with this environment. It did not consider elements of self-satisfaction (e.g., satisfaction with the one's role as student) as did the other researchers.

Satisfaction was here found to have a greater impact on student retention than on performance. This relationship may well be even stronger when considering the different conditions under which students leave. An earlier follow-up study of non-returning students conducted at the same institution (Wince, 1994) suggested that there are important differences between students who transfer to other institutions and those who do not re-enroll anywhere due to money problems, changes in employment, or other personal reasons. It is quite possible that the feelings of satisfaction will more strongly influence the re-enrollment decision of students who have clear options to attend other colleges. Students who have few, if any options but to stay or leave may be less influenced by their levels of satisfaction with their college experience.

The findings of this study are subject to the limitations of multivariate regression techniques using correlated predictors. To minimize these constraints, the analysis focused on the net change in prediction of performance and retention and not on individual regression coefficients. The results of this study suggest that any attempts to disentangle the effects on performance and persistence of various satisfaction, demographic, and past performance measures should be guided by two principles. First, student satisfaction should be specifically defined in the context of an explanatory model. The model may be one that has theoretical roots, such as Tinto's (1975) retention model, but could also derive from a service process model as used in total quality management (TQM) methods. Second, the analysis should employ techniques that at least accommodate correlated predictors, such as ridge or two-stage least squares regression techniques. Beyond this minimum, the authors suggest the use of analysis of covariance methods, such as LISREL that can also distinguish between measurement and model error.

The present study demonstrates the merit of using subgroups identified through cluster analysis or similar segmentation strategies as a means of reducing a range of demographic factors into a set of groups with specific demographic profiles. Differences in the performance-satisfaction association among student subgroups provides potential leverage points for programmatic interventions. For example, the results of these analyses suggest that single, female, full-time students may give more weight to their level of satisfaction when deciding whether to continue their schooling. On the other hand, older students with more significant family and work obligations may be more satisfied than others but this may have less bearing on how well they perform given the larger variety of obligations that they balance.

This study examined two specific measures of student learning outcomes, each measured by one observable variable. There are several other potentially important outcomes of student satisfaction or dissatisfaction that should not be ignored. For example, while dissatisfied students may continue to remain enrolled for lack of alternative choices, they may not represent the university well to other potential students with whom they come in contact and may not be expected to be good supporters of the university after graduating. Conversely, very satisfied students who leave due to changes in work or family obligations, may represent the university's best form of marketing and recruitment and may eventually return to pursue their studies.

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