DOCUMENT RESUME

ED 126 835 HE 008 154

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TITLE A Longitudinal Comparative Study of a Process Oriented Tutorial Program. OASIS Research Report No. 5.
INSTITUTION California Univ., La Jolla.
PUB DATE Jun 76
NOTE 23p.
AVAILABLE FROM University of California, Office of Academic Support and Information Services, P.O. Box 109, La Jolla, California 92037

EDRS PRICE MF-$0.83 HC-$1.67 Plus Postage.
DESCRIPTORS *Academic Achievement; Comparative Analysis; *Dropout Rate; *Higher Education; *Remedial Programs; *Tutorial Programs; *Tutoring

ABSTRACT

The grade-point average (GPA) of Educational Opportunity Program (EOP) freshmen who received tutoring through the OASIS Provosts' Tutorial Fellowship Program and EOP freshmen who did not receive such tutoring were compared at the University of California, San Diego. A one-way analysis of covariance using high school GPA, Scholastic Aptitude Test (SAT) mathematics score, and SAT verbal score as covariates revealed significantly higher adjusted grades for the tutored group in each of three replications over a period of three years. These students were also tracked through their sophomore year and, in two of three replications, the students who were tutored as freshmen also had significantly lower sophomore year attrition than the students who were untutored as freshmen. (Author)

OASIS Research Report #5

A Longitudinal Comparative Study of a Process Oriented Tutorial Program

June 1976

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Abstract

The freshman grade point average (GPA) of Educational Opportunity Program (EOP) freshmen who received tutoring through the OASIS Provosts' Tutorial Fellowship Program and EOP freshmen who did not receive such tutoring were compared at the University of California, San Diego. A one-way analysis of covariance using high school GPA, Scholastic Aptitude Test (SAT) mathematics score, and SAT verbal score as covariates revealed significantly higher adjusted grades for the tutored group in each of three replications over a period of three years. These students were also tracked through their sophomore year and, in two of three replications, the students who were tutored as freshmen also had significantly lower sophomore year attrition than the students who were untutored as freshmen.

The last ten years has produced an increasing emphasis on equal educational opportunity and the gradually evolving concept of student affirmative action in higher education (University of California, 1975). Liberalized, experimental, or special admissions requirements have been used to provide university admission to some students who otherwise would not have been admitted. Programs such as Educational Opportunity Program (EOP) have been developed to recruit minority, low income, and other students who traditionally have not sought admission to colleges or universities. A concomitant of these recruitment programs has been academic support programs designed to assist students in adapting to the academic demands of university curricula and provide assistance with certain key skills in specific curricular areas. Typically, these supportive programs have centered around tutorial assistance to students.

The development of tutorial services for disadvantaged students was stimulated by the Higher Education Amendment of 1968, which provided funds for support services on college and university campuses for disadvantaged young people (Burkheimer and Davis, 1973). Three years later a national survey (Burkheimer and Davis, 1973) revealed that half of all undergraduate institutions had some forms of supportive services for disadvantaged students. Yet a recent national evaluation of supportive services for the disadvantaged (Davis, 1975) concluded that "there is no evidence that the availability of or

participation in support services systematically improves performance and satisfaction over that which may be expected from previous academic performance".

Another national survey of tutoring programs in higher education (Reed, 1974) has concluded that tutorial programs, "originally implemented to meet the academic needs of the educationally deficient student ... are becoming the sine qua non for all students". Although Reed concludes that these programs "appear to have been successful", he also notes that instances in which any type of systematic evaluation of program effectiveness have been conducted are rare. Reed further states that although the present perceptions of program effectiveness are encouraging, the continued support for these programs will depend on evaluations that are much more rigorous. He specifically cites that the two most frequently stated goals of tutorial programs relate to (1) the provision of effective academic support for students who lack the background for college work and, (2) ensuring retention of these students in college. Hence, programs must demonstrate that they are capable of meeting these goals.

The research literature on tutorial programs is somewhat limited and equivocal. Rosenshine and Furst (1969) reviewed the literature on tutorial programs through 1969 and concluded that there was no compelling evidence that tutorial programs improved student achievement. Since that time, studies have

continued to produce conflicting results on the effectiveness of tutorial programs. Studies by Wilson (1970) and Benz (1970) indicate that tutorial programs for disadvantaged college students were not successful in producing a higher level of academic performance in tutored students than that of a control group of similar students. Other studies by Taylor (1970) and Wright (1971) reported that tutorial programs were successful in producing higher GPA's and greater retention rates among tutored students than would be predicted on the basis of previous academic performance. These conclusions coupled with the more recent findings of Davis described above contribute to the equivocal nature of the issue.

Program Description

In 1971, a new tutorial program for EOP students was designed in the Office of Academic Support and Instructional Services (OASIS) at the University of California, San Diego (UCSD). This program, the Provosts' Tutorial Fellowship Program, provided assistance in key mathematics and science courses in the lower division curriculum. Tutors recruited from outstanding junior or senior mathematics and science majors were required to take a four unit training course to teach them the skills necessary to provide learning and academic survival skills to tutees. Each tutor was assigned three tutees from a particular mathematics or science course for the entire quarter. Tutors were required to attend the lectures of the class in which they tutored and, in addition, they were required to

meet with their tutees at least once per week throughout the quarter.

Method

Subjects

Subjects for this four year study comprised groups of EOP freshman students who entered UCSD during fall quarter 1971, fall quarter 1972, and fall quarter 1973. The experimental groups consisted of students who received tutoring during their freshman year (the 1971-72, 1972-73, or 1973-74 academic years respectively). During the 1971-72 academic year, tutees were referred by faculty members while during the 1972-73 and 1973-74 academic years all EOP freshmen were invited to seek tutorial assistance. For each experimental group, a control group was randomly selected from EOP freshmen who entered in the same year but who did not receive tutoring.

Procedure

Three analyses were performed. First, the cumulative freshman year GPA of the three experimental and control groups were compared in separate analyses with a one-way analysis of covariance design. High school GPA, SAT mathematics score, and SAT verbal score were used as covariates to compensate for the initial differences in ability between the experimental and control groups (Peters and Van Voorhis, 1940). The groups were tracked through their sophomore year, during which time none of the students were tutored. The freshman year and sophomore year overall grade point averages were computed for students

in each of the groups who persisted through their sophomore year. For each of the three samples, the data were analyzed by a 2 x 2 repeated measures analysis of variance to determine whether there was an interaction between tutoring/non-tutoring treatment and year in which GPA is measured.

Finally, the retention rate during the sophomore year was computed for each group. For each of the three samples in the study, a 2 x 2 contingency table was constructed indicating the number of students in the experimental and control groups who continued as students versus the number of students who dropped out. A Chi-square was computed for each contingency table, to test the hypothesis that the retention rate for the experimental and control groups was not significantly different.

Results

Table 1 presents the results of the covariance analysis of freshman grades obtained by the tutored (experimental) and untutored (control) groups of EOP freshmen during the 1971-72 academic year. High school GPA, SAT mathematics score, and SAT verbal score were used as covariates to adjust freshman GPA. There were 80 students in each group. The tutored students received significantly higher adjusted grades than the untutored group, $F\ (1,158) = 6.494$, $p < .02$.

Table 1

Freshman GPA obtained by the Experimental and Control Groups of 1971-72 EOP Freshmen

Group	Unadjusted Freshman GPA	Adjusted[1] Freshman GPA	df	F
Tutored	2.683	2.757	1,158	6.494*
Untutored	2.541	2.461		

Note: N = 160, 80 per group
[1] Covariates used were high school GPA, SAT mathematics score, and SAT verbal score.
* $p < .02$

Table 2 presents the results of the covariance analysis of freshman grades obtained by the tutored and untutored groups of EOP freshmen during the 1972-73 academic year. The same covariates were used to adjust freshman GPA. The 85 tutored students achieved a significantly higher adjusted freshman GPA than the 85 untutored students, $F(1,168) = 19.487$, $p < .01$.

Table 2

Freshman GPA obtained by the Experimental and Control Groups of 1972-73 EOP Freshmen

Group	Unadjusted Freshman GPA	Adjusted[1] Freshman GPA	df	F
Tutored	2.548	2.768	1,168	19.487*
Untutored	2.506	2.286		

Note: N = 170, 85 per group
[1] Covariates used were high school GPA, SAT mathematics score, and SAT verbal score.
* $p < .01$

Table 3 presents the results of the covariance analysis of freshmen grades obtained by the 1973-74 groups. Again, the same covariates were used to adjust freshman GPA. The 85 tutored students achieved a significantly higher adjusted freshman GPA than the 85 untutored students, $F\ (1,168) = 8.576$, $p < .01$.

Table 3

Freshman GPA obtained by the Experimental and Control Groups of 1973-74 EOP Freshmen

Group	Unadjusted Freshman GPA	Adjusted[1] Freshman GPA	df	F
Tutored	2.708	2.848	1,168	8.576*
Untutored	2.714	2.574		

Note: N = 170, 85 per group

[1] Covariates used were high school GPA, SAT mathematics score, and SAT verbal score

* $p < .01$

Table 4 is a mean summary table and table 5 presents the results of the analysis of variance of the freshman GPA and sophomore GPA of the students who were tutored or untutored freshmen during the 1971-72 academic year. Only students who persisted through their sophomore year were included in the analysis. The main effect of the tutoring was not significant, $F\ (1,106) = .008$, $p > .05$. Similarly, the class level effect was not statistically significant, $F\ (1,106) = 3.158$, $p > .05$. The interaction effect was statistically significant, however, $F\ (1,106) = 4.019$, $p < .05$. This interaction

indicates that the grades of students who were tutored as freshmen tended to increase between the freshman and sophomore years relative to the grades of the untutored group. Figure 1 presents a diagrammatic representation of the interaction.

Table 4

Freshman and Sophomore GPA of Tutored and Untutored 1971-72 EOP Freshmen

Group	Freshman GPA	Sophomore GPA
Tutored	2.760	2.778
Untutored	2.864	2.645

Table 5

Analysis of Variance of Freshman and Sophomore GPA of Tutored and Untutored 1971-72 EOP Freshmen

Source	SS	df	MS	F
Tutored-Untutored	.001	1	.001	.008
Subjects within Groups	83.490	106	.79	
Freshman-Sophomore	.565	1	.565	3.158
Interaction	.719	1	.719	4.017*
Year x Subjects w. Groups	18.96	106	.1789	

* $p < .05$

Figure 1

Freshman and Sophomore GPA of Tutored and Untutored 1971-72 EOP Freshmen

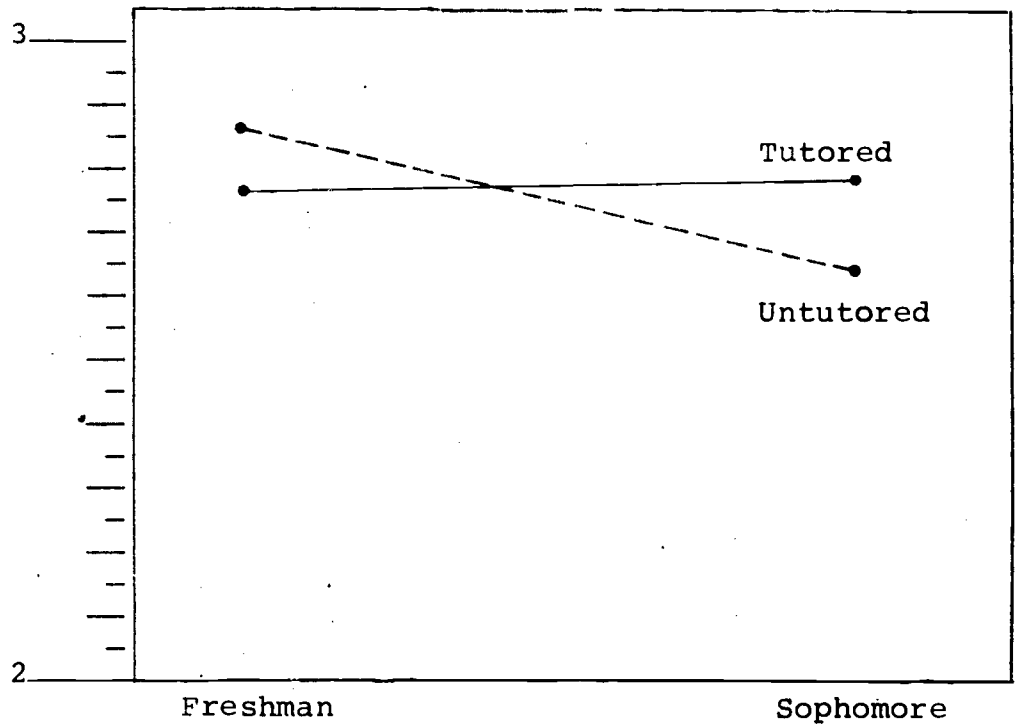

Table 6 is a mean summary table and table 7 presents the results of the analysis of variance of the freshman GPA and sophomore GPA of the students who were tutored or untutored freshmen during the 1972-73 academic year. Again, only students who persisted through their sophomore year are included in the analysis. The main effect of tutoring was not significant, $F\ (1,121) = 1.525$, $p > .05$. Similarly, the class level effect was not significant, $F\ (1,121) = .229$, $p > .05$. The interaction effect was statistically significant, however, $F\ (1,121) = 13.301$, $p < .01$. As with the first group, this interaction indicated that the grades of students who were tutored during their freshman year tended to increase between

the freshman and sophomore years in relation to the grades of untutored students. Figure 2 presents a diagrammatic representation of this interaction.

Table 6

Freshman and Sophomore GPA of Tutored and Untutored 1972-73 EOP Freshmen

Group	Freshman GPA	Sophomore GPA
Tutored	2.686	2.924
Untutored	2.803	2.636

Table 7

Analysis of Variance of Freshman and Sophomore GPA of Tutored and Untutored 1972-73 EOP Freshmen

Source	SS	df	MS	F
Tutored-Untutored	.427	1	.427	1.525
Subjects within Groups	33.823	121	.280	
Freshman-Sophomore	.061	1	.061	.229
Interaction	3.538	1	3.538	13.301*
Year x Subjects w. Groups	32.205	121	.266	

* $p < .01$

Figure 2

Freshman and Sophomore GPA of Tutored and Untutored 1972-73 EOP Freshmen

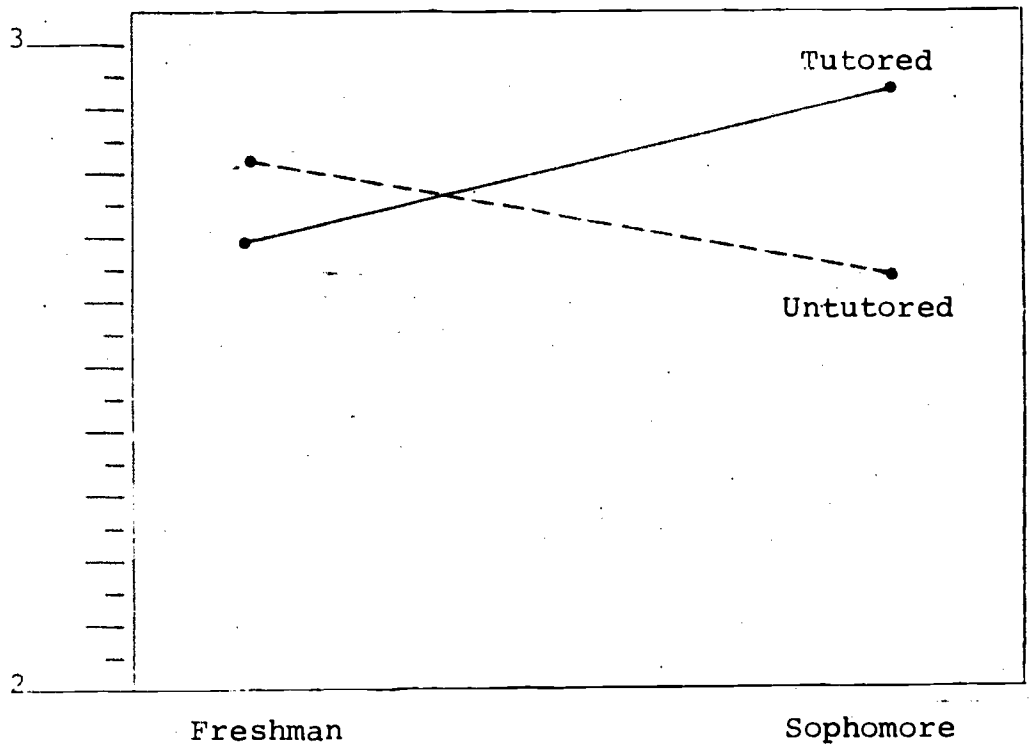

Table 8 is a mean summary table and table 9 presents the results of the analysis of variance of the freshman GPA and sophomore GPA of the students who were tutored or untutored freshman during the 1973-74 academic year. Only students who persisted through their sophomore year are included in the analysis. The main effect of tutoring was not statistically significant, $F\ (1,130) = .236$, $p > .05$, nor was the class level effect, $F\ (1,130) = .273$, $p > .05$. In addition, in this third replication, the interaction effect was not statistically significant, $F\ (1,130) = 1.647$, $p > .05$, although it was significant

for the two previous comparisons. Figure 3 presents a diagrammatic representation of this (non-significant) interaction.

Table 8

Freshman and Sophomore GPA of Tutored and Untutored 1973-74 EOP Freshmen

Group	Freshman GPA	Sophomore GPA
Tutored	2.725	2.834
Untutored	2.753	2.718

Table 9

Analysis of Variance of Freshman and Sophomore GPA of Tutored and Untutored 1973-74 EOP Freshmen

Source	SS	df	MS	F
Tutored-Untutored	.130	1	.130	.236
Subjects within Groups	71.777	130	.552	
Freshman-Sophomore	.065	1	.065	.273
Interaction	.392	1	.392	1.647
Year x Subjects w. Groups	31.412	130	.2380	

Figure 3

Freshman and Sophomore GPA of Tutored and Untutored 1973-74 EOP Freshmen

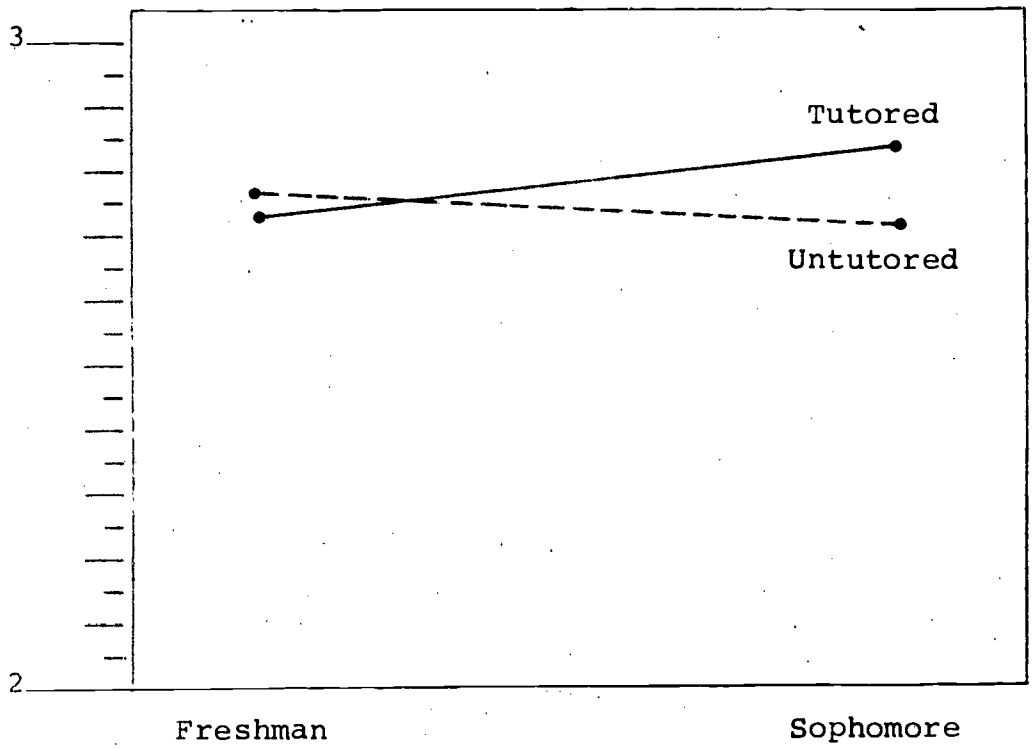

Table 10 presents the results of the tabulation of the sophomore year retention of the students who were tutored or untutored freshmen during the 1971-72, 1972-73, and 1973-74 academic years, respectively. Sixty-six of the 80 students who were tutored as freshmen during the 1971-72 academic year were retained in school at the end of their sophomore year, while 14 students left the University from this group. Forty-two of the 80 students who did not receive tutoring as freshmen during the 1971-72 academic year were retained as students

by the end of their sophomore year, while 38 students from this group left the University. A Chi-square analysis revealed that the tutored group had significantly higher retention during their sophomore year than the untutored group, Chi-square = 15.07, df = 1, $p < .01$.

Table 10

Sophomore Year Retention of EOP Students who were Tutored or Untutored as Freshmen

	1971-72 Freshmen		1972-73 Freshmen		1973-74 Freshmen	
Group	Number Retained	Number who Withdrew	Number Retained	Number who Withdrew	Number Retained	Number who Withdrew
Tutored during Freshman Year	66	14	67	18	73	12
Untutored during Freshman Year	42	38	56	29	59	26
	$\chi^2 = 15.07$, $p < .01$		$\chi^2 = 2.94$, $p > .05$		$\chi^2 = 4.97$, $p < .05$	

Sixty-seven of the 85 students who were tutored as freshmen during the 1972-73 academic year were retained in school through the end of their sophomore year, while 18 students from this group left the University. Fifty-six of the 85 students who were untutored as freshmen during the 1972-73 academic year were retained in school at the end of their sophomore year, while 29 students from this group left the University. A Chi-square analysis revealed that there was not a significant difference in retention between the two groups of students, Chi-square = 2.94, $p > .05$.

Seventy-three of the 85 students who were tutored as freshmen during the 1973-74 academic year were retained in school at the end of their sophomore year, while 12 students left the University from this group. Fifty-nine of the 85 students who did not receive tutoring as freshmen during the 1973-74 academic year were retained in school at the end of their sophomore year, while 26 students left the University from this group. A Chi-square analysis revealed that the tutored group had significantly higher retention during the sophomore year than the untutored group, Chi-square = 4.94, df = 1, $p < .05$.

Discussion

The results of this study support the immediate impact of the tutorial program on students' grade point average. In each of three replications, tutored EOP freshmen achieved significantly higher adjusted overall GPA's than the control group of untutored EOP freshmen. These differences are not only statistically significant, but are large enough to have educational significance as well.

The results of this study also support the notion that EOP students who are tutored as freshmen are likely to increase their grade point average as sophomores. This phenomenon presented itself in two of the three replications, indicating that tutored students tended to increase their GPA's (relative to untutored students) in their sophomore year. This underscores the fact that tutoring not only produced higher student achievement, but tutees retained their level of achievement more than

untutored students did, and actually increased their GPA's after tutoring had ceased. The implication seems to be that tutoring not only had immediate benefits, but long-term effects as well, perhaps due to the general learning skills that were acquired from the tutorial experience.

The significance of the long-term effect of tutoring on tutees is further substantiated by the results indicating that tutees had significantly less sophomore year attrition than untutored students in two of the three replications. Thus, not only do the former tutees' grades increase with respect to nontutees, but the former tutees exhibit less attrition as well.

The difference in retention between tutored and untutored groups of EOP freshmen in 1972-73 was not statistically significant. A possible explanation lies in the fact that the differences between the covariate averages (high school GPA and SAT scores) of the tutored group and untutored groups was largest during that year. A number of tutored students had very low scores on the covariates and attained low freshman GPA's. It is possible that some of these students were simply unable to compete effectively during their sophomore year without tutoring and withdrew. A very small number of such students could have made the difference between significance and non-significance if one hypothesizes that the treatment was effective for the higher ability students. The fact that the interaction of tutored versus untutored group and freshman versus sophomore GPA was significant is consistent with the notion that the

treatment was effective for students who persisted.

The interaction between tutored versus untutored groups and freshman versus sophomore GPA was not significant for 1973-74 EOP freshmen, although the tutored group had significantly higher sophomore year retention. A possible explanation lies in the fact that the 1973-74 EOP freshmen had higher covariate scores and freshman GPA. A reorganization of the EOP office in 1972 led to new recruitment practices for the fall quarter, 1973, which in turn led to more able EOP students. These higher achieving students may have been more easily integrable into the academic life of UCSD, diminishing the significance of the tutoring process on their academic integration. This might result in the observed nonsignificant interaction. However, Tinto (1975) has hypothesized that both academic and social integration are crucial factors in the retention of students. If the tutorial program facilitates the social integration of students, then the significant difference in retention could be explained in terms of tutoring's facilitation of social integration among tutees.

This study has dealt only with general effects (overall GPA and attrition) of a novel tutorial program on EOP students. More study will be required to isolate the effects of tutoring on specific curricular areas and on specific affective variables. It is likely that tutoring has more specific impact on some people based on their particular learning styles or on some curricular areas such as mathematics. This seems particularly

likely since the tutorial program described here was restricted to mathematics and science courses. More research is also needed to isolate the effects of factors within the tutorial program. Finally, further research will be required to clarify the effects of the interaction of student characteristics and tutorial program components.

Summary

The freshman grade point average (GPA) of Educational Opportunity Program (EOP) freshmen who received tutoring through the OASIS Provosts' Tutorial Fellowship Program and EOP freshmen who did not receive such tutoring were compared at the University of California, San Diego. A one-way analysis of covariance using high school GPA, Scholastic Aptitude Test (SAT) mathematics score, and SAT verbal score as covariates revealed significantly higher adjusted grades for the tutored group in each of three replications over a period of three years. These students were also tracked through their sophomore year and, in two of three replications, the students who were tutored as freshmen also had significantly lower sophomore year attrition than the students who were untutored as freshmen.

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