DOCUMENT RESUME

ED 329 166 HE 024 277

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TITLE Study Skills Differences among High-Risk College Freshmen.
PUB DATE Oct 90
NOTE 29p.; Paper presented at the Annual Meeting of the Mid-Western Educational Research Association (12th, Chicago, IL, October 17-20, 1990).
PUB TYPE Speeches/Conference Papers (150) -- Reports - Research/Technical (143)

EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS *Academic Achievement; Behavior Change; *College Freshmen; *College Preparation; Higher Education; *High Risk Students; Learning Strategies; Liberal Arts; *Study Skills

ABSTRACT

This study investigated three aspects of the study skills and academic performances of at-risk college freshmen. The following questions were examined: (1) Can groups of at-risk freshmen who have different levels of academic performance be identified through pre-existing differences in study skills? (2) Do significant changes in study skills, as measured by the Learning and Study Strategies Inventory (LASSI) Test, occur during the first semester of college for this population? and (3) Do changes in study skills have any impact on academic performance for this at-risk group? The study was conducted at a small liberal arts university with 20 female and 39 male college freshmen identified to be academically at-risk. Results of the study indicated that: (1) pre-existing differences in study skill scores as measured by the LASSI Test could not be used to identify groups of students who performed at different academic levels during the first year; (2) the subjects exhibited significant gains in some study skill areas during the first semester, including: anxiety management, concentration, information processing, self-testing, and use of study aids; and (3) gains in study skills had little impact on academic performance as measured by the first and second semester grade point averages. (25 references) (Author/JDD)

Study Skills Differences Among High-Risk College Freshmen

A Paper Presented at the 12th Annual Meeting of the
Mid-Western Educational Research Association,
Chicago, Illinois
October 17-20, 1990

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Abstract

This study investigated three aspects of the study skills and academic performances of at-risk college freshmen. First, the study investigated whether initial differences in study skills of at-risk freshmen could be used to identify groups of students who would have different levels of academic performance during their first year in college. Second, the study attempted to determine whether the study skills of the at-risk freshmen changed during the first semester. Third, the study examined whether the changes in study skills had an impact on the students' academic performances. The ten subscales of the Learning and Study Strategies Inventory (LASSI) were used to measure the students' use of learning and study strategies. The students' first and second semester grade point averages were used to measure academic performances. Th

e data were analyzed through cluster analysis, analysis of covariance, Hotelling's T^2 test, and univariate F tests.

Introduction

Recent evidence suggests the use of effective study skills is an important factor in determining success at the college and university level (Pollock & Wilkinson, 1988). Unfortunately, it seems a growing number of entering college students may not be proficient in the use of study skills, due to a lack of previous training. Because of this, academic achievement is likely to suffer, particularly for at-risk college freshmen. Thus, the challenge for college and university counseling centers is to develop and implement programs which improve academic performance (Kirschenbaum & Perri, 1982).

The focus on ways to improve academic performance is increasing due to recent changes in the types of students now attending colleges and universities. Traditionally, only students with sound academic histories were admitted to colleges, but this has changed. Since the 1970's there has been a growing trend towards open-admissions policies or at least, some softening of entrance requirement by many institutions of higher education. Because of this, an increasing number of academically underprepared students are now pursuing college degrees (Abrams &

Jernigan, 1984). These authors suggest colleges and universities admit academically at-risk students for a number of reasons including: furthering affirmative action goals, stabilizing enrollments, and providing opportunities for a college education that otherwise would not exist. Unfortunately, many students are unable to meet the academic demands and eventually withdraw from college. The resulting increase in attrition rates has led many colleges and universities to develop special programs which include study skill courses, aimed at helping this at-risk population.

Whyte (1985) in a survey of colleges and universities, confirmed the notion of a growing emphasis on developmental and support programs for academically underprepared students. She reported that 81% of the educational institutions surveyed, offered some type of developmental courses. It was also determined that about 75% of those institutions have learning centers and about 80% anticipate expanding such programs.

Traditionally, remediation at the college level had focused primarily on providing developmental courses in areas such as math and English. As the number of underprepared students increased, additional

programs, such as study skills courses were added. Study skills courses vary considerably across institutions and may cover a wide range of academic skills. This training may focus on such skills as time management, note-taking, memory improvement, test anxiety, and test-taking strategies.

Demitroff (1974) was one of the first researchers to suggest that at-risk students would benefit from both types of intervention (developmental courses and study skills training). He argued that there are at least two main factors that typically lead to academic dismissal for members of this group. First, many students simply do not possess the intellectual competence to meet the academic demands of college. In addition, and perhaps just as important, he states it is clear that for many others, academic dismissal is due primarily to a lack of study skills and habits required to meet the demands of college work. Pollock and Wilkinson (1988) agree that the importance of sound study skills should not be overlooked. They strongly suggest that study skills are probably the most important skills students require for success at the college level. They point out that students lack such skills primarily due to the lack of previous training.

Therefore, it is argued that remediation at the college level seems advantageous.

Simpson (1984) closely examined the study skill deficiencies of incoming at-risk college freshmen. She reports these students had a restricted range of study strategies; could rarely explain why a strategy was important to their learning processes; tended to use one study strategy for most learning task; and had little idea how to know if they were ready for a test. Simpson goes on to explain three main reasons why students lack these strategies. First, students have not been taught adequate strategies during high school. Second, students are often unable to self-regulate study strategies. Finally, even if they have knowledge of such strategies, they do not think to use them.

While there is general agreement as to the need for study skills training at the college level, there is little agreement as to what type of intervention is most effective. Many programs have been developed and implemented, with differing emphasis on content and training approach.

A review of the literature regarding the components of study skills training, reveals much diversity in technique and focus. Perhaps the most

well known overall training approach is the SQ3R (survey, question, read, recite, review) approach (Robinson, 1961). This methods was one of the earliest efforts to help students improve their study skills and became quite popular.

Since the introduction of the SQ3R method, many other strategies have been introduced. Slade (1986) reports on the success of a study skill training program which emphasizes organization skills. His program teaches students to divide tasks into parts, use time management schedules to help establish study routines, and strive to enhance decision-making skills. Simpson (1986) put forth a five step study skills approach called PORPE. This method involves having students predict potential essay questions, organize key ideas, rehearse these ideas, practice recall of these main points via self-writing tasks, and evaluate this performance by comparing the writing tasks to the original key ideas. Scott and Robbins (1985) concentrate on the role goal instability plays on academic success. They suggest study skills training should primarily focus on the goal stability. The role of memorization strategies and the use of study maps is advocated by another researcher (Aaronson,1985).

Anxiety management (Wilson & Rotter, 1986) and note-taking skills (Norton & Hartley, 1986) are also the main focus of training in some study skill programs. Even work ethic (Stephen, 1987) and underlining approaches (Blanchard, 1986) have been the primary focus of such training programs.

Outcome research examining the efficacy of study skill training at the university level, has generally been positive. Training programs have been found to improve student attitudes and actual behavior (Tarpey & Harris, 1979; Zimmerman, Goldstein, & Gadzella, 1977). Studies also suggest study skill training improves academic achievement (Zimmerman et.al., 1977; Kirkland & Hollandsworth, 1979; Kristine, 1985). Several studies point out that gains from study skills training vary and may be a function of the type of strategy used of the influence of outside factors (i. e. motivation, locus of control, help-seeking behavior, etc.) (Robyak & Downey, 1978; Kirschenbaum & Perri, 1982; Ames & Lau, 1987).

Pollock and Wilkinson (1988) in an extensive review of the study skills literature noted that most interventions tend to view all students as needing identical remediation. As a result, a variety of

approaches have been used with inconsistent results. These authors suggest this variability may be due to pre-existing differences in the study habits of students entering college. Because of these pre-existing differences, there may be differences in the needs to be met by a study skills program.

The idea of individual pre-existing differences in study strategies is also held by Weinstein et. al., (1987). In fact, these authors have developed a self-report instrument, the Learning and Study Strategies Inventory (LASSI), to measure a student's use of a number of specific learning and study strategies. Weinstein et. al., recommend this instrument be used to assess the specific study skill needs of students and direct individual remediation.

The purpose of the present study was to explore whether pre-existing differences in study skills (as measured by the LASSI) could be used to identify groups of at-risk freshmen who would have different levels of academic performance during their first year. The study also investigated whether changes in study skills occurred during the first semester of college for the at-risk freshmen. Finally, the study analyzed whether any changes in study skills had an impact on the

students' academic performances during the first year.

Method

Subjects

The study, which was conducted at a small liberal arts university, used a sample that consisted of 20 female and 39 male college freshman who were identified to be academically at-risk. Students were classified as at-risk on the basis of pre-admission criteria of a high school GPA of less than 2.3 and/or an ACT composite of less than 15. The average high school GPA for the group was 1.88; and the average ACT composite score was 15.7. As a condition of admission to the university, these students were required to enroll in a study skills program. This program was designed to address individual study skill needs using the LASSI as a diagnostic tool.

Data Collection

Four pieces of information were collected from university files for each student. This information included the following: (a) first semester grade point average, (b) second semester grade point average, (c) high school grade point average, (c) composite scores from the American College Test.

The students' first and second semester college grade point averages were used to measure their academic performances. The grade point averages served as the dependent variables in the analysis of covariance used in this study. The students' high school grade point averages and the ACT composite scores were used as covariates in the analysis of the students' academic performances.

Information concerning the students' study skills was obtained through the administration of the LASSI test. Since the LASSI test consists of ten subscales, each student had 10 scores that measured his/her study skills. The 10 scores attempted to measure the following study skill areas: (a) Attitude, (b) Motivation, (c) Time Management, (d) Anxiety, (e) Concentration, (f) Information Processing, (g) Selecting Main Ideas, (h) Use of Study Aids, (i) Self-Testing, and (j) Test Strategies.

The LASSI Test is a self-report measure containing 77 items. Administration time is approximately 15-20 minutes. Students are required to respond to each item on a 5 point scale ranging from "not typical of me," to "very typical of me."

The reported coefficient alpha and test-retest

reliability calculated for each of the 10 subscales ranged from .68 to .86 and .72 to .85, respectively. It should be noted that no validity estimates were provided.

The LASSI was administered to the subjects via a computer during the first two weeks of the Fall semester. After completion of a fourteen week study strategies course, the LASSI was readministered. Data concerning first semester and second semester GPA was secured through university records. See Table 1 for the descriptive statistics and symbols used to represent the variables.

Results

The data recorded for this study were analyzed through three procedures. First, a cluster analysis was used to determine whether pre-existing differences in the LASSI scores could be used to identify groups who performed at different academic levels. Second, a Hotelling's T^2 Test and univariate F test were used to determine if changes in the LASSI scores occurred. Third, Analyses of covariance of the academic performances were conducted to determine the impact of the changes in the LASSI scores. See Table 1. for a listing of the symbols used to represent the variables

used in the analyses.

Analysis of pre-existing study skill differences. The first question posed in this study investigated whether the students' 10 LASSI pretest scores could be used to identify groups of students who would tend to have lower academic performances during their first year in college than other groups. The method of investigation first involved subjecting the 10 LASSI scores to a cluster analysis to determine if specific groups of students could be identified. The clustering method used to cluster the students was Ward's method which employed the squared Euclidean distances as the distance measure. The cluster analysis produced three groups. Two groups included 16 students each and the third group was composed of 27 students.

The second step of the analysis of the groups involved the use of analysis of covariance to determine if the three groups differed on their first and second semester college grade point averages. The students' high school grade point average and ACT scores were used as covariates. The analysis of covariance results are included in Tables 2 and 3.

Table 1.

Means, Standard Deviations & Symbols for the variables used in this study.

Variable		Symbol	Mean	Std
Pretest	Attention	Pre1	32.59	4.58
Pretest	Motivation	Pre2	30.48	5.03
Pretest	Time Management	Pre3	25.76	5.47
Pretest	Anxiety	Pre4	23.34	5.90
Pretest	Concentration	Pre5	26.61	5.25
Pretest	Information Processing	Pre6	26.14	5.14
Pretest	Selecting Main Ideas	Pre7	17.85	3.41
Pretest	Study Aids	Pre8	25.12	3.76
Pretest	Self-testing	Pre9	26.10	4.68
Pretest	Test strategies	Pre10	28.25	4.83
Posttest	Attention	Post1	33.56	3.76
Posttest	Motivation	Post2	31.97	4.68
Posttest	Time Management	Post3	27.41	5.55
Posttest	Anxiety	Post4	26.03	6.53
Posttest	Concentration	Post5	28.68	5.20
Posttest	Information Processing	Post6	28.12	5.51
Posttest	Selecting Main Ideas	Post7	19.59	3.21
Posttest	Study Aids	Post8	27.39	5.14
Posttest	Self-testing	Post9	27.15	4.67
Posttest	Test strategies	Post10	29.80	4.52
High School Grade Point Average		HSGPA	1.88	.29
ACT Test Scores		ACT	15.70	3.71
Grade Point Average first term		GPA1	2.27	.70
Grade Point Average second term		GPA2	1.96	.83
Post1-Pre1		C1	.97	4.33
Post2-Pre2		C2	1.49	4.90
Post3-Pre3		C3	1.64	4.86
Post4-Pre4		C4	2.70	5.63
Post5-Pre5		C5	2.07	4.23
Post6-Pre6		C6	1.98	4.86
Post7-Pre7		C7	1.75	2.80
Post8-Pre8		C8	3.27	4.60
Post9-Pre9		C9	1.05	4.94
Post10-Pre10		C10	1.54	4.39

Table 2

Analysis of Covariance of First Semester GPA Values

Sources	SS	DF	MS	F	Sig of F
Groups	.768	2	.384	.761	.472
ACT	.001	1	.001	.002	.968
HSGPA	.595	1	.595	1.180	.282
Residual	27.231	54	.504		
Total	28.615	58	.493		

[a] The sum of squares value was partitioned by regression procedure.

Table 3

Analysis of Covariance of Second Semester GPA Values

Sources	SS	DF	MS	F	Sig of F
Groups	.480	2	.240	.349	.707
ACT	.031	1	.031	.045	.832
HSGPA	2.504	1	2.504	3.637	.062
Residual	37.181	54	.689		
Total	40.108	58	.692		

[a] The sum of squares value was partitioned by a regression procedure.

The groups identified by the cluster analysis of the 10 LASSI subtest scores did not explain a statistically significant amount of the variation in first semester GPA values adjusting for the influences of ACT composite scores and high school GPA values (see Table 2). Less than 2.7% of the variation in first semester GPA values was explained by group membership.

Similar results were found for the second semester GPA values. The amount of variation in the second semester GPA values explained by the groups was not statistically significant. Less than 1.3% of the variation in second semester GPA values was explained by group membership.

Analysis of Study Skill Changes. Ten difference scores were formed by subtracting the 10 pretest LASSI scores from the corresponding posttest LASSI scores. The means and standard deviation for the 10 difference scores are listed in Table 1. The Hotelling's T^2 statistic was used to test the null hypothesis that the population means do not differ from 0 (see Table 4). Based on the T^2 value, the null hypothesis was rejected.

The univariant tests were conducted on the 10 mean difference scores to gain insight into which means

differed from 0. To control for the inflation of the chance of type I errors, the significance level of .05 was adjusted for the number of dependent variables being tested as suggested by Burns (1984). Thus, the significance level of .05 was divided by 10, which was the number of dependent variables, to produce the significance level of .005.

Five of the 10 univariant tests were statistically significant. These five mean scores were the changes in anxiety, concentration, information processing, selecting main ideas , and study aids. These results are shown in Table 5.

Impact of Difference Scores on Academic Performance. The impact of the 10 mean difference scores on the students' first and second semester grade point averages were analyzed with the students' high school grade point averages and ACT composite scores used as covariates. The R^2 value and the F test values for the regression models used to determine the impact of the 10 mean difference scores on the students' first and second semester GPA values are listed in Tables 6 and 7.

The 10 mean differences scores increased the percent of variation explained in the first semester

GPA from 2.2%, which was explained by the students high school GPA values and ACT composite scores, to 21.5%. The .193 increase in the R^2 value, however, was not statistically significant at the .05 level. It should be noted that over 78% of the variation in first semester GPA values remained unexplained.

Similar results were obtained for the second semester GPA values. The 10 difference scores increased the amount of variation explained from 6.1%, which was obtained for the two covariates, to 20.7%. The .146 increase in the R^2 value was not statistically significant at the .05 level. Again, it should be noted that over 79% of the variation in second semester GPA values remained unexplained.

Table 4

Multivariate Test of Significance for the 10 LASSI Difference Scores

Test	Value	Approx. F	DF	Error DF	Prob.
Hotelling's	1.10658	5.42	10	49	.000

Table 5

Univariate F-Tests of Significance for the 10 LASSI Difference Scores

Variable	Hypoth. SS	Error SS	Hypoth. MS	Error MS	F	Prob.[a]
C1	55.07	1289.93	55.07	18.79	2.93	.092
C2	131.25	1390.75	131.25	23.98	5.47	.023
C3	159.47	1367.53	159.47	23.58	6.76	.012
C4	428.49	1836.51	428.49	31.66	13.53	.001
C5	252.27	1239.73	252.27	17.93	14.07	.000
C6	232.01	1368.98	232.01	23.60	9.83	.003
C7	179.81	455.19	179.81	7.84	22.91	.000
C8	631.34	1227.66	631.34	21.17	29.83	.000
C9	65.15	1412.85	65.15	24.36	2.67	.107
C10	140.36	1116.64	140.36	19.25	7.29	.009

[a] Using the Bonferroni method, the probability level required for statistical significance is (.05)/10=.005.

Table 6

Multiple Regression Analysis Used to Determine The Impact of The LASSI Difference Scores on The First Semester Grade Point Averages.

Full Model Value	R 2	Change in R^2	DF	F
GPA = a+b1c1+ b2c2+b3c3+b4c4+ b5c5+b6c6+b7c7+ b8c8+b9c9+b10c10+ b11ACT+b12HSGPA+e	.215	.193	10/46	1.13[a]
Restricted Model				
GPA= a+b11ACT+ b12HSGPA+e	.022			

[a] Not statistically significant at the .05 level.

Table 7

Multiple Regression Analysis Used to Determine The Impact of The LASSI Difference Scores on The Second Semester Grade Point Averages.

Full Model Value	R 2	Change in R^2	DF	F
GPA = a+b1c1+ b2c2+b3c3+b4c4+ b5c5+b6c6+b7c7+ b8c8+b9c9+b10c10+ b11ACT+b12HSGPA+e	.207	.146	10/46	.73[a]
Restricted Model				
GPA= a+b11ACT+ b12HSGPA+e	.061			

[a] Not statistically significant at the .05 level.

Discussion

The purpose of this study was to investigate three basic questions. The first question examined was: Can groups at-risk freshmen who have different levels of academic performance be identified through pre-existing differences in study skills? The second question of interest asked: Do significant changes in study skills, as measured by the LASSI Test, occur during the first semester of college for this population? The third question was: Do changes in study skills have any impact on academic performance for this at-risk group?

Looking at the first question, the results of this study indicated that pre-existing differences in study skill scores as measured by the LASSI Test, could not be used to identify groups of students who performed at different academic levels during the first year. This finding may in fact, be due to the genuine lack of a significant relationship between pre-existing study skills and academic performance in this particular homogenous group. A second possible explanation is that pre-existing differences in study skills are related to academic performance, but their effect has been negated by study skill remediation. That is,

different levels of academic performance may have been noted across the groups had the students not taken the study skills course. A third possible explanation involves the use of student grade point averages as measurement of academic performance. Since the students did not take the exact same courses or instructors, the influence of pre-existing study skill differences on academic performance may have been confounded. Additional studies with a more narrowly defined or more tightly controlled measure of academic performance would be informative.

With regards to the question dealing with study skill changes, the results indicate statistically significant changes in some study skill areas did occur during the first semester. Significant gains were demonstrated in the following five areas: anxiety, concentration, information processing, self-testing, and study aids. It is unclear at this time why these particular areas showed significant gains while the others did not. Perhaps these study skill areas are more amenable to change via remediation or experience.

The final area of investigation examined the impact of study skill changes on academic performance. It appears that despite significant changes in a number

of study skill areas, these gains had little impact on academic performance as measured by the first and second semester grade point averages.

While it is possible that the role study skills has been overemphasized in the previous research, we feel there are two other plausible explanations for the findings presented in this study.

First, the method of used to assess study skills may not have been valid. This study used the Learning and Study Strategies Inventory (LASSI). This self-report instrument was designed to accurately measure the student's use of learning and study strategies. While the manual describes reliability figures, no information is provided on the validity of the scores obtained for the instrument. The LASSI Test may not have provided valid scores of the students study skills and strategies.

The possible lack of validity may be related to response-bias on the part of the subjects involved. Since the LASSI is a self-report measure, it is plausible that posttest gains in study skill areas were artificially inflated. Despite instructions to the contrary, the students may have felt motivated to demonstrate gains in effective study strategies when in

fact, actual behavior had not changed. Reported behavior may have little to do with academic performance. Studies should be conducted on the LASSI Test to determine its validity.

The second possible explanation for the inability of the changes in LASSI scores to explain variations in academic performances, may again, be related to the use of GPA values to measure academic performance. The use of grade point averages may have introduced a number of noise factors (e.g. differences in courses, differences in instructors) that interfered with detection of the actual influences of the study skill changes on academic performance. An alternative method of assessing academic performance may be required.

In conclusion, this preliminary study of study skills and academic performance leaves more questions than answers. Further research is needed to further define the nature of study skill changes and what impact these skills have on academic performance. A more tightly controlled study using alternative measures of study skills and academic performance is strongly urged.

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