

# Experiential Learning Enters the Eighties, Volume 7, 1980

## DIFFERENTIAL PREDICTORS OF ACADEMIC PERFORMANCE FOR WHITE AND NON-WHITE SAMPLES

Gregory Moorhead, Arizona State University  
Daniel C. Brenenstuhl, Arizona State University  
Ralph Catalanello, Northern Illinois University

### ABSTRACT

This paper presents the results of a study of the academic performance of white and non-white students in an upper division management course. ACT, GPA, pretest scores, and final exam scores differed significantly for the two groups. In addition, there were different predictors of final exam scores and measured learning (final minus pretest) for the two groups.

### INTRODUCTION

There have been many studies of achievement test scores for entering college freshmen which have compared white and non-white students' preparation for college. Scores on the Scholastic Aptitude Test (SAT) have differed by as much as 200 points, with scores of white students being higher on the 200-800 point range test.[1] Scores of black students on the American College Test (ACT) have been shown to be significantly lower than the national average.[3] In addition, studies by McKelvin [2] and Munday [3] have shown that both the SAT and ACT have tended to have adequate validity in predicting grades in freshmen level courses.

These findings coincide with the traditionally held view that preparation for college is better for whites than non-whites. In grade level testing the U. S. Commission on Civil Rights [4] reported that more black students were more than two years behind the modal group than were white students. Thus, with poorer college preparation and lower test scores the freshman level performance for non-white students should be expected to be lower than that of white students.

However, there has been little study of the academic performance for white and non-white students in upper division courses. By the junior year most students are taking courses in their major area of study where they are expected to be more interested and more highly motivated. They may be beginning to interact and compete with other students who will also constitute their peer group upon graduation. Their first two years of general studies may serve to decrease the preparation differentials for the two groups. The possibly culturally biased nature of examinations, their wording and terminology, and environmental conditions over the two year period may serve to reduce the differences in performance in upper division courses.

These considerations led to the development of the following research questions:

1. Is there a difference in white and non-white student performance on the final exam of an upper division university course?
2. Is there a difference in measured learning (final exam minus pretest) for white and non-white students in an upper division university course?
3. What factors predict performance in an upper division university course for white and non-white students?

### RESEARCH METHOD

The sample consisted of 1504 college juniors and seniors

enrolled in a basic introductory management course at a midwestern university. Approximately 500 students were enrolled each semester for three consecutive semesters. During the first week of class the students completed a pretest examination. Two versions of a comprehensive objective question final examination were developed as one measure of cognitive learning. Students attending the 9:00 am lecture period answered version A as a pretest and took version B as their posttest at the conclusion of the course, while those in the second lecture period at 11:00 am took version B as their pretest and version A as their posttest. The difference between a student's pretest and posttest scores was used as a measure of cognitive learning. Three midterm examinations were also used as measures of learning in the course. These midterm exams were also objective type exams.

While responses to examination questions provide relatively objective measures of learning, the perception of the student as to what was learned is also an important aspect in the total learning process. If students experiencing an instructional methodology perceive greater opportunities to satisfy human needs through that methodology, then they should display a relatively higher motivation level with hypothesized increases in related student productivity, i.e. learning. At the conclusion of the course, measures of perceived learning and satisfaction were obtained from student responses to a course evaluation form using a seven point Likert scale with low numbers associated with positive responses and high numbers with negative responses. An additional measure of individual satisfaction or at least participation in the course was obtained from lecture and laboratory attendance records. Students were advised that attendance records were being maintained but no points would be subtracted or added for attendance.

### RESULTS

The data were first analyzed using t-tests and are reported in Table 1. Consistently, the scores are lower for non-whites than for whites. The only departure is for measured learning. There was no significant difference in measured learning (final exam minus pretest) for non-white and white students.

TABLE 1  
T-TEST DATA ON ACT SCORES, GPA, AND PRETEST SCORES

Variable	Mean		T Value	Probability (p<)
	White	Non-White		
ACT Scores	21.4	16.8	7.47	.001
GPA	2.7	2.3	4.60	.001
Pretest	32.0	29.8	2.49	.05
Final Exam	50.8	47.1	4.98	.001
Learning (Final minus pretest)	18.6	17.1	1.58	N.S.

The third research question was addressed by regressing, respectively, final exam scores and measured learning on nine possible predictors: pretest, GPA, ACT scores, expected grade (EXPGRADE), expected satisfaction (EXPSAT), laboratory absences (ABSLAB), lecture absences (ABSELECT), need for achievement (NEEDACH), and

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average high school grades (AVCRADS). Stepwise multiple regression techniques were used. Separate analyses were run for each group: whites and nonwhites. Results predicting final exam scores are shown in Table 2. The predictors of final exam scores differ for white and non-white students. The best predictors for white students are CPA, ACT, and pretest, while those for non-white students are ACT, need for achievement, and expected satisfaction. Note that CPA is far down the list. In addition, the variance explained is higher for the non-white prediction equation.

TABLE 2  
REGRESSION OF FINAL EXAM SCORES ON NINE  
PREDICTORS FOR WHITES AND NON-WHITES

(a) Whites					
Independent Variable	Regression Coefficient	Beta	Multiple R	R <sup>2</sup>	F
GPA	5.06	.429	.563	.317	55.39
ACT	0.33	.191	.599	.360	11.61
PRETEST	0.13	.099	.606	.367	3.65
EXPGRAD	-0.85	-.082	.608	.370	2.55
EXPSAT	-0.48	-.060	.611	.373	1.36
ABSLAB	-0.18	-.046	.612	.375	0.71
NEEDACH	-0.02	-.016	.612	.375	0.11
AVGRADS	-13.36	-.014	.612	.375	0.07
ABSLECT	-0.01	-.010	.613	.375	0.03
(CONSTANT)	28.00				
df = 9,298 F = 3.00; p < .001					

(b) Non-Whites					
Independent Variable	Regression Coefficient	Beta	Multiple R	R <sup>2</sup>	F
ACT	1.33	.943	.550	.302	7.12
NEEDACH	-0.62	-.520	.653	.426	4.98
EXPSAT	-4.38	-.551	.754	.568	3.98
PRETEST	-0.69	-.477	.798	.637	1.27
EXPGRAD	-2.97	-.217	.820	.673	0.86
ABSLECT	0.22	.084	.827	.684	0.09
GPA	2.25	.142	.831	.690	0.25
AVGRADS	103.24	.117	.833	.694	0.11
(CONSTANT)	66.98				
df = 8,16 F = 6.19; p < .001					

The results predicting measured learning are shown in Table 3. The best predictors of learning for white students are PRETEST, CPA, and ACT; while the best predictors of learning for non-white students are PRETEST, ACT, and need for achievement. Note once again that CPA is far down the list for non-white students. The predictive equation for non-white students explains more variance in learning than does the equation for white students.

TABLE 3  
REGRESSION OF MEASURED LEARNING ON NINE PREDICTORS  
FOR WHITES AND NON-WHITES

(a) Whites					
Independent Variable	Regression Coefficient	Beta	Multiple R	R <sup>2</sup>	F
PRETEST	-0.87	-.631	.439	.193	165.52
GPA	5.06	.404	.640	.410	55.39
ACT	0.33	.180	.661	.437	11.61
EXPGRAD	-0.86	.077	.663	.440	2.55
EXPSAT	-0.48	-.057	.665	.442	1.36
ABSLAB	-0.18	-.044	.666	.444	0.71
NEEDACH	-0.02	-.015	.667	.444	0.11
AVGRADS	-13.36	-.013	.667	.444	0.07
ABSLECT	-0.01	-.009	.667	.444	0.03
(CONSTANT)	28.00				
df 9,298 F = 3.00; p < .001					

(cont.)

Table 3 (continued)

(b) Non-Whites					
Independent Variable	Regression Coefficient	Beta	Multiple R	R <sup>2</sup>	F
PRETEST	-11.69	-1.090	.418	.175	7.61
ACT	1.33	.883	.677	.458	7.12
NEEDACH	-0.62	-.487	.758	.575	4.99
EXPSAT	-4.38	-.516	.826	.682	3.98
EXPGRAD	-2.97	-.203	.844	.713	0.87
ABSLECT	0.22	.079	.851	.723	0.09
GPA	2.25	.133	.853	.728	0.25
AVGRADS	103.24	.109	.856	.732	0.11
(CONSTANT)	66.98				
df 8,16 F = 6.19; p < .001					

The F values reported in the tables are partial F-ratios. As such, they represent the significance of the amount of variance contributed by a given predictor variable when all other variables were included in the model. In predicting final exam scores CPA, ACT, and pretest made significant contribution (p < .001) to explained variance for whites, while only ACT made significant contribution for non-whites. For learning, the most significant contribution was by pretest, GPA, and ACT for whites (however the amounts differ). For non-whites pretest and ACT made significant contribution.

## DISCUSSION

Several important findings emerged from this study. First, ACT scores, CPA, pretest scores and final exam scores all differed for white and non-white students, while measured learning did not differ. Preparation for and performance in this upper division course follow the expected trend. However, the non-white students evidently learned as much in an absolute sense in the course as did the white students even though they started with a lower base.

Second, ACT scores were predictive of both final exam scores and measured learning for both student groups. The predictive validity of ACT scores evidently continues to this upper division course.

Third, other than ACT, the predictors of final exam scores and learning differed for white and non-white student groups. The most notable difference is in the predictor GPA. For white students the current university GPA made a significant contribution to explained variance in both final exam scores and learning. However, GPA made no significant contribution to explained variance in either final exam scores or learning for the non-white students. For prediction of performance in upper division courses for white students, ACT and CPA provide valuable information. However, for non-white students the CPA may reflect performance in lower level courses which may be a carry over from previous poor preparation, and not indicative of their abilities to perform in upper division courses.

Preparation for entering upper division courses may be different for white and non-white students, as was indicated in this study. Final exam performance also differed, but measured learning did not. Assuming that the knowledge base is similar for students entering upper division courses may not be an appropriate assumption. Thus, coverage of course material may be different.

In selecting students for entrance into upper division courses, these findings indicate that ACT scores may be a good predictor, while university CPA in lower level

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courses may not be. This suggests additional difficulties for those making such entrance decisions.

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