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INTERACTIVE EFFECTS OF ACHIEVEMENT ORIENTATION AND TEACHING STYLE ON ACADEMIC ACHIEVEMENT

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Abstract

This study examines the hypothesis that the interaction between a student's achievement orientation and the teaching style to which he is exposed differentially affects both the amount of learning that takes place and the degree of expressed satisfaction with the scholastic environment. One hundred students, selected because of their extreme scores on the Achievement-via-Conformance and Achievement-via-Independence scales of the California Psychological Inventory, were assigned to introductory psychology sections taught in either a conforming or an independent manner. An analysis of their scores on a final examination consisting of multiple-choice items and essay questions, as well as their ratings of teacher effectiveness and course evaluation, indicated a clear interaction effect. Students taught in a manner consonant with their achievement orientation obtained significantly higher means on the multiple-choice items, on factual knowledge ratings of their essay answers, and on their ratings of teacher effectiveness and course evaluation, than their peers who were taught in a dissonant manner.

INTERACTIVE EFFECTS OF ACHIEVEMENT ORIENTATION AND TEACHING STYLE ON ACADEMIC ACHIEVEMENT[1]

George Domino[2]

The interaction between student characteristics and instructional method has for years been a plausible hypothesis in education. However, in their review of studies of aptitude treatment interaction, Cronbach and Snow (1969) found many methodological problems and little conclusive evidence supporting interaction effects. While maximizing academic achievement in college is an obvious goal of college educators, few studies have attempted to directly alter aspects of the college environment in order to use interaction effects to increase academic achievement. This study, an experimental extension of an earlier survey study, investigates the interacting effect of student achievement orientations and teaching style on both student accomplishment and satisfaction.

In an earlier study, Domino (1968) studied the academic performance of high- and low-scorers on the Achievement-via-Conformance (Ac) and Achievement-via-Independence (Ai) scales of the California Psychological Inventory (CPI) (Gough, 1957) to test the hypothesis that conforming and independent achievement orientations are differentially related to academic achievement. The results not only supported this notion but indicated that, for students high on one achievement dimension and low on the other, there was a distinct interaction between the student's achievement orientation and the demands of the college environment. Students high on Ac obtained higher grades in courses rewarding conforming behavior, whereas students high on Ai obtained higher grades in courses rewarding independence.

The present study is an experimental study of the hypothesis that there is an interaction between a student's achievement orientation and the teaching style he is exposed to which differentially affects both the amount of learning that takes place and the student's expressed satisfaction with his scholastic environment. Specifically, it is hypothesized that students high on Ac or Ai who are taught in a manner consonant with their achievement orientation will perform better academically and report greater satisfaction than their peers who are taught in a manner dissonant with their achievement orientation.

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Method

Sample

In September, 1968, members of the entering class (N= approximately 900) of a large university were administered the CPI as part of a freshman testing program. In September, 1969, from a frequency distribution of scores on the Ac and Ai scales, the top 50 high Ac-low Ai and the top 50 low Ac-high Ai students were identified, eliminating those with SAT scores below 550 or above 650. These 100 students were assigned to four introductory psychology sections with the same instructor in such a manner that each section contained 25 students with equal sex composition and comparable mean SAT scores, and homogeneous with respect to their Ac or Ai scores. Table 1 presents a demographic description of the four sections.

Table 1

Summary Statistics for Four Sections[a]

Variables	*Sections*			
	High Ai 1	**High Ai 2**	**High Ac 3**	**High Ac 4**
1. CPI Ac range	15-25	16-25	28-32	28-32
M	20.7	21.2	29.4	29.2
SD	2.9	2.2	1.6	1.5
2. CPI Ai range	22-26	21-26	12-19	14-19
M	23.7	23.5	17.4	17.3
SD	1.4	1.4	1.5	1.2
3. Sex composition	11 M	9 M	12 M	12 M
	13 F	12 F	13 F	11 F
total	24	21	25	23
4. SAT Verbal				
M	612.5	612.2	595.4	604.6
SD	32.2	26.8	26.2	32.5
5. SAT Math				
M	602.3	594.5	588.1	584.6
SD	35.8	26.5	34.6	32.7

[a]Twelve males and 13 females were assigned to each section. Withdrawals reduced the registration to the numbers shown under sex composition. All values are for the participating students.

Procedure

Neither the instructor nor the students were aware that class assignments had been made on other than routine scheduling by the registrar's office. The instructor, however, cooperated with the author in a study of the effectiveness of teaching styles by teaching sections 2 and 3 in a "conforming" manner, and sections 1 and 4 in an "independent" manner, using the criteria indicated by Domino (1968). Thus for one group of high Ai students and one group of high Ac students, instructional material was presented solely through lectures, great emphasis was placed upon factual knowledge, classroom attendance was required, and course content closely paralleled textbook assignments.

For the high Ai and high Ac sections taught in an independent manner, emphasis was placed upon ideas rather than facts and upon the active participation of students in the learning process. All four sections were assigned identical textbook readings and examinations, but for the independent sections the examinations served as a guide for the student rather than a grading device. Thus for groups 1 and 3 the teaching style was consonant with the achievement orientations of the students and for groups 2 and 4, dissonant.

Instruments

At the termination of the semester all students took a final examination consisting of 200 multiple-choice items tapping mostly factual content, as well as six essay questions which demanded both convergent and divergent thinking (Guilford, 1959). Both the multiple-choice items and the essay questions were formulated prior to the beginning of the course and independently of the course instructor.

Essay answers for each student were independently rated by three psychologists using two nine-point scales, one scale rating the amount of factual knowledge present and the other the degree of original thinking which was present. All judges rated all essay answers on both dimensions, with the order of ratings randomized for both dimensions.

Students evaluated both the course and the instructor using seven-point rating scales; although code numbers were used to provide anonymity and honest responses, it was possible to compare these ratings with other variables. Finally, each student's introductory psychology grade (assigned without reference to the final examination) and cumulative GPA for the first two years (not considering his introductory psychology grade) were available.

The data were submitted to both a correlational analysis and a two-factor analysis of variance.

Results

A preliminary consideration was the inter-rater reliability of the factual knowledge and original thinking ratings of essay answers. As can be seen in Table 2, the inter-rater reliability coefficients are in an acceptable range, although not exceptionally high.

Table 2

Inter-Rater Reliability Coefficients

Factual knowledge				*Original thinking*			
Rater	**B**	**C**	**Pooled**	**Rater**	**B**	**C**	**Pooled**
A	67	77	91	A	55	75	88
B		58	79	B		55	73
C			88	C			90

In subsequent analyses ratings were pooled using either the mode, if at least two judges agreed, or the median if no agreement occurred. Table 2 also indicates the correlations between each rater and the pooled values. These ratings were judged to be satisfactorily reliable for use in the analysis.

In order to examine other preliminary questions the 11 variables of concern in this study were correlated with the results given in Table 3.

One consideration was the independence of both the faculty knowledge-original thinking ratings and the teacher effectiveness-course evaluation ratings. Faculty knowledge and original thinking ratings did not correlate significantly with each other, as indicated in Table 3. Faculty knowledge ratings do correlate significantly with scores on the multiple-choice items, with introductory psychology grades, and with GPA; original thinking ratings also correlate significantly with introductory psychology grades, as well as with CPI Ai and Ac scores, and with students' ratings of teacher effectiveness. These correlations support both the independence of the factual knowledge and original thinking ratings, and their construct validity.

Student ratings of teacher effectiveness and course evaluation do correlate significantly with one another, but in a rather moderate manner. Ratings of teacher effectiveness correlate significantly with original thinking ratings and with introductory psychology grades. Ratings of course evaluation correlate significantly with scores on the multiple-choice items. In general, these results also support the construct validity of the two effectiveness rating scales.

The relevance of the multiple-choice items as an appropriate (though not necessarily complete) measure of achievement in introductory psychology was supported by their correlation with psychology grades and GPA.

Since selection limits were placed on SAT scores, and since SAT scores did not correlate significantly with other variables, an analysis of covariance was not deemed necessary. The seven dependent variables were therefore submitted to an analysis of variance with two factors, achievement orientation and teaching style, and the results are

Table 3

Correlations between Indicated Variables for All Students (n = 93)

	2	3	4	5	6	7	8	9	10	11
1. CPI Ac[a]	−83**	−12	−22	−02	−11	−60**	−21	−02	−30**	−15
2. CPI Ai[a]		12	22	02	11	60**	21	02	30**	15
3. SAT Verbal			22	−12	02	18	−11	−07	−06	01
4. SAT Math				−02	01	05	03	−19	01	05
5. Multiple choice					50**	21	21	25*	55**	38**
6. Factual knowledge						16	16	22	44**	25*
7. Original thinking							25*	10	24*	22
8. Teacher effectiveness								27**	39**	03
9. Course evaluation									18	14
10. Psychology grade										24*
11. GPA										

[a]Correlation coefficients among Ac, Ai scores, and other variables are biserial.

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

given in Table 4. It should be recalled that the primary interest is in the presence of interaction effects not main effects. If a consonant teaching style and achievement orientation produce greater achievement or satisfaction than dissonance, the interaction will be significant.

For the multiple-choice items, factual knowledge ratings, teacher effectiveness ratings, course evaluation ratings, and introductory psychology grades, there are significant interaction effects between achievement orientation and teaching style. For the original thinking ratings, teacher effectiveness ratings, introductory psychology grades, and GPA there are significant achievement orientation effects. No significant teaching style main effects were obtained.

Table 4

Summary Statistics and Analyses of Variance Results on Dependent Variables

Variable	*Group*[a]	*M*	*SD*	*Results of ANOVA*	
				Source of variation	**F**
1. Multiple choice	1	98.2	21.6	Achievement orientation	0.00
	2	89.6	25.1	Teaching style	1.08
	3	103.5	29.6	Interaction	6.50*
	4	84.7	23.7		
2. Factual knowledge ratings	1	6.7	1.7	Achievement orientation	0.75
	2	5.7	2.0	Teaching style	0.83
	3	6.7	1.7	Interaction	10.68**
	4	5.0	2.2		
3. Original thinking ratings	1	7.0	1.3	Achievement orientation	66.73**
	2	7.1	1.2	Teaching style	0.19
	3	4.2	1.5	Interaction	0.33
	4	4.6	2.1		
4. Teacher effect	1	6.8	0.5	Achievement orientation	7.66**
	2	6.3	1.1	Teaching style	2.31
	3	6.5	0.8	Interaction	14.42**
	4	5.5	1.1		
5. Course evaluation	1	6.7	0.6	Achievement orientation	0.54
	2	5.5	1.7	Teaching style	0.47
	3	6.3	1.2	Interaction	12.07**
	4	5.6	1.4		
6. Psychology grade	1	3.5	0.5	Achievement orientation	8.66**
	2	2.9	0.8	Teaching style	0.68
	3	3.1	0.8	Interaction	20.54**
	4	2.3	0.8		
7. GPA	1	2.8	0.5	Achievement orientation	6.31*
	2	2.7	0.5	Teaching style	0.24
	3	2.5	0.4	Interaction	0.02
	4	2.6	0.4		

[a]Group 1 = high Ai with independent teaching style;
Group 2 = high Ai with conforming teaching style;
Group 3 = high Ac with conforming teaching style;
Group 4 = high Ac with independent teaching style.

*$p < .05$

**$p < .01$

Discussion

The major concern of this study is the hypothesized interaction between student achievement orientation and teaching style. Though there is some artificiality in having the same instructor assume both teaching styles, this is a distinct advantage in that instructor effects are eliminated and the variance in student outcomes can be attributed specifically to the different instructional methods. Our results quite clearly indicate a definite interaction between student achievement orientation and teaching style on five variables. Thus, student achievement of factual knowledge (as measured by multiple-choice items, ratings of factual content in essays, or grades) as well as student satisfaction (with the teacher and the course) are greater when teaching style and student achievement orientation are consonant. If our educational aims should include both the imparting of factual knowledge and some degree of satisfaction on the part of students, then one method of achieving these aims is to match student achievement orientation with teaching style.

On the other hand, the results indicate that teaching style has no interacting effect on original thinking; to elicit original thinking from students one must begin with students whose achievement orientations are conducive to independent, original thinking. In other words, teaching conforming students by a conforming style did not produce original achievement in the way that teaching independent students in an independent style produced increased factual achievement.

The lack of any teaching style main effect indicates that neither the conforming nor independent teaching style is uniformly better in producing achievement for all students. However, the interaction effects are teaching effects in the sense that a teaching style appropriate to the students' orientations did produce achievement and satisfaction. This result supports the position that favors adapting teaching methods to the particular needs of the student and suggests that no one teaching method will be a panacea for teaching all types of students.

One important reservation on these results is that only students with extreme achievement orientations were used, approximately 11% of the student body. Thus, while the results are conclusive for this segment of the student body, the degree to which the interaction effects are important for the entire group has not been explored here.

Even for the students considered, the results of this research do not lead directly to a recommendation for educational practice as there are many considerations in such a recommendation in addition to those studied here. One may argue, for example, that homogeneous grouping of students on the basis of their achievement orientation is a desirable practice, since it maximizes both their learning of factual material and their reported satisfaction. Yet homogeneous grouping may deny both the independent and the conforming student any valuable insights into themselves or their approach to ideas that result from exposure to heterogeneity of achievement orientation. While it may be possible both to provide students with the type of educational setting that will most effectively utilize their potential and also expose them to diversity of achievement orientations, this is a question for future research. In any case, future explorations of ways to maximize learning should consider teacher-student interaction as well as the possibility of student-student interaction. In addition, the effect of teaching style on students with less extreme achievement orientations must be investigated. Such research promises to help colleges provide students with the type of educational setting that will most effectively utilize their potential for learning.

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