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ABSTRACT

In consecutive quarters, two studies were conducted at a two-year vocational/technical college to determine how different goal structures within the learning environment could influence student expectations, achievement, and perceptions of the causes of learning outcomes. The first study investigated three goal structures (i.e., cooperative, individualistic, and cooperative with group competition), while the second added a "homogeneous group" cooperative condition. Study subjects were students from sections of a general psychology course, who were given expectation measures and individual achievement tests. In the cooperative condition, students worked in small groups during their section meetings to help prepare for exams, which were taken on individual and group bases. In the group competition condition, students similarly worked in groups, with the highest-scoring groups receiving bonus points. In the individualistic condition, students worked individually in their sections and participated in whole class discussions. In the homogeneous group condition, students selected their own small work group, as opposed to having these groups teacher-assigned. Results from the two studies provided a mixed pattern of findings. While the first study provided support for the cooperative model in terms of improved expectations and achievement, poor student performance in the second study greatly diminished the benefits of cooperation. (LAL)

EXPECTATIONS, ATTRIBUTIONS, AND ACHIEVEMENT OF COLLEGE STUDENTS UNDER COOPERATIVE, GROUP COMPETITIVE, AND INDIVIDUALISTIC GOAL STRUCTURES

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The way that goals are structured within any learning environment is an important determinant of outcomes. It is clear that structuring goals competitively has very different consequences on interaction patterns, learning, and outcomes than would occur if goals were structured cooperatively or individualistically. Regardless of the environment that is studied (home, playground, work, school), there will be goals to be achieved and means to attain them. Therefore, the study of interaction patterns that occur in the pursuit of goals and whether those patterns facilitate or inhibit goal attainment comprises an important aspect of the study of learning environments.

The present study focuses on how different goal structures can influence interaction patterns as they are reflected in student self-reports of their expectations, outcomes, and perceptions of the causes of those outcomes (viz., attributions). The group studied was college students. The specific setting in which the study was conducted was introductory psychology classes at a two-year vocational/technical school which focuses on agricultural programs. As such, it provided a population which has had little exposure to cooperative goal structures insofar as (1) learning techniques in the rural communities feeding into this school were unlikely to have had resource persons available to promote "contemporary trends" such as cooperative learning and (2) cooperative techniques probably would not have been viewed as needed to cope with diversity within classes. In effect, we tapped in our study a population with its own unique characteristics. Before examining further particulars about the study, we provide a conceptual background and consider existing literature in the next section.

BACKGROUND

Recent work examining alternative goal structures has revealed that cooperative goal structures are most effective in enhancing learning (e.g., Johnson, Maruyama, Johnson, Nelson & Skon, 1981). This research and other studies quite clearly support the value of structuring classrooms cooperatively; positive effects have been found for all age groups as well as within and outside traditional educational settings. These effects, however, do not imply that all interactions should be structured cooperatively or that cooperation will be best in all circumstances and settings. Rather, they suggest that cooperation can be a powerful means of improving learning at all levels. When taken in conjunction with other work revealing social benefits of cooperative goal structures (e.g., Johnson, Johnson & Maruyama, 1983), cooperation seems to be a particularly important teaching strategy.

The theory underlying use of cooperation was spelled out by Deutsch (1949), who defined a cooperative situation as one in which the goals of individuals or groups in a situation are promotively interdependent, (i.e., there is a positive relationship between goal attainments). With competition, on the other hand, goals are contriently interdependent and goal attainments are negatively related. Finally, in individualistic situations, individuals' goals are unrelated and their goal attainments are independent of one another.

Although the effectiveness of cooperation has been established widely, the mechanisms through which cooperation functions and the consequences it produces are less well understood. For example, if one learns better in a cooperative situation, the improved learning could result from improved cognitive structuring of information, from higher motivation levels, from changed self-perception and/or self-expectations, from increased time spent on task, or from other factors. Clearly, understanding of how and why cooperation is effective is far from complete.

STUDY 1: THREE GOAL STRUCTURES

The first study described in this chapter involved investigation of the effects of three goal structures (cooperative, individualistic, and cooperative with group competition) on college student expectations and achievement. The comparison of cooperative strategies that involve competition between or among the cooperating groups with cooperative strategies lacking group competition could prove interesting because, even though both strategies have been shown to be effective, there has been relatively little work involving direct comparison of the two.

Among the dependent variables, the expectation measures were viewed as particularly interesting since one way in which cooperation might be effective is by increasing student expectations, which in turn could have an impact on future performance. Individual expectations and test scores were examined over the duration of a 10-week introductory psychology course. If cooperative interdependence acts to increase expectations and enhance confidence, over time both expectations and outcomes of students in cooperative classes should improve compared to individualistic classes.

With respect to specifics related to the learning environment, the current study involved exa ination of perceptions and outcomes of a non-traditional college-aged group of students who had had little exposure to cooperative goal structures. Any cooperation experienced by students prior to the study typically did not involve carefully structured cooperative learning experiences but, instead, consisted of simply working in groups. Therefore, those students in the cooperative goal structure conditions probably were deficient with respect to skills needed to work effectively in groups.

Subjects

Subjects were 42 students from three sections of a general psychology course at a small two-year college in the midwest of the USA. (Initially there were 45 students enrolled in the class, but the three students who did not complete the class were omitted from the analyses.) Nine were in the cooperative condition, 18 in the individualistic condition, and 15 in the cooperation plus group competition condition. Students shared a common lecture and the same instructor. Expectation measures and individual achievement tests were given in the lecture. Since assignment to conditions was not random, pretests were given at the first class meeting to get information about initial expectation and substantive background. For those instances in which there were pretest differences between conditions, analyses of covariance (ANCOVA) are reported along with other analyses. The course used criterion-referenced grading and students were allowed to contract individually for the grade that they would attempt to achieve. As well as the pretest, there were three examinations plus a final examination, so data were collected at five points in time.

In the cooperative condition, students worked in small cooperative groups during their section meetings to help prepare for examinations. In lectures, after turning in their individual examinations, students met in cooperative groups to review and complete a group product for the same test. If any group missed two or fewer questions, all members of that group would receive four bonus points that were added to each individual's total examination score; for missing three or four questions, two bonus points were awarded. (In the cooperative condition, actually achieving bonus points varied by tests; on two tests, no bonus points were given, while on others most groups got bonus points.) In the group competition condition, students similarly worked in groups in sections and after completing individual examinations, but only the groups scoring highest and second highest got any bonus points. In the individualistic condition, students worked individually in their section and participated in whole-class discussions led by the teacher. Bonus points were available based upon outside work which the students could do and students were given class time after each test to review that test on their own.

Expectation measures, which were administered before each test are included items specific to individual tests as well as about the class as a whole, consisted of the following questions:

How well do you expect to do in this class?
How well do you expect to do on this test?
How likely is it that you will do well in this class?
How likely is it that you will do well on this test?
What grade do you expect to receive on this test?

The first four items were scored on a seven-point Likert scale ranging from "not at all" (1) to "extremely" (7). It is noteworthy that the "how likely" questions seem to tap confidence about expectations, thereby moving away from "wishing" responses. As suggested earlier, actual test performance, grade contracted for, and grade received were also recorded.

Results and Discussion

As can be seen from Table 1, there were only small differences between conditions on the grades students contracted for, expected, or actually received. Thus, it appears that neither the bonus points nor the cooperative conditions had much of an impact on final grades. (Note, however, that grades were slightly higher in the cooperative conditions.) Table 2 displays the results for the two course expectation questions. For neither question was there pretest differences between conditions, so pretests were not used as covariates. For the "expect to do well" question, there were significant differences on test 4, plus a pattern of increasing differences between the cooperative and individualistic conditions that was consistent with prior research. More notably, the "likely will do well" question, with two significant findings and two others approaching significance, showed a similar and stronger pattern. Gaps between cooperative and individualistic conditions appear to increase over time. Although not reported, the two sets of test expectation items having to do with particular test expectations showed a pattern similar to the course expectation questions.

Finally, Table 3 displays actual test-by-test performance for the different conditions plus expected test scores for each test. Because there were pretest differences between conditions, ANCOVAs as well as ANOVAs are reported. Further, because the pattern of differences for the "expected score" data tends to parallel pretest differences, ANCOVAs are presented for those findings as well. Although there is variability in findings, they do support the value of cooperation because, in all tests except the first one, there were differences favoring the cooperative groups. In addition, students in the cooperative conditions consistently expected to get higher scores than students in the individualistic condition, even after controlling pretest differences. Notably, even though students scored less well than they expected to score, they seemed not to lower appreciably their future expected score or the grade (Table 1) they expected.

In summary, the findings provide evidence that cooperative learning can raise students expectations on a number of measures. A particularly interesting finding is the stronger effects for a measure such as "how likely is it that you will do well" than for "how well will you do." The former measure could minimize wishful thinking. The results also provide further evidence for the value of cooperative learning on achievement. Although these data are interesting, nonetheless, they warrant causal explanations for performance. Such a focus is provided in Study 2, which replicates Study 1 and adds information about causal explanation.

STUDY 2: FOUR GOAL STRUCTURES

In the quarter following Study 1, students from sections of a general psychology class were divided into four treatment conditions: individualistic, cooperative with instructor assigned heterogeneous groups which experienced group competition, cooperative with instructor assigned heterogeneous groups, and cooperative with self-selected groups (viz., homogeneous). This study replicates Study 1, thereby helping in the assessment of whether the findings could be class specific, and also extends it by adding a "homogeneous group" cooperative condition. In addition, student attribution measures were added to complement the expectation measures. The attribution measures were viewed as important since they assess how students perceive the causes of their successes and failures as well as what they perceive to be important in affecting future outcomes. Although students generally have been found to explain their outcomes in terms of the internal factors of ability and effort (e.g., Arkin & Maruyama, 1979), there is less certainty about how various types of cooperative goal structures affect student attributions. Study 2, then, provided a replication of Study 1 and also extended it by increasing both the number of treatment conditions and the array of dependent measures.

Subjects

Subjects were 78 students enrolled in four sections of a general psychology course at a small two-year college in the midwest of the USA. Eighteen students were in the individualistic condition, 18 in the self-selected or homogeneous cooperative condition, 19 in the instructor assigned heterogenous cooperative condition, and 19 in the instructor assigned heterogenous cooperative condition with group competition. As was true for Study 1, students shared a common lecture and the same instructor. Except for the fact that there were three examinations rather than four, data collection techniques paralled those of Study 1. Procedures for group review and group bonus points were identical to those used in Study 1.

The expectation and test performance measures were the same as those used in Study 1. In addition, prior to and after each examination, students were asked about the importance of the attribution categories of ability, effort, task, and luck in shaping their outcomes. The response format used consisted of seven-point scales ranging from "not at all" to "a great deal."

Results and Discussion

Findings for the class and test expectation measures in the second study (see Table 4) generally paralleled those of Study 1. Although by the final examination there were significant differences between conditions, the pattern of those differences reflect marginally significant differences between conditions prior to the study. Therefore, even though they favor the cooperative conditions, any conclusions about the effects of cooperation are at best tenuous.

Table 5 presents the results of the same two course expectation questions that were used in Study 1. As is apparent, however, the predominant pattern in all conditions is one of lowering expectations. Such a drop in expectations, to the extent that it reflects poor test performance, could suppress typical benefits of cooperative strategies. In fact, the lower expectations in this study accurately reflect students' poor performance (see Table 6). Since outcomes tended to be unfavorable, positive feelings about the group were probably minimized. Only on Test 1 did students in the cooperative conditions perform better. Further, given the fact that bonus points were contingent upon a high level of performance that was not attained in Study 2, those points were generally unavailable. Reflecting the poor performance and lack of gains from cooperation, the expected test scores did not differ between conditions. Finally, Table 7 provides findings for the attribution data. Perhaps not surprisingly, given the achievement data, few differences in attributions between conditions emerged.

DISCUSSION

Studies 1 and 2 provide a mixed pattern of findings. Study 1 furnishes interesting findings which need replication, which Study 2 does not provide. From another perspective, however, Study 2 is interesting in its own right; the poor student performance greatly diminished benefits of cooperation. One might conjecture about the conclusion that could be drawn if the two studies had occurred in reverse order; it would not be unreasonable to conclude that the "deficiencies" of the first study, which reflected poor student performance, were remedied in the second study in which results more consistent with past work were found.

In effect, then, the results of these two studies perhaps help put the goal structuring literature in perspective; the effectiveness of powerful interventions in any particular learning environment seem to depend upon practical issues as well as conceptual ones. The present studies of the effectiveness of cooperative learning conditions involved a group of college-aged subjects with little prior experience in cooperative learning. Perhaps more attention should have been paid to the naivety of the sample. The implementation of the treatments did not involve as much training of students in effective use of cooperation as it might have. Even more importantly, the instructor was not told that the level of success attained by the students was important or to be sure that students did relatively well on tests. Thus, it seems highly likely that the effectiveness of the treatments of the two studies depended upon the practical factor of how successful students actually were. Perhaps ironically, this work illustrates the importance of attending to the interplay of theory and practical application when studying learning environments. Said differently, outcomes in actual learning environments can be influenced markedly by manipulating critical variables. Nonetheless, effects of critical variables also can be negligible if necessary conditions are not met. Gaining a fuller understanding of the complexity of learning environments can only be attained when approaches involve both sampling from the broad array of conceptually important variables and attending to practical issues that modify the impact of those variables.

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TABLE 1

Grade Expected Throughout Course, Grade Contracted for, and Grade Received Under Three Goal Structures

Goal Structure	Grade							
	Pre-class Expected	Contracted for	Pre-first Test Expected	Pre-second Test Expected	Pre-third Test Expected	Pre-fourth Test Expected	Pre-final Expected	Final Grade
Cooperative	3.1	3.1	3.2	3.0	2.9	2.9	2.9	2.9
Individualistic	3.1	3.2	3.4	3.1	3.2	3.0	2.9	2.7
Cooperative with Group Competition	3.4	3.5	3.3	3.3	3.3	3.2	3.3	2.9
F(2,39)	2.15	1.65	0.28	0.82	1.18	0.62	1.18	0.81

Grades were coded as A = 4, B = 3, C = 2, N = 0.

TABLE 2

Class Expectations of Doing Well and Confidence About Doing Well Under Three Goal Structures

Goal Structure	Mean Score				
	Pre-first Test	Pre-second Test	Pre-third Test	Pre-fourth Test	Pre-Final
Expect to do well					
Cooperative	5.1	4.9	4.8	5.1	5.0
Individualistic	4.9	4.7	4.6	4.3	4.3
Cooperative with Group Competition	5.3	5.2	5.0	5.5	4.9
F(2,39)	1.58	1.50[1]	1.58	9.48**	2.10
Likely to do well					
Cooperative	5.2	5.2	4.8	5.1	4.9
Individualistic	4.7	4.4	4.1	4.1	4.2
Cooperative with Group Competition	5.0	4.9	4.8	5.3	4.8
F(2,39)	2.06	5.64**	2.76	7.73**	2.38

Scores ranged from 1 to 7 (most favorable). On these measures, there were no pretest differences.

[1]For this analysis, one subject from the individualistic condition failed to answer the question, yielding an F with 2,38 degree of freedom.

TABLE 3

Test by Test Performance and Expected Performance
Under Three Goal Structures

Goal Structure	Mean Score					
	Pretest	Test 1	Test 2	Test 3	Test 4	Final
Actual Test Performance						
Cooperative	22.2	13.4	17.1	18.8	22.0	39.8
Individualistic	20.5	13.3	13.8	14.5	19.5	33.6
Cooperative with Group Competition	24.4	14.6	16.7	18.6	22.3	39.3
F(2,39)	3.66*	0.69	6.33**	5.61**	2.67	7.57*
Covarying Pretest Score, F(2,38)	---	0.12	4.26*	3.09 (p<0.06)	0.95	4.74*
Expected Test Performance						
Cooperative	36.8	16.6 (20.7)	19.6	19.2	24.1 (20.1)	39.9
Individualistic	31.6	13.7 (17.1)	17.1	16.2	19.6 (16.3)	33.8
Cooperative with Group Competition	34.7	15.2 (19.0)	18.5	17.7	23.6 (19.7)	36.1
F(2,39)	1.61	5.87**	4.91*	5.25**	8.04**	1.98
Covarying Pretest Expectations F(2,38)	---	4.86*	5.89*	4.78*	7.24**	2.50

* P<0.05
** p<0.01

The maximum possible score was 50, 20, 25, 25, and 30, respectively, for pretest, Test 1, Test 2, Test 3, Test 4, and Final Test.

[1]For Test 1 (25 to 20) and 4 (25 to 30), expectation scores were transformed to the actual test score range. Numbers in parentheses are scores based upon 25 items and therefore are directly comparable to Tests 2 and 3.

TABLE 4

Grade Expected Throughout Course, Grade Contracted for, and Grade Received Under Four Goal Structures

Goal Structure	Grade						
	Pre-class Expected	Contracted for	Pre-first Test Expected	Pre-second Test Expected	Pre-third Test Expected	Pre-fourth Test Expected	Final Grade
Cooperative (Homogeneous)	3.4	3.4	3.4	2.9	3.1	2.9	2.4
Individualistic	2.9	3.0	2.8	2.8	2.4	2.2	1.6
Cooperative with Group Competition	3.0	3.0	2.9	2.5	2.7	2.6	1.8
Cooperative (Heterogeneous)	3.2	2.8	2.8	2.7	2.6	2.5	1.8
F(3,66)	2.33*	1.69	2.55*	0.98	2.10	3.59**	

Grades were coded as A = 4, B = 3, C = 2, N = 0.

* $p<0.10$
** $p<0.05$

TABLE 5

Class Expectations of Doing Well and Confidence About Doing Well Under Four Goal Structures

Goal Structure	Mean Score				
	Pre-pre-Test	Pre-first Test	Pre-second Test	Pre-third Test	Pre-fourth Test
Expect to do well					
Cooperative (Homogeneous)	5.4	5.0	4.4	4.1	4.2
Individualistic	4.6	4.3	4.2	3.7	3.6
Cooperative with Group Competition	5.1	4.5	4.5	4.2	4.2
Cooperative (Heterogeneous)	5.2	4.6	4.2	4.1	3.9
F(3,66)	4.11***	1.98	0.68	0.67	2.66*
Likely to do well					
Cooperative (Homogeneous)	5.2	4.9	3.9	4.1	3.6
Individualistic	4.2	4.1	4.0	3.5	3.2
Cooperative with Group Competition	5.0	4.3	4.3	4.0	3.9
Cooperative (Heterogeneous)	4.9	4.3	4.2	4.2	3.8
F(3,66)	3.81**	2.00	0.41	1.48	2.00

*** p<0.01
** p<0.05
* p<0.10

TABLE 6

Test by Test Performance and Expected Performance Under Four Goal Structures

Goal Structure	Mean Score				
	Pretest	Test 1	Test 2	Test 3	Test 4
Actual Test Performance					
Cooperative (Homogeneous)	21.3	25.2	23.5	25.4	35.0
Individualistic	20.4	19.7	21.1	21.8	32.9
Cooperative with Group Competition	23.6	21.6	22.2	22.3	30.4
Cooperative (Heterogeneous)	21.6	24.0	23.7	23.5	29.8
F(3,67)	1.24	4.15**	0.79	1.46	1.69
Expected Test Performance					
Cooperative (Homogeneous)	37.8	32.1	26.3	26.9	35.3
Individualistic	35.1	27.8	25.2	25.6	33.5
Cooperative with Group Competition	39.6	31.4	27.7	27.2	40.7
Cooperative (Heterogeneous)	36.9	28.7	26.9	26.6	37.2
F(3,66)	0.68	1.51	0.99	0.12	2.54*

* $p<0.05$
** $p<0.01$

The maximum possible score was 60, 40, 40, 40, and 60, respectively, for the Pretest, Test 1, Test 2, Test 3, and Test 4.

TABLE 7

Pretest and Posttest Attribution Throughout Course

Goal Structure	Mean Score						
	Test 1		Test 2		Test 3		Test 4
	Pre	Post	Pre	Post	Pre	Post	Pre
Ability							
Cooperative (Homogeneous)	4.5	4.1	4.2	3.8	4.5	4.4	4.4
Individualistic	4.1	3.8	4.1	3.9	3.9	3.7	3.9
Cooperative with Group Competition	4.4	4.0	4.4	4.3	4.3	4.1	4.5
Cooperative (Heterogeneous)	4.3	3.7	3.8	3.4	3.9	3.8	3.9
F(3,66)	0.67	0.36	1.32	2.30*	1.21	1.58	1.95
Effort							
Cooperative (Homogeneous)	5.2	4.9	4.6	4.7	4.8	4.8	4.9
Individualistic	4.4	4.2	4.1	4.5	4.4	4.0	4.3
Cooperative with Group Competition	4.8	4.7	4.5	4.5	4.5	4.3	4.6
Cooperative (Heterogeneous)	4.6	4.1	3.8	4.1	3.9	3.9	4.1
F(3,67)	2.46*	2.90**	1.76	0.97	1.77	1.84	1.61

(continued)

Task							
Cooperative (Homogeneous)	4.3	3.6	3.9	3.7	4.1	4.4	4.0
Individualistic	4.0	4.2	4.0	3.7	4.5	3.9	3.6
Cooperative with Group Competition	4.7	4.7	4.5	4.6	4.7	4.5	4.9
Cooperative (Heterogeneous)	4.3	4.0	4.2	4.0	4.0	4.2	4.4
F(3,66)	2.02	2.44*	0.73	1.75	1.56	0.53	1.85
Luck							
Cooperative (Homogeneous)	4.0	2.6	4.1	3.5	4.1	3.6	3.9
Individualistic	4.5	3.3	4.2	4.1	4.7	3.7	4.0
Cooperative with Group Competition	4.4	3.4	4.4	3.8	4.2	3.9	4.2
Cooperative (Heterogeneous)	4.7	3.4	4.3	3.6	3.7	3.2	3.9
F(3,66)	0.80	1.41	0.24	0.54	1.07	0.82	0.58

* $p<0.10$
** $p<0.05$