Cooperative Learning and Student Achievement

Remarkable claims are made about cooperative learning, many of them true, but the research tells us that to produce achievement gains, these methods must include both a group goal and individual accountability.

In recent years, cooperative learning has been proposed as a solution to a staggering array of problems. Cooperative learning methods have been offered as an alternative to ability grouping, special programs for the gifted, Chapter 1 pull-outs, and special education. They have been suggested as a means of introducing higher-level skills into the curriculum, of ensuring students an adequate level of basic skills, of mainstreaming academically handicapped students, and of giving students the collaborative skills necessary in an increasingly interdependent society. Further, cooperative learning methods have been proposed as a major component of bilingual and ESL programs and as a way to improve relationships among students of different racial or ethnic backgrounds.

There is evidence that cooperative learning can in fact, under certain circumstances, accomplish many of these goals. However, I am becoming increasingly concerned about a widespread belief that *all* forms of cooperative learning are instructionally effective. This is emphatically not the case.

Two Essential Conditions

Two conditions are essential if the achievement effects of cooperative learning are to be realized. First, the cooperating groups must have a *group goal* that is important to them. For example, groups may be working to earn certificates or other recognition, to receive a few minutes extra of recess, or to earn bonus points on their grades (although I am philosophically opposed to having grades largely determined by team performance). Second, the success of the group must depend on the individual learning of all group members. That is, there must be *individual accountability* as well as group accountability. For example, groups might be rewarded based on the average of their members' individual quiz scores.

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We can only hypothesize reasons that group goals and individual accountability are essential to the achievement effects of cooperative learning. Some plausible explanations are that group goals are necessary to motivate students to help one another learn; they give students a stake in one another's success. Without group goals, students are not likely to engage in the elaborate explanations that have been found to be essential to the achievement effects of cooperative learning (Webb 1985). Further, group goals may help students overcome their reluctance to ask for help or provide help to one another; that is, without an overriding group goal, they may be embarrassed to ask for

or offer help. In addition, without individual accountability, one or two group members may do all the work; group members perceived to be low achievers may be ignored if they contribute ideas or ask for help.

Achievement Effects of Various Methods

Figure 1 presents data from a recent review of the cooperative learning literature (Slavin 1988). In the studies from which the figure was derived, cooperative learning groups were compared to randomly selected or matched control groups on fair measures of the objectives pursued equally by both groups. Study durations were at least four weeks, with a median length of 10 weeks.

Figure 1 shows that the success of cooperative learning in increasing student achievement depends substantially on the provision of group goals and individual accountability. Methods that incorporate group goals and individual accountability include Student Teams-Achievement Divisions (Slavin 1986), Teams-Games-Tournament (DeVries and Slavin 1978), Cooperative Integrated Reading and Composition (Stevens et al. 1987), and Team Assisted Individualization–Mathematics (Slavin et al. 1984).

In contrast to the relatively positive effects of methods that use both group goals and individual accountability, those that use group goals but not individual accountability have been ineffective in increasing student achievement. For example, in Johnson and Johnson's (1987) Learning Together methods, students work together to complete a single worksheet and are praised, rewarded, and/or graded on the basis of this common worksheet. On fair measures of achievement these methods have produced no better achievement than individualistic or traditional methods (e.g., Johnson et al. 1978). Two studies did find positive achievement effects for a form of this approach in which students were graded not on the basis of one worksheet, but on the average of individual quiz scores, which ensures individual accountability (Humphreys et al. 1982, Yager et al. 1986). However, it is important to note that these studies are highly artificial experiments in which teachers did not present lessons to students. Rather, teachers only helped individuals with worksheets, so that in the "individualistic" control groups students had no resources other than the worksheets to help them understand the material.

	Median Effect Size	No. of Studies
Group Goals and Individual Accountability	+.30	32
Group Goals Only	+.04	8
Individual Accountability Only (Task Specialization)	+.12	9
No Group Goals or Individual Accountability	+.05	2

Note: Effect sizes are the difference between cooperative learning and control classes on achievement measures divided by the post-test standard deviation. Only methodologically adequate studies of at least four weeks' duration are included.

Fig. 1. Achievement Effects of Alternative Forms of Cooperative Learning

Another major category of cooperative learning methods uses task specialization, which means that each student has a unique task within an overall group objective. For example, Jigsaw Teaching (Aronson et al. 1978) assigns each student a topic on which he or she is to become an "expert." This method has not generally been instructionally effective. A much more effective form of cooperative learning that uses task specialization is Group Investigation (Sharan and Shachar in press), in which students take on subtasks within an overall group task. In contrast to Jigsaw, Group Investigation bases individuals' evaluations on the group's product or report, so this method may in actuality be an instance of group goals and individual accountability.

Finally, studies of methods that provide neither group goals nor individual accountability find few achievement benefits for this approach. One example is the Groups of Four mathematics program in which students work together to solve complex math problems (Burns 1981).

Comparing the achievement effects of the various cooperative learning methods, we see that those incorporating both group goals and individual accountability are considerably more effective than other methods (see, for example, the following reviews of the literature: Slavin 1983a, b; Davidson 1985; Newmann and Thompson 1987). The misconception that all forms of cooperative learning are equally effective can perhaps be attributed to a meta-analysis by Johnson and colleagues (1981) that claimed that 122 studies supported the effectiveness of cooperative learning in all its forms. However, this meta-analysis was not restricted to *school* achievement; it included playing golf, card playing, swimming, block stacking, solving mazes, and other performance outcomes. Most of these were laboratory studies of a few hours' duration, and most allowed the groups to work together on the task that constituted the outcome measure while the "individualistic" students had to work alone. Obviously, individuals will score better when they can give each other answers than when they work in isolation, but they may or may not *learn* more from the experience (see Slavin 1984).

Consider the Research

I'm delighted to see the enthusiasm with which school districts have embraced cooperative learning. Regardless of its effects on achievement, cooperative learning has many positive effects, for example, on self-esteem, intergroup relations, and the ability to work with others (see Slavin 1983a). However, when schools adopt cooper-

ative learning methods with the primary intention of increasing student achievement, they must take the research into account. There is no reason to expect that if teachers simply allow students to work together or reward them based on a single group product or task, they will learn more than will students taught traditionally.

Future research may identify effective forms of cooperative learning that do not require group goals and individual accountability; but schools that use such programs now must do so with a clear understanding that, at present, nothing in the literature promises that they will increase student achievement.□

References

Aronson, E., N. Blaney, C. Stephan, J. Sikes, and M. Snapp. *The Jigsaw Classroom*. Beverly Hills, Calif.: Sage, 1978.

Burns, M. "Groups of Four: Solving the Management Problem." *Learning* (September 1981): 46-51.

Davidson, N. "Small-Group Learning and Teaching in Mathematics: A Selective Review of the Research." In *Learning to Cooperate, Cooperating to Learn*, edited by R. E. Slavin, S. Sharan, S. Kagan, R. Hertz-Lazarowitz, C. Webb, and R. Schmuck. New York: Plenum, 1985.

DeVries, D.L., and R. E. Slavin. "Teams-Games-Tournament (TGT): Review of Ten Classroom Experiments." *Journal of Research and Development in Education* 12 (1978): 28-38.

Humphreys, B., R. Johnson, and D. W. Johnson. "Effects of Cooperative, Competitive, and Individualistic Learning on Students' Achievement in Science Class." *Journal of Research in Science Teaching* 19 (1982): 351-356.

Johnson, D. W., and R. T. Johnson. *Learning Together and Alone*. 2nd ed. Englewood Cliffs, N.J.: Prentice Hall, 1987.

Johnson, D. W., R. T. Johnson, and L. Scott. "The Effects of Cooperative and Individualized Instruction on Student Attitudes and Achievement." *Journal of Social Psychology* 104 (1978): 207-216.

Johnson, D. W., G. Maruyama, R. Johnson, D. Nelson, and L. Skon. "Effects of Cooperative, Competitive, and Individualistic Goal Structures on Achievement: A Meta-Analysis." *Psychological Bulletin* 89 (1981): 47-62.

Newmann, F. M., and J. Thompson. *Effects of Cooperative Learning on Achievement in Secondary Schools: A Summary of Research*. Madison, Wis.: University of Wisconsin, National Center on Effective Secondary Schools, 1987.

Sharan, S., and H. Shachar. *Language and Learning in the Cooperative Classroom*. New York: Springer-Verlag, in press.

Slavin, R. E. *Cooperative Learning*. New York: Longman, 1983a.

Slavin, R. E. "When Does Cooperative Learning Increase Student Achievement?" *Psychological Bulletin* 94 (1983b): 429-445.

Slavin, R. E. "Meta-Analysis in Education: How Has It Been Used?" *Educational Researcher* 13, 8 (1984): 6-15, 24-27.

Slavin, R. E. *Using Student Team Learning*. 3rd ed. Baltimore: Center for Research on Elementary and Middle Schools, Johns Hopkins University, 1986.

Slavin, R. E. "Cooperative Learning and Student Achievement." In *School and Classroom Organization*, edited by R. E. Slavin. Hillsdale, N.J.: Erlbaum, 1988.

Slavin, R. E., N. A. Madden, and M. Leavey. "Effects of Team Assisted Individualization on the Mathematics Achievement of Academically Handicapped Students and Nonhandicapped Students." *Journal of Educational Psychology* 76 (1984): 813-819.

Stevens, R. J., N. A. Madden, R. E. Slavin, and A. M. Farnish. "Cooperative Integrated Reading and Composition: Two Field Experiments." *Reading Research Quarterly* 22 (1987): 433-454.

Webb, N. "Student Interaction and Learning in Small Groups: A Research Summary." In *Learning to Cooperate, Cooperating to Learn*, edited by R. E. Slavin, S. Sharan, S. Kagan, R. Hertz-Lazarowitz, C. Webb, and R. Schmuck, 147-172. New York: Plenum, 1985.

Yager, S., R. T. Johnson, D. W. Johnson, B. Snider. "The Impact of Group Processing on Achievement in Cooperative Learning." *Journal of Social Psychology* 126 (1986): 389-397.

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