

# Cooperative Learning and Peer Orientation Effects on Motivation and Achievement

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**ABSTRACT** The effects of graduate students' peer orientation on achievement and motivation to learn with cooperative learning strategies while enrolled in a 1-semester educational research methods course were investigated. During 15 weekly lessons (2 hr and 50 min each), students with high and low peer orientation were exposed to cooperative-learning instruction that involved face-to-face promotive interaction, positive interdependence, individual accountability enforced by group members, collaborative skills, and group processing. At the end of the course, the students' achievement and motivation levels were assessed. Differences in the achievement of students with high and low peer orientation were not statistically significant. However, students with high peer orientation were significantly more motivated to learn than were students with low peer orientation. Potential causes and ramifications of the findings are discussed.

**Key words:** cooperative learning, motivation and achievement, peer orientation

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Motivation may be defined as the force that energizes, directs, and sustains behavior toward a goal (Baron, 1992; Pintrich & Schunk, 1996). In educational contexts, Brophy (1988) described *motivation to learn* as a student's tendency to find academic activities meaningful and worthwhile when deriving the intended benefits of those activities. Researchers often find a strong correlation between motivation to learn and student achievement (Wang, Haertel, & Walberg, 1993; Weinstein, 1998). As a result, teachers at all levels routinely implement strategies designed to enhance student motivation to learn.

Despite its importance, motivation to learn is one of the least understood phenomena in the classroom. The four philosophical approaches to motivation—behavioral (Skinner, 1953; Walker, 1996), humanistic (Deci, Vallerand, Pelletier, & Ryan, 1991; Maslow, 1970; Rogers & Freiberg, 1994), cognitive (Graham, 1991; Piaget, 1952; Vroom, 1964; Weiner, 1992), and sociocultural (Lave, 1988; Lave & Wenger, 1991)—inform our general understanding of student motivation. However, none of those approaches cap-

tures the full range of situational and personality variables needed to create and sustain student motivation to learn in all classrooms. As a result, educators continue to pursue better understanding of motivation as a function of situational variables in the educational setting and of students' personality characteristics (Beck, 2000; Kauchak & Eggen, 1998; Keller, 1983; Wentzel, 1991).

One situational variable often examined by researchers has been the extent to which students work collectively to complete academic tasks in the classroom (Jacob, 1999). An impressive body of research has found that *cooperative learning*—students working in mixed-ability groups on clearly defined tasks with the expectation that they will be rewarded on the basis of group success—can be an effective instructional method (Johnson, Maruyama, Johnson, Nelson, & Skon, 1981; Sharan, 1980; Slavin, 1990, 1996). For example, in Slavin's (1983) review of 46 experimental studies, he found that cooperative-learning groups performed significantly higher than did control groups in 29 classrooms and no differently in 15 classrooms. Control groups outperformed cooperative-learning classrooms in only 2 classrooms. Despite that impressive record, researchers discovered an array of personality variables (e.g., peer orientation, shyness, anxiety, introversion, and persistence) that often mollify the positive effects of cooperative learning (Kagan, 1994; Webb & Palincsar, 1996).

A personality variable sometimes examined in the context of cooperative learning has been peer orientation (Onwuegbuzie & Daley, 1997). Peer orientation may be described as the extent to which a person prefers to work on tasks alone or with others (Dunn, Dunn, & Price, 1989). Keefe and Monk (1986) and Renzulli and Smith (1978) examined the extent to which individuals prefer to learn individually or in groups in a variety of contexts. Because many research efforts indicate that students perform best

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when they are allowed to learn in their preferred manner (Carbo, 1997; Dunn, Beaudry, & Klavas, 1989; Dunn & Dunn, 1987; Dunn & Griggs, 1995), identification of group members' peer orientations in cooperative-learning classrooms may help predict the achievement of individual group members.

Student achievement in the classroom is an important learning outcome often examined by educational researchers. As a result of their experiences in an academic course, students are expected to master specified content as evidenced by their performance on examinations. To enhance achievement, teachers should clearly specify and systematically examine learning objectives during course activities. At the end of a course, student achievement often is assessed through the use of well-constructed, criterion-referenced, and teacher-created examinations (Glaser, 1994; Jones & Southern, 1998).

Another important outcome often examined by educational psychologists is student motivation to learn (Ames, 1992; Bandura, 1997; Csikszentmihalyi, 1990; Deci & Ryan, 1985; Pintrich, 1989). One frequently used motivation instrument, the Motivated Strategies for Learning Questionnaire (MSLQ; Pintrich, Smith, Garcia, & McKeachie, 1991), assesses college students' motivational orientations and uses of different learning strategies in college courses. The MSLQ is based on a cognitive view of motivation and learning strategies that recognizes a learner's need for order, predictability, and an understanding of events in her or his environment. Many researchers suggest that the MSLQ is an effective means of measuring student motivation to learn in the classroom (Garcia & Pintrich, 1995; McClendon, 1996; Tuckman, 1993).

The impact of cooperative-learning environments and peer orientations on student performance has been investigated widely by educational researchers. Most evidence suggests that students who prefer to work collaboratively respond favorably to cooperative-learning environments (Brown, 2000; Johnson, Johnson, & Smith, 1991; Slavin, 1995). Unfortunately, most of those investigations focused on children in Grades 3 to 12 (Purdom & Kromey, 1992). Few studies have been conducted at the college level, and the results of those studies have been inconclusive (Qin & Johnson, 1995).

For example, Wilson (1998) found that graduate students working in cooperative-learning groups demonstrated less anxiety when the professor used humor, applied statistics to real-world situations, discussed students' anxiety, and lowered the threat of evaluation. However, because the cooperative-learning techniques in this study were not isolated from the other classroom activities, the individual effect of cooperative learning on anxiety was not determined.

In another study, Onwuegbuzie and DaRos (1999) found that graduate students who participated in cooperative learning in a research methods course performed significantly worse on a midsemester examination than did stu-

dents enrolled in sections of the same course in which all assignments were undertaken and graded individually. However, on the final examination, that statistically significant difference disappeared.

In a third study, contradicting the consistent finding that elementary and secondary school students who prefer to work collaboratively perform well in cooperative-learning settings, Onwuegbuzie (2001) found that graduate students with an inherent desire to work in groups achieved at a significantly lower level in cooperative-learning classrooms than did students with a propensity to work individually. Unfortunately, in that study, Onwuegbuzie assessed peer orientation with the Productivity Environmental Preference Scale (PEPS; Dunn, Dunn, & Price, 1991)—an instrument with limited reliability and for which virtually no content, construct, or predictive validity information exists (Kaiser, 1998; Rozecki, 1998).

In addition to the conflicting findings of the research efforts, none of those researchers explored student motivation to learn as an outcome variable resulting from the cooperative-learning environments in which the students attended classes. Because student motivation is such an important but poorly understood issue in higher education classrooms, researchers should devote attention to situational and personality factors that influence student motivation to learn.

Therefore, one purpose of the present study was to clarify the inconsistencies in research at the higher education level that related to the impact of cooperative-learning environments and students' peer orientations on student achievement in the classroom. To enhance understanding of situational and personality factors that affect higher education students' motivation, I also explored the influence of cooperative-learning classrooms and students' peer orientations on student motivation to learn.

## Instrumentation

### *Independent Variable*

I used the Learning Style Inventory—2nd Edition (LSI-2; Kolb, 1985) to assess peer orientation (the independent variable). The LSI-2 is a self-report measure comprised of 12 sentences. For each sentence, respondents must rank order four sentence endings that correspond to four learning modes—concrete experience (CE), reflective observation (RO), abstract conceptualization (AC), and active experimentation (AE). The sum of the choices for each mode yields a raw score ranging from 12 to 48. One uses those scores to classify a respondent into one of four learning-style types—diverger (CE and RO), assimilator (RO and AC), converger (AC and AE), or accommodator (AE and CE).

*Divergers* perceive information concretely and process it reflectively. They are feelings oriented, enjoy and are concerned about people, value harmony, and seek personal meaning as they learn. They learn by concrete information

given them by their senses (feeling) and by watching. They are called divergers because they excel at viewing an event or idea from many perspectives and at generating many ideas. Divergers often have broad interests and are imaginative. They learn by sharing ideas and are good at brainstorming, imagining implications, and working in groups. However, they can be indecisive when confronted by many alternatives (Dyrud, 1997; Kolb, 1984, 1985; McCarthy, 1986; Smith & Kolb, 1986).

*Accommodators* perceive reality through concrete experience and process it through active experimentation. They learn by concrete information from their senses (feeling) and by doing. They like to try new experiences, solve problems, take risks, envision possibilities, adapt information to new situations, and use intuition in trial-and-error situations. They are called accommodators because they adapt well to new circumstances and to applying knowledge in new ways. Accommodators work well in challenging or crisis situations and like to obtain information by talking to and influencing others. They enjoy teaching themselves and others. Accommodators may be stifled by too much regimentation and procedure; they like variety and thrive on change and unstructured settings without timeliness. However, they sometimes may have impractical plans and may fail to complete work on time (Dyrud, 1997; Kolb, 1984, 1985; McCarthy, 1986; Smith & Kolb, 1986).

*Assimilators* perceive information abstractly and process it reflectively. They learn by watching and thinking. They are rational, logical thinkers who value order, continuity, stability, expert opinion, accuracy, detailed information, and certainty. They are called assimilators because they can assimilate diverse, separate data into an integrated whole. Assimilators excel at procedures, analyses, objectivity, exactness, and forming theories and models. They follow directions well and like to thoroughly understand concepts before they act. Assimilators prefer to work alone, as in traditional lecture-oriented classrooms, and tend to be cautious. They focus on the soundness of ideas rather than on practical application. They sometimes may be overly cautious (Dyrud, 1997; Kolb, 1984, 1985; McCarthy, 1986; Smith & Kolb, 1986).

*Convergers* perceive reality through abstract conceptualization and process it through active experimentation. They learn by doing and thinking. They are commonsense learners who value practicality, productivity, and efficiency. They focus on the bottom line and thrive on timeliness. They are called convergers because they move (converge) quickly to reach a conclusion or to find a single, correct answer. Convergers dislike ambiguity, working in groups, and wasting time. They tend to be impersonal and prefer working with things rather than people. They prefer "hands on" work to lectures and are decisive when faced with multiple alternatives. However, they sometimes act before they have sufficient data or without considering important aspects of a situation (Dyrud, 1997; Kolb, 1984, 1985; McCarthy, 1986; Smith & Kolb, 1986).

Because they prefer to work in groups and to learn by talking to others, divergers and accommodators may be classified as having high peer orientation. Conversely, because they prefer to work alone and with things rather than people, assimilators and convergers may be classified as having low peer orientation.

The psychometric properties of the LSI-2 were sufficient for use in this study. Smith and Kolb (1986) reported Cronbach alphas ( $n = 268$ ) of .83 (AC), .82 (CE), .78 (AE), and .73 (RO). Comparing LSI-2 items with those on the LSI-1, Gregg (1989) reported Spearman-Brown split-half reliability coefficients in excess of .50. An overall review of validity data (Kolb, 1981, 1999; Mainemelis, Boyatzis, & Kolb, 2002) suggests that the scales of the LSI-2 measure that which they purport to measure.

#### *Dependent Variable 1*

I measured the first dependent variable, student achievement, by using a professor-made, criterion-referenced final examination in a graduate-level course in educational research methods. The course was designed so that students would examine empirical and conceptual research problems and methods of conducting and interpreting basic research.

The final examination required students to answer questions related to learning objectives addressed during 15 lessons of the one-semester course. Fifty items were short-answer, constructed-response questions, and 12 items were multiple-part essay questions. Examples of the short-answer, constructed-response questions were: (a) List and describe briefly the nine components of the cyclical theory-based research process and (b) describe briefly the five Campbell and Stanley (1971) threats to internal validity and how they can be neutralized or controlled. An example of the multiple-part essay questions was: Name a general problem area in which you might conduct research. State a research hypothesis, purpose, or question for your research. Will you be reporting descriptive statistics? Inferential statistics? Explain.

Seventy features were expected in each student's answers to the examination items. Points were awarded when features were present. The content validity of the examination was established when the items were aligned with the lesson objectives and two educational research experts reviewed the examination for content. All evidence indicated acceptable content validity.

#### *Dependent Variable 2*

I assessed the second independent variable, student motivation to learn, by using the motivation section of the Motivated Strategies for Learning Questionnaire (MSLQ; Pintrich et al., 1991) with two additional items. The MSLQ is a self-report instrument that the authors designed to assess college students' motivational orientations and learning strategies in a college course. The motivation section consists of

31 items in six subscales that assess students' goals and value beliefs for a course, their beliefs about their skills to succeed in a course, and their anxiety about tests in a course. Normally administered in a classroom, the motivation section of the MSLQ takes 10 to 15 min to complete. Students respond to the items by using a 7-point, Likert-type scale in which only the first and seventh points are anchored (*not at all true of me to very true of me*). Examples of items include: (a) It is important for me to learn the course material of this class; (b) If I can, I want to get better grades in this class than most of the other students; and (c) If I try hard enough, then I will understand the course material. An individual's motivation score is determined by computing the mean of the items in the motivation section of the MSLQ.

Supported by the National Center for Research to Improve Post-Secondary Teaching and Learning, development of the MSLQ began as a research project on college student learning and teaching. Several waves of data, collected from over 1,700 college students, were used for revising and ultimately constructing the version of the MSLQ used in this study. The resulting subscales were derived empirically on the basis of item and factor analysis. Internal consistency coefficients for the motivation subscales have ranged from .62 to .93. With respect to predictive validity, five of the six motivation subscales have shown significant correlations with final grade ( $r > .13$ ,  $\alpha = .05$ ) when administered to 380 college students (Pintrich, Smith, Garcia, & McKeachie, 1993). The content validity of the MSLQ has been supported through extensive literature on college student learning and teaching (Gable, 1998).

To help identify factors that influenced students' motivation to learn, researchers asked students to respond to two additional items: (a) Describe two or three things that you liked about this course and (b) describe two or three things that you disliked about this course.

## Method

In this study, the effects of graduate students' peer orientation on achievement and motivation to learn with cooperative-learning strategies while enrolled in an educational research methods course were investigated.

### Participants

Fifty-two graduate students at a large, state-supported university in the southeast United States, enrolled in an educational research methods course, participated in this study. The average age of the participants was 34.12 years ( $SD = 8.6$ ). Seventy-one percent of the participants were women.

### Procedures

The 52 participants, enrolled in two sections of relatively equal size, were given approximately 15 min to complete

the Learning Style Inventory–2nd Edition (LSI-2; Kolb, 1985) for assessing peer orientation. LSI-2 scores revealed that 23 participants had high peer orientation (12 accommodators; 11 divergers) and 29 participants had low peer orientation (15 assimilators; 14 convergers). The peer orientations of the participants remained unknown to the professor throughout the study.

During the first lesson of the course, students were assigned to groups of three or four students. The professor explained the objectives and requirements of the course, emphasizing that students would be highly involved in the learning process through participative and interactive activities. Students were told that they would be reassigned to a different small group during lessons 5 and 10.

During the 15 weekly lessons of the course (2 hr and 50 min each), the professor implemented cooperative-learning strategies using lesson plans designed in accordance with the five cooperative-learning characteristics of Johnson and Johnson (1999)—face-to-face promotive interaction, positive interdependence, individual accountability, collaborative skills, and group processing.

With face-to-face promotive interaction, group members encouraged and facilitated each other's efforts to achieve group goals in order to build academic and personal support systems for every group member. Factors that contributed to face-to-face promotive interaction included (a) scheduling enough time for the group to meet, (b) requiring that group members work together to achieve group goals, and (c) celebrating instances of promotive interaction between members.

Positive interdependence prompted group members to believe and to convince others that all group members were essential for the success of the group. That was accomplished by assigning each group clear and measurable tasks and structuring and routinely reinforcing goal interdependence within the groups. Positive interdependence necessitated sharing resources, mutual support and encouragement, and public acknowledgment of joint successes.

Individual accountability occurred when the performance of each group member was assessed by individual and group members and compared against a standard of performance. Each member was held accountable by other group members for contributing her or his fair share to the group's success. Individual accountability was promoted by (a) keeping the size of the group small, (b) giving an individual test to each member, (c) calling on group members in class randomly and asking them to present the group's work to the entire class, (d) assigning a group member to ask other members to explain new material to the rest of the group, and (e) requiring each member to teach something that he or she had learned to someone else.

Collaborative skills such as giving constructive feedback, reaching consensus, involving every group member, and making others believe that they were contributing group members were constantly emphasized and reinforced. The goal was that all group members in each group

communicate effectively with each other, solve conflicts, and possess mutual knowledge and trust in one another.

With group processing, students reflected on group sessions to determine which member actions were constructive and which were less than constructive and decided which actions to continue, change, or modify. The objective of group processing was to clarify and improve the contributions of each group member with respect to the collaborative efforts to achieve the goals of the group.

To ensure treatment fidelity, two outside experts reviewed the lesson plans incorporating the cooperative-learning strategies and concluded that they supported Johnson and Johnson's (1999) cooperative-learning characteristics. In addition, one expert unobtrusively observed Lessons 4 and 12 and concluded that they were conducted in accordance with their respective lesson plans.

At the end of Lesson 15, the professor-made, criterion-referenced test was administered to measure the extent to which participants had accomplished the objectives of the course. After all tests were scored, I conducted an item analysis to ensure that the items on the test functioned as intended and were free of irrelevant clues and defects. A split-half reliability coefficient of .69 was obtained with the Spearman-Brown formula. After lesson 15, I assessed students' motivation to learn by using the motivation section of the MSLQ (Pintrich et al., 1991) and two additional items regarding what students liked and disliked about the course. Students took approximately 17 min to complete the MSLQ and two items.

*Design*

Employing a quasi-experimental design, I found that the independent variable in this study was students' peer orientation (high or low) as determined by the Learning Style Inventory-2nd Edition (LSI-2; Kolb, 1985). The first dependent variable was student achievement in a graduate-level course in educational research methods as measured with a professor-made, criterion-referenced final examination. The second dependent variable was student motivation to learn as assessed with the motivation section of the MSLQ (Pintrich et al., 1991) and two additional items. I calculated independent samples *t* tests to determine whether students with high or low peer orientation differed significantly with respect to achievement and motivation. Furthermore, I used techniques of qualitative research analysis (Wolcott, 1994) to evaluate systematically students' narrative responses to the two items regarding what they liked and disliked about the course.

**Results**

Means, standard deviations, and sample sizes for the achievement and motivation levels by peer orientation groups are reported in Table 1. The independent samples *t* test comparing the achievement levels of students with high and low

**TABLE 1. Means, Standard Deviations, and Sample Sizes of Achievement and Motivation, by Peer Orientation**

Peer orientation	Achievement			Motivation		
	<i>M</i>	<i>SD</i>	<i>n</i>	<i>M</i>	<i>SD</i>	<i>n</i>
High	84.78	7.46	23	5.04	1.33	23
Low	82.76	6.76	29	4.31	1.23	29
Overall	83.65	7.08	52	4.63	1.31	52

peer orientation was not statistically significant  $t(50) = 1.03$ ,  $p = .311$ . Students with high peer orientation did not score differently in achievement ( $M = 84.78$ ,  $SD = 7.46$ ) than did students with low peer orientation ( $M = 82.76$ ,  $SD = 6.76$ ); effect size was .27. However, the independent samples *t* test comparing the motivation levels of students with high and low peer orientation was statistically significant,  $t(50) = 2.06$ ,  $p = .045$ . Students with high peer orientation were significantly more motivated to learn ( $M = 5.04$ ,  $SD = 1.33$ ) than were students with low peer orientation ( $M = 4.31$ ,  $SD = 1.23$ ); effect size was .55.

Using techniques of qualitative research analysis suggested by Wolcott (1994), I analyzed the students' narrative comments regarding what they liked and disliked about the course to identify patterns in their responses. Specifically, the students' comments were read in their entirety several times to gain a general sense of how they felt about the course. The readings led to patterned regularities (i.e., patterns of responses that appeared more frequently than others). On the basis of those patterns, the most frequently cited "likes" were (a) opportunities to interact with classmates about the course material, (b) applications of the course material to real-world situations, (c) overall climate of the course that was conducive to learning, and (d) professionalism and trust displayed toward students by the professor. The most frequently cited "dislikes" were (a) tendency of some students to control classroom activities and/or dominate small-group discussions, (b) some students' refusal to contribute to group efforts while others contributed excessively to group activities, and (c) lack of the professor's influence over classroom activities.

**Discussion**

Although the achievement scores on the final examination of students with high peer orientation were predictably higher than the achievement scores of students with low peer orientation (i.e., by two points), the difference was not significant. Qualitative analysis of the two items that were designed for assessment of students' likes and dislikes about the course and the videotapes of Lessons 4 and 12 offered three possible explanations for this outcome.

First, students seemed to value the cooperative-learning process more than they valued learning. Specifically,

socializing with group members sometimes took priority over thoughtfulness and diligent group effort to create a sound product. On the two questionnaire items, several students commented that they liked the "informal atmosphere" of the classroom and the opportunity to "catch up" with friends. On at least two occasions in the videotapes of Lessons 4 and 12, students in small groups were observed talking at length about issues unrelated to the classroom assignment, but then working feverishly during the last 5 min to derive a group answer. Social interaction between group members occurred at the expense of conscientious thought and effort centered on the course material.

Second, students sometimes supported and reinforced misunderstanding of the material rather than challenging and correcting misconceptions. For example, the videotaped lessons revealed at least three instances in which well-intentioned students offered erroneous comments about the course content. On each occasion, group members did not refute the incorrect assertion; the professor was involved with other students. As a result, group members left the learning situation with less-than-complete understanding of key concepts. One student's written remark reflected that issue: "Usually, we assumed that whoever spoke first in our group had the right answer. So we all wrote it down and hoped it was correct."

Third, a few students sometimes dominated group interactions. As a result, group members who were less boisterous or less extroverted did not engage fully in the discussions of the material. Sometimes, the more dominant group members knew the course content better than other group members. However, because significant research suggests that learning is enhanced when students are involved actively in the learning process (Cohen, 1994; Johnson & Johnson, 1999), the dominance of some students reduced the more introverted students' potential for learning by limiting their involvement in group discussions and interactions.

Although the final examination scores of students with high and low peer orientation were not significantly different, an important finding of this study was that the motivation levels of those students differed significantly. Students who had high peer orientation were significantly more motivated to learn when exposed to cooperative-learning strategies than were students who had low peer orientation. Qualitative analysis of the two items that assessed students' likes and dislikes about the course and the videotapes of Lessons 4 and 12 offered at least two possible explanations for the outcome.

First, students responded to the cooperative-learning strategies in ways predicted by their desire to work with peers during classroom activities. Specifically, students who desired to work with others thrived on (a) face-to-face interaction, (b) positive interdependence, (c) individual accountability enforced by group members, (d) need for collaborative skills, and (e) group processing inherent in the cooperative-learning environment. Conversely, students with predispositions to work alone were not motivated to

learn in the cooperative-learning setting. One student who had low peer orientation commented, "Having to listen to a bunch of uninformed classmates talk about things they didn't know anything about was bull-\_\_\_\_. I lost interest early and never got it back." On the other hand, a student who had high peer orientation reflected, "This was my best course in graduate school. I actually looked forward to class. Why don't all professors teach this way?"

Second, the difference in motivation exhibited by students with high and low peer orientation may have been influenced by the content of the course. Several students referred in their written comments and on the videotape to their apprehension about taking a course on research methods. Many students were worried that they would fail the course and jeopardize their goal of earning a master's degree. The fear of failure may have exacerbated the students' inherent predispositions toward peer orientation. That is, students with high peer orientation may have become particularly interested in working with others, whereas students with low peer orientation may have longed even more profoundly to work alone. As a result, when exposed to cooperative-learning strategies involving extensive interaction with classmates, students with high peer orientation may have become particularly motivated to learn, whereas students with low peer orientation may have become less motivated.

## Conclusions

Unfortunately, the results of this study do not clarify previous research in higher education settings regarding the impact of cooperative-learning environments and students' peer orientations on student achievement in the classroom. Graduate students who desire to work with others do not necessarily learn more in settings that foster student interaction and collaboration. Other variables, such as the extent to which students value learning more than social interaction and whether students allow others to dominate classroom discussions of course material, seem to influence graduate students' achievement as much as peer orientation.

Conversely, this study offers an important contribution to educators' understanding of factors that influence graduate students' motivation to learn. Specifically, peer orientation was an important determinant of student motivation in the classroom. Students who desired to work with others seemed to be more motivated to learn in settings that maximized student interaction than were students who desired to work alone. That finding has important ramifications for the conduct of higher education courses and deserves additional research attention. Professors who are more interested in students' achievement than in their motivation may not need to consider the extent to which their classroom strategies match students' desire to work collectively or alone. However, if students' motivation to learn is a goal, professors may want to determine the peer orientations of their students before designing their instructional strategies. In any

event, researchers should attempt to identify the specific personality and situational variables that foster graduate students' achievement in addition to fostering their motivation to learn.

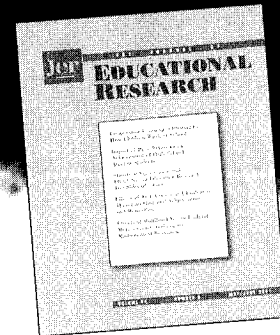
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