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Lecture Organization yielded relatively consistent patterns across a
number of learning outcomes: lecture attention, student achievement,
perceptions of control, affect, and motivation. High text-anxious
students were unable to benefit directly from high-organized
instruction though organized instruction did increase these students'
motivation to attend future classes. Specific explanations are
postulated on how the differences in effective teaching behaviors and
student differences may operate together to produce ideal and less
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classroom instructors and college students. (Contains 82 references.)
(Author)

An Empirical investigation of Effective College Teaching Behaviors and Student Differences: Lecture Organization and Test Anxiety

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Abstract
The present study investigated the interaction between student entry characteristics and effective instruction. The experimental design involved 380 introductory psychology students and consisted of a Lecture Organization (low, high) by Test Anxiety (low, moderate, high), 2 x 3 design. The dependent variables included student attention, achievement, cognition, affect, and motivation observed during a lecture presentation. A set of hypotheses dealt with identifying which types of students, and under what teaching conditions, learning was enhanced or thwarted. First, test anxiety yielded differences in student learning outcomes. Second, analyses of Test Anxiety with Lecture Organization yielded relatively consistent pattern across a number of learning outcomes: lecture attention, student achievement, perceptions of control, affect, and motivation. Specific explanations are postulated on how the differences in effective teaching behaviors and student differences may operate together to produce ideal and less than ideal learning environments. Finally, a number of new directions are provided for future research and suggestions are made for classroom instructors and college students.

An Empirical Investigation of Effective College Teaching Behaviors and Student Differences: Lecture Organization and Test Anxiety

The purpose of the present study was to extend previous research on effective teaching and test anxiety on college students' scholastic behaviors. More specifically, the focus was to explore why certain students are less likely to benefit from effective classroom instruction than others. The exploration of such phenomenon addresses some of the questions educators have concerning the improvement of students' learning experience in the college classroom.

Effective teaching does not occur in a vacuum but in conjunction with a number of other factors such as class size, time of day, length of presentation, and student differences (McKeachie, Pintrich, Lin, & Smith, 1986). The interaction between effective teaching and student differences as they effect learning outcomes was of specific interest. Prior to investigating this interaction, a consideration of individual differences is necessary.

According to recent educational literature (see McKeachie et al., 1986; Perry, 1991), students are viewed as active learners, confronted with the task of attending, understanding, and seeking organizational cues and key concepts, as well as processing and retaining information presented. However, not all students are able to do these tasks equally well, even when exposed to ideal learning conditions. Educational researchers have spent considerable time and energy trying to delineate the factors which enhance or impede student performance in the college classroom (McCann, Short, & Stewin, 1986; McKeachie et al., 1986). Their efforts have generated a long-standing theme in higher education research: the importance of individual differences in the ability to benefit from instruction (Corno & Snow, 1986; Domino, 1971; 1975; Messick, 1979; Pintrich, Cross, Kozma, & McKeachie, 1986; Snow & Lohman, 1984).

According to these researchers, students do not enter college with "blank slates", but rather, they come with a variety of cognitive, motivational, and behavioral characteristics generated from previous educational experiences. These entry characteristics determine the effects of instruction on student scholastic outcomes. Whereas some of these characteristics are catalytic, enhancing learning, others impede scholastic achievement, resulting in debilitating consequences, such as procrastination and student "dropout". For these "at-risk" students, effective teaching may potentially compensate for their less adaptive learning orientation by enhancing their achievement performance (Perry, Schonwetter, Magnusson, & Struthers, 1994; Schonwetter, Perry, Struthers, 1994). "At-risk" students are defined as those who consistently perform poorly on achievement tasks such as assignments, quizzes, and tests in the classroom and are considered at a learning disadvantage. Finally, some individual differences are thought to protect (Perry, 1991) students from the debilitating effects of ineffective instruction, causing them to strive harder, to engage in self-study, and to seek additional academic help, thereby achieving academically.

Of the various student differences identified in the educational literature, test anxiety was chosen to represent these differences for the following reasons. First,

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past research has demonstrated that students identified in the extreme categories of test anxiety represent less adaptive and adaptive learning orientations. Second, test anxiety offers a specific measure of student performance in achievement settings.

Test Anxiety

Given that most college learning experiences involve the evaluative process, an investigation considering test anxiety was of interest. This measure not only addresses the relation between student differences and student learning outcomes, but may also elucidate the issues surrounding the interaction between effective teaching and student differences. Furthermore, research focusing on student differences has demonstrated that anxiety also distinguishes less adaptive from adaptive learning. Students exhibit various levels of anxiety as evident by the vast body of research conducted in higher education (Sarason, 1975; Tobias, 1985).

Anxiety is the emotion of avoidance to perceived but largely unrealistic threats or dangers (Plutchik, 1980). It involves a state of arousal that occurs as a result of perceiving a lack of power to handle some threatening situation. One of its most pronounced forms in the college setting is test anxiety, a situational-specific form of trait anxiety (Spielberger, 1972). It refers to individual differences in anxiety proneness in evaluative situations. For example, high test-anxious students are more likely to experience (a) emotional reactions characterized by feelings of tension, apprehension, and nervousness; (b) self-centered worry cognition that interferes with attention; and (c) activation or arousal of the autonomic nervous system (Spielberger, Gonzalez, & Fletcher, 1979). In short, test anxiety is a pattern of intense and substantial emotional, cognitive, and physiological activation that has earned the reputation of being one of the most pervasive problems associated with student learning in institutions of higher education.

The literature is voluminous in demonstrating individual differences in anxiety proneness to academic situations. For example, in Hembree's (1988) recent meta-analysis, 562 studies had been identified. Since the late 1950's, educational researchers have reported scholastic performance decrements among high, as compared to low, test-anxious students exposed to evaluative situations (Arkin, Detchon, & Maruyama, 1982; Sarason, 1980; Sarason, 1959; Spielberger, Anton, & Bedell, 1976; Tobias, 1985). High versus low test-anxious students display less adaptive study habits (Wittmaier, 1972), such as spending less time studying (Allen, Lerner, & Hinrichsen, 1972), are more prone to procrastination of study and homework behaviors (Rothblum, Solomon, & Murakami, 1986), and demonstrate lower levels of intelligence (Gjesme, 1983) and high school GPAs (Prociuk & Breen, 1973). High, as compared to low, test-anxious students tend to report more negative self-thoughts (Blankstein, Flett, Boase, & Toner, 1990), and diminished levels of personal control as well as reduced confidence in situations involving problem-solving (Blankstein, Flett, & Batten, 1989). Thus, high, in comparison to low, test anxiety, is related to poorer achievement outcomes, reduced mental ability, inadequate scholastic behaviors, and poorer self-perceptions.

Test Anxiety and Effective Teaching.

Although previous studies have investigated the effects of test anxiety in college students, little is known about the combined effects of test anxiety and effective teaching. Extending previous studies, the present thesis investigated the effects of instructor organization in combination with test anxiety on student learning. This interaction model sought to identify which types of students, and under what teaching conditions, learning is enhanced or thwarted. Before investigating this interaction, a better understanding of organized teaching behaviors' impact on student learning is necessary.

Organization

Descriptive research findings present a consistent picture of the outstanding college teacher. A number of teaching behaviors are repeatedly reported. These reoccurrences have prompted further investigation of the different fundamental teaching dimensions through experimental studies. Of specific interest was organization. Organization was selected given that it is significantly correlated with student achievement (r = .57; Feldman, 1989).

Good organization of subject matter and planning of course content are important to student learning (Kallison, 1986). Examples include "the instructor planned the activities of each class period in great detail", "gives preliminary overview of lecture", "puts outline of lecture on board", "uses headings and subheadings", "signals transitions to a new topic", and the "seriation of relevant points" (Feldman, 1989; Murray, 1991). The latter is best described as the enumeration of elements in a series such as "first,...", "second,...", "third,...", and "finally,...". The organized instructor has a well-structured method of teaching which breaks the course into units more readily accessible for information processing (Perry, 1991).

Organization is postulated to provide specific cues for what is to be attended to. This is accomplished through the organization of course material, as seen through well-structured presentations, syllabi, lecture outlines, and seriation of relevant points, headings, and subheadings (Schonwetter, 1993; see Figure 1). Lecture material presented in the aforementioned ways has a higher probability of being recorded, a factor which, in turn, significantly improves achievement (Hartley & Cameron, 1967; Hartley & Fuller, 1971; Maddox & Hoole, 1975). Intact outlines may serve to guide note-taking, depicting the organization of the main ideas of a presentation. The use of embedded headings and intact outlines with videotaped instruction optimizes both immediate and delayed learning (Frank, Garlinger, & Kiewra, 1989).

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Insert Figure 1 about here
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In addition to being a specific stimulus cue, organization in the form of outlines represents a knowledge structure, serving as an advance organizer (Glynn & Di Vesta, 1977) and providing students with "chunking" strategies (Perry, 1991). Chunking refers to the process whereby distinct pieces of information are grouped together in order to enhance memory (Perry, 1991). This knowledge structure represents a set of related categories about the nature of and the relationships between the ideas presented (Rumelhart & Ortony, 1977). As such, it enhances students' integration of

content topics by providing a "chunking" strategy for linking new to preexisting knowledge. In other words, it provides a quick and logical method of structuring lecture material (Perry, 1991), which influences comprehension (Meyer, 1975; 1977) and facilitates encoding and retrieval of learning material (Glynn & Di Vesta, 1977). For instance, when the information was organized during learning, students showed better memory of information (Katona, 1940). Also, highly structured teaching has produced significantly better student achievement than less structured teaching (Guetzkow, Kelley, & McKeachie, 1954).

Overall, organization appears to influence student learning, specifically affecting their attention. Organization is thought to elicit attention to specific lecture material cued by outlines, headings, and seriation of relevant points. These cues tend to be directly linked to what is regarded as important. For instance, a lecture outline provides the student with the relevant stimuli to be learned. Also, the seriation of relevant points not only specifies what is important, but may also dictate the order of importance. Thus, a direct link is thought to exist between organization and the relevant stimuli to be learned. Based on this premise, organization is viewed as a specific orienting stimulus, directing attention to specific lecture material.

The Present Study

Two sets of hypotheses were examined, the first dealing with the differentiation of learning and related outcomes based on three levels of test anxiety; the second, investigating the interaction effects of the teaching behavior organization and test anxiety.

Test Anxiety Main Effects

Although the research norm typically relies on dichotomizing test anxiety scores based on a median split (Hembree, 1988), a more refined delineation categorizing students as low, moderate, and high test-anxious was used. This approach was chosen in order to explore a more specific definition of test anxiety, in particular, one that would reflect the equivalent of "at-risk", normal, and mastery college students (i.e., high, moderate, and low test-anxious respectively). The outcomes related to the "at-risk" or high test-anxious students was of specific interest to the present study. Based on previous research, high, as compared to low or moderate, test-anxious students, were hypothesized to have less adaptive learning orientations as defined by lower lecture attention and achievement scores. Also, high test-anxious students were postulated to perceive less control over their performance, to experience more negative affect, and to feel less motivated than low or moderate test-anxious students. Thus, test anxiety was postulated to predict differences in learning orientations: high test-anxious students with less adaptive, and low or moderate test-anxious students with more adaptive learning orientations.

Test Anxiety and Teaching Behaviors

Next, the effectiveness of test anxiety and organization was examined, thereby further extending the Manitoba studies (Perry, 1991). The hypotheses focused on the impact of instructor organization and student test anxiety on student learning outcomes. High, in comparison to low or moderate, test-anxious students, given their less adaptive learning orientations, were not expected to benefit from highly

organized instruction, demonstrating poorer achievement outcomes. In order to test the above hypothesis, five a priori comparisons were conducted. First, no learning related differences, such as achievement, were foreseen between high test-anxious students receiving low, as compared to high, organized instruction. Second, poorer learning related outcomes were anticipated to occur between high, as compared to low, test-anxious students receiving high organized instruction. Third, poorer learning related outcomes were anticipated to occur between high, as compared to moderate, test-anxious students receiving high organized instruction. Fourth, poorer learning related outcomes were expected between low test-anxious students receiving low, as compared to high, organized instruction. Finally, poorer learning related outcomes were expected between moderate test-anxious students receiving low, as compared to high, organized instruction. In order to test the above hypotheses, groups of low, moderate, and high test-anxious students were exposed to low and high levels of effective teaching behaviors, expressiveness and organization. Student learning outcomes were denoted by measures of attention, achievement, cognition, affect, and motivation.

According to the previous literature, organization was expected to interact with test anxiety. For instance, effective teaching (i.e., high organization) was hypothesized to increase attending to relevant stimuli. Given that increased attention is associated with the adaptive learning orientations, low and moderate test-anxious students were hypothesized to have a further advantage over their counterparts. They are better able to attend to relevant lecture stimuli, filtering out irrelevant ones. Furthermore, under learning conditions that provoke loss of control, such as ineffective teaching (i.e., low organization), all students should perform poorly.

Finally, cognition, affect, and motivation were thought to be directly related to achievement outcomes. For instance, students who perform well, as compared to poorly, should perceive more control, experience more positive affect and motivation. Independent variables included instructor organization and test anxiety. Student attention and achievement behavior, cognition, affect, and motivation comprised the dependent variables.

Method

Subjects

The subjects were 380 students who volunteered for one of 10 two-hour time slots in order to fulfill their course requirements: 85 in the control group (39 males; 46 females; ages: 18 - 45; $M = 22.22$ $SD = 6.39$) and 295 in the experimental groups (males = 118; females = 177; ages: 18 - 45; $M = 20.87$; $SD = 4.65$). These subjects represented a group of approximately 3200 students from a multisection introductory psychology course from a Western Canadian university.

Materials

Instructional manipulation. Given their effect on student achievement in the college classroom, organization was selected to represent teaching (Feldman, 1989; Murray, 1991; Perry, 1991). Lecture content was held constant by equating the lectures for the number of teaching idea units. This was accomplished by having the instructor use the identical set of lecture notes for all presentations. In order to test

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the hypotheses, two sets of color videotapes were developed: low organization and high organization. In each of the videotapes, a female economics professor who had won a number of teaching awards gave a lecture on the topic of "demand", a lecture typically presented to first year economics students. The organization manipulation included variation of the following behaviors: giving a preliminary overview of the lecture, providing an outline of lecture on the overhead, using headings and subheadings, and signaling transitions to a new topic. These characteristics were decreased and increased in the low and high conditions, respectively.

An Electrohome Color Videotape Projection Unit projected the videotapes onto a 2.2 meter diagonal screen in order to simulate a life-size presentation. Furthermore, the videotape-camera focused on the lecturer at all times during the initial recording session, with the exception of an occasional view of the overhead material. Projection of this format of videotape recording onto a flat screen produces the illusion that the instructor is at all times facing the audience, regardless of the angle of vision that each student's seat represented. In order to enhance the visual effect, students were seated facing the screen within 50 degrees on either side of the perpendicular from the screen. This was done in order to reproduce as close to "life" representation of the lecturer as possible.

Taped lectures rather than "live" presentations were selected for a number of reasons. First, in order to investigate the causal nature of specific teaching behaviors, it was necessary to control for lecture content and presentation variables across all conditions, a task that is easily accomplished through videotaping. Second, comparable effectiveness in demonstrating teaching effects in college classrooms has been maintained through the use of videotapes (Abrami, Leventhal, & Perry, 1982; Perry, 1991; Perry, Abrami, & Leventhal, 1979). Third, videotaped instruction serves as an effective alternative to conventional instruction (Jamison, Suppes, & Wells, 1974).

Classroom analog. The simulated college classroom setting was intended to provide a realistic environment in which to study effective instruction and student differences on student learning outcomes. Behavioral, affective, and cognitive involvement is generally quite high. According to Perry (1991), participants are often highly motivated to provide explanations for the outcome of the achievement event in a classroom analog. Furthermore, investigating instructor characteristics in the laboratory setting is thought to "lead to more precise descriptions of effective teaching behaviors" (p. 461-462; Abrami et al., 1982).

Pre-lecture student questionnaire. A prelecture questionnaire included a number of demographic items: age, gender, student high school GPA, last introductory psychology test score, and the Test Anxiety Scale. The **Test Anxiety Scale** (Sarason, 1975) has been widely used as a measure of test anxiety in college settings. It has been used as an independent variable, where groups representing extreme scores have been compared in examination situations (Tobias, 1985). Test-retest reliabilities tend to be over .80 on intervals of several weeks. For instance, Wagaman, Cormier, and Cormier (1975) have shown test-retest reliability coefficients of .87. The Test Anxiety Scale has also been used as a dependent variable in testing

various clinical treatments of test anxiety reduction (Crocker & Schmitt, 1987; Decker, 1987).

The test anxiety scores were trichotomized to provide approximately equal groups of students. Students were categorized as low, moderate, or high test-anxious according to the thirds of the scale's distribution (range = 2 to 35). Students scoring 16 or less, between 17 and 23, and 24 or more were classified as low (n = 95; M = 9.68 ; SD = 4.01), moderate (n = 90; M = 20.29; SD = 1.96), and high test-anxious (n = 100; M = 28.67; SD = 3.26), respectively. These delineations were used to ensure a suitable definition of test anxiety while maintaining acceptable sample sizes.

The effectiveness of the trichotomization procedure was addressed by conducting a one-way, Test Anxiety (low, moderate, high), ANOVA on two prelecture achievement outcomes. Test Anxiety main effects were demonstrated for reported high school GPA, $F(2, 281)$ = 3.23, MS_e = 4.37, $p < .05$, and reported psychology test score, $F(2, 284)$ = 4.54, MS_e = 6.19, $p < .01$. Moderate test-anxious students had better high school GPAs (M = 4.20, SD = 1.90, n = 89; ≈ "B+") than high test-anxious students (M = 4.98, SD = 1.68; n = 93; ≈ "B"), $t_B(280)$ = 2.46. Low test-anxious students had higher psychology test scores (M = 5.52, SD = 2.50, n = 96; ≈ "C+" - "B") than high test-anxious students (M = 6.57, SD = 2.44, n = 101; ≈ "C" - "C+"), $t_B(283)$ = 2.83. High achievement scores, which may reflect adaptive learning orientations, were demonstrated by low and moderate test-anxious students, albeit on different measures, whereas low achievement scores, which tend to reflect less adaptive learning orientations, were found for high test-anxious students. These finding provide evidence that the trichotomization procedure utilized represents a suitable definition of test anxiety.

Selective attention. Studies investigating the teaching-learning phenomenon have indirectly inferred student attention from cognitive deficits. For instance, in a summary of the Manitoba Laboratory studies, Perry (1991) stated that "expressive teaching did not enhance learning and performance in helpless students, suggesting that selective attention may have been impaired" (p. 37). However, these studies provided no direct evidence supporting the link between effective instruction and student attention. Based on the difficulty of measuring student attention during learning, these studies relied on the consequences of attention, namely achievement tests.

However, presuming student attention from achievement performance has its limitations. For instance, the achievement measure used in these studies relied on the multiple choice format (Perry & Dickens, 1984; 1987; Perry & Magnusson, 1987; Perry et al., 1986; Schonwetter et al., 1994). Multiple choice format tests provide cues which enhance students' memory of information processed during the lecture presentation. To define selective attention on the basis of recognition scores is problematic in that student scores may not only be the result of selective attending during lecture presentation, but also the result of cues provided by the test. In order to address this issue, the present study administered a recall test based on the following reasons. First, a recall test does not provide stimulus cues. Students are

given a piece of paper that contains no words related to the lecture and are required to write down all the lecture unit ideas presented. Second, recall has not been used before as a measure of effective teaching and given that it does not provide lecture presentation cues, it can be a better measure of learning than recognition. Although not a direct measure of attention, recall may give greater confidence in concluding that attention is affected. Furthermore, previous research on effective teaching and student learning has not considered self-report measures of student attending to lecture presentation. In the present study, the administration of student lecture attention self-report was hypothesized to provide an alternative method of denoting selective attention.

Thus, selective attention was denoted by a recall test and a self-report item. During the five-minute recall test, students were not provided with any lecture cues, but rather, with a blank sheet of paper on which to record as many of the key words presented during the lecture (i.e., demand, complements, services, goods, etc.). Of the possible 42 lecture unit ideas consistently presented across all four teaching episodes, students scored well below the median ($\underline{Md}$ = 21; $\underline{M}$ = 11.87; $\underline{SD}$ = 3.91; range = 4 - 23). On a single-item, ten-point scale, students identified the extent to which they attended to the lecture (i.e., 1 = "0%"; 10 = "100%"). One student scored 0 on the recall test, representing an outlier (i.e., $\underline{z}$ = 3.0) and was therefore removed from further analyses.

Lecture achievement test. Most studies have relied almost exclusively on student final examinations as outcome measures (see Murray, 1991). According to McKeachie et al. (1986), final examinations can be poor criteria for differentiating the effects of teaching since they are based primarily on textbook material and therefore poor indicators of learning derived solely from the lecture presentation. Moreover, students may try to compensate for ineffective teaching by additional research or getting help from peers, thereby confounding any teaching effect. In order to avoid this problem, an empirical investigation of teaching behaviors in a controlled environment was conducted where the criteria for learning was the amount of information learned from novel lecture material and not from external sources such as textbooks or peers. Students were exposed to a "one-time" lecture presentation and were then required to write the achievement test.

Furthermore, past studies relying on achievement tests have almost exclusively depended on recognition tests consisting of multiple-choice items (i.e., Perry & Dickens, 1987, Perry & Magnusson, 1987; 1989; Perry & Penner, 1990; Schonwetter et al., 1994). Although recognition is a measure of student learning, it only represents one dimension of student thinking: knowledge (Bloom, 1956). It involves the correct identification of content from a large array of content with cues. Recognition tests do not force recall, the remembering of content without any cues and therefore, may represent a lower or less in-depth processing of information. A more involved or deeper level of learning is the application of knowledge. This requires the ability to use general principles or ideas presented during the lecture and to apply them to new or novel situations. Compared to previous studies, the present study incorporated recognition and application items to create a more comprehensive definition of learning.

In order to ensure that the material presented was novel, students were screened regarding their experience with the lecture material. Few studies have sought to control students' prior knowledge of content material presented in the lecture manipulation. Two methods were utilized to address this issue here. First, introductory psychology students were exposed to lecture content not directly related to their discipline--an economics lecture. Second, in order to control for prior knowledge effects, students who self-reported economics experience were deleted from the initial sample, i.e., "Have you ever had this material before?": "Yes" or "No".

Given that the removal of 139 economics experienced students might result in a unique subsample of remaining students and therefore make generalization a potential problem, student differences were examined. A Previous Exposure (no, yes) one-way ANOVA was conducted on a number of student difference variables. No significant effects were demonstrated on Type A Behavior Pattern, Internality, Test Anxiety, or Age. However, significant main effects were found for achievement score, $F(1, 432) = 71.76$, $MS_e = 26.75$, $p < .0001$, and for the importance to do well $F(1, 427) = 5.66$, $MS_e = 5.73$, $p < .01$, suggesting that economics experienced students performed much better ($M = 20.28$; $SD = 5.48$; $n = 139$ vs. $M = 15.77$; $SD = 5.02$; $n = 295$) and felt that it was more important to do well than their counterparts ($M = 5.50$; $SD = 2.49$; $n = 133$ vs. $M = 4.90$; $SD = 2.35$; $n = 295$). Since the purpose of the study was to examine the effects of teaching behaviors on novel lecture material, these subjects were removed from further analyses. Obviously, this presents certain limitations for the generalizability of the results.

The achievement test derived from the lecture was composed of 30 multiple-choice items, each item having four choices. Ten items represented recognition, whereas the other items measured knowledge application. The multiple-choice test was designed to be moderately difficult in order to avoid a ceiling affect ($M = 15.77$; $SD = 5.02$; range = 4 - 29). Students perceived the test as difficult. For instance, on a 10-point scale (i.e., 1 = "no influence on my performance"; 10 = " a great deal of influence on my performance"), they attributed test difficulty as having an influence on their performance ($M = 6.37$; $SD = 2.33$). One student scored 0 on the recognition and application tests, representing an outlier (i.e., $z = 3.1$) and was removed from further analyses. Given that perceived versus actual learning may be linked to students' cognition, affect, and motivation (Weiner, 1986), students rated the amount that they perceived they had learned (i.e., 1 = "very little"; 10 = "very much").

Post-achievement test questionnaire. In order to investigate the impact of effective teaching on student perceptions of control, affect, and motivation, a post-achievement test questionnaire was administered. Each of these items were rated on a ten-point scale. First, students rated how much control they had over their performance (i.e., 1 = "very little control"; 10 = "completely under my control"). Next, students rated the extent to which they experienced confidence (i.e., 1 = "helpless"; 10 = "confident"). Motivation was denoted by students' willingness to take another class with the lecturer (i.e., 1 = "not at all interested"; 10 = "very much interested").

Procedure

Students volunteered for one of five sessions. They came in groups of 40-50 to the simulated college classroom. Students in the experimental sessions completed the prelecture questionnaire, viewed one of two videotaped lectures (low organization and high organization), wrote the recall and achievement tests, and completed the post-achievement questionnaire. Students who were in the control group completed the prelecture questionnaire, the achievement tests, and the post-achievement questionnaire. Finally, to ensure an educational learning experience, all students were debriefed.

Rationale for Design and Statistical Analysis

The purpose of the study was two fold. First, students with adaptive (i.e., moderate test-anxious students), as compared to less adaptive (i.e., high test-anxious students), learning orientations were identified. Significant Test Anxiety main effects were further probed using one-tailed Bonferroni t tests. Given that the anxiety effect is well-established (Hembree, 1988), the familywise alpha level was set at .10. Thus, one-tailed Bonferroni t tests with alpha set at .033 for each contrast were used with an interpolated critical $t_B(293) = 2.47$ (i.e., 3 comparisons).

The second purpose was to investigate how organization related to individual differences between students. The Organization by Test Anxiety hypothesis was tested with five a priori comparisons. Because of the exploratory nature of this research question, the familywise alpha level was also set at .15. Thus, using the Bonferroni adjustment procedure (Keppel, 1991; Maxwell & Delaney, 1990), one-tailed Bonferroni t tests with alpha set at .03 for each contrast were used with an interpolated critical $t_B(286) = 2.595$.

Manipulation Checks

Teaching Manipulation

Researchers have compiled persuasive evidence regarding the validity of student ratings (Centra, 1979; Cohen, 1987; Feldman, 1989; Marsh, 1984; McKeachie, 1979). Thus, in order to ensure that the teaching manipulation was effectively portraying the teaching behaviors of interest, students (n = 294) rated the teaching behaviors. Using a 5-point Likert-type scale (i.e., 1 = "poor"; 5 = "outstanding"), students rated the videotaped lectures on 7 low and 1 high inference teaching behaviors. The 7 low inference items denoting the organization was extracted from Murray's (1983; 1987) Teacher Behaviors Inventory. The high-inference item (i.e., "organization") was added because it represents the global items found in most instructor evaluation questionnaires.

The eight organization items were summed and the means computed (i.e., item total score/8; range, 1 = "poor"; 5 = "excellent"). This measure was used as a dependent variable in order to test the effectiveness of the manipulations. A one-way Organized Instruction (low, high) ANOVA demonstrated a significant Organized Instruction main effect on the organization score, $F(1, 293) = 439.66$, $MS_e = 0.56$, $p < .0001$, $\omega^2 = 0.60$ ($M = 4.06$; $SD = .58$; $n = 147$ vs. $M = 2.24$; $SD = .90$; $n = 147$). Based on these results, it was concluded that the videotape manipulations were verified. In other words, the type of teaching condition that students were exposed to was consistent with the intended manipulation of the teaching behaviors. Students

exposed to low organization rated the teaching episode as low in organization, whereas students receiving high organization perceived the manipulation as highly organized.

Results

Five dependent variables were analyzed in order to explore the combined effects of effective teaching and student differences on student learning and learning related outcomes. They included student attention as denoted by a recall test, lecture achievement as measured by a recognition test, cognition as characterized by perceived control, affect as defined by confidence, and motivation as assessed by students' interest to take another class with the lecturer. Independent variables included instructor organization and test anxiety. The overall findings are recorded in Table 1. Given that the research questions focused specifically on how test anxiety interacted with organized teaching behaviors on student learning outcomes, specific a priori comparisons were explored. These comparisons are reported below.

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Test Anxiety

In order to reveal the learning orientations hypothesized to differentiate low and moderate from high test-anxious students, the five dependent variables were assessed. Test anxiety main effects were anticipated such that low and moderate, in comparison to high, test-anxious students would be more attentive, demonstrate higher levels of achievement, feel more in control, express more positive affect, and report higher levels of motivation. A Test Anxiety (low, moderate, high) x Instructor Organization (low, high), 3 x 2 ANOVA demonstrated significant Test Anxiety main effects on recognition, $F(2, 284) = 4.44$, $MS_e = 3.36$, $p < .01$ $\omega^2 = .022$, perceived control, $F(2, 283) = 7.50$, $MS_e = 5.35$, $p < .001$, $\omega^2 = .044$, and confidence, $F(2, 283) = 7.22$, $MS_e = 3.67$, $p < .001$, $\omega^2 = .041$. As hypothesized, high test-anxious students produced lower recognition scores ($M = 5.50$, $SD = 1.68$, $n = 100$) than either low ($M = 6.34$, $SD = 2.09$, $n = 95$) or moderate test-anxious students ($M = 6.19$, $SD = 1.90$, $n = 90$), t_B's$(284) = 3.20$, 2.95. p's $< .033$. Low test-anxious students also demonstrated higher perceptions of control ($M = 6.88$, $SD = 2.27$, $n = 94$) than high test-anxious students ($M = 5.64$, $SD = 2.43$, $n = 100$), $t_B(283) = 3.74$, $p < .033$. Moderate ($M = 5.93$, $SD = 2.20$, $n = 90$), in comparison to low test-anxious students ($M = 6.88$, $SD = 2.27$, $n = 94$), demonstrated lower perceptions of control, $t_B(283) = 2.79$, $p < .033$.

Comparable differences were also observed on the measure of confidence. Although all experimental cells were well above the median of the scale ($Md = 5.00$), high test-anxious students felt less confident ($M = 5.82$, $SD = 2.00$, $n = 100$) than either low ($M = 6.84$, $SD = 1.97$ $n = 94$) or moderate test-anxious students ($M = 6.52$, $SD = 1.91$ $n = 90$), t_B's$(283) = 3.70$, 2.50, p's $< .033$. Thus, the one-time lecture exposure was able to distinguish adaptiveness in learning orientations among low, moderate, and high test-anxious students.

Instructor organization and test anxiety. To assess the effectiveness of instructor organization and test anxiety on student learning outcomes, five dependent variables were examined. The initial hypothesis indicated that high, in comparison to low or moderate, test-anxious students, given their less adaptive learning orientations, were not expected to benefit from high organized instruction, demonstrating poor achievement outcomes. Five a priori comparisons were conducted to test the hypothesis. The first comparison demonstrated results as initially hypothesized. No comparable differences were observed between high test-anxious students receiving low, as compared to high, organized instruction for measures of recall ($\underline{M}$ = 10.51, $\underline{SD}$ = 3.16, $\underline{n}$ = 55, vs. $\underline{M}$ = 12.07, $\underline{SD}$ = 3.86, $\underline{n}$ = 45), recognition ($\underline{M}$ = 5.33, $\underline{SD}$ = 1.63, $\underline{n}$ = 55, vs. $\underline{M}$ = 5.71, $\underline{SD}$ = 1.74, $\underline{n}$ = 45), perceived control ($\underline{M}$ = 5.58, $\underline{SD}$ = 2.50, $\underline{n}$ = 55, vs. $\underline{M}$ = 5.71, $\underline{SD}$ = 2.36, n = 45), confidence ($\underline{M}$ = 5.64, $\underline{SD}$ = 1.98, $\underline{n}$ = 55, vs. $\underline{M}$ = 6.04, SD = 2.01, n = 45), $t_{BS}(282)$ = 2.09, 1.03, 0.28, 1.04, $\underline{ps}$ > .03. Based on these results, high test-anxious students were unable to benefit from organized instruction. However, this was not the case for the measure of motivation. High test-anxious students receiving low, as compared to high, organized instruction were less willing to attend another class with the instructor ($\underline{M}$ = 3.05, $\underline{SD}$ = 2.27, $\underline{n}$ = 55, vs. $\underline{M}$ = 4.65, $\underline{SD}$ = 2.71, $\underline{n}$ = 43), $t_B(281)$ = 3.21, p < .03 (see Figure 2). Thus, organized instruction increased high test-anxious students' motivation.

The second comparison revealed differences, as initially hypothesized, between high, as compared to low, test-anxious students receiving high organized instruction on measures of recognition (M = 5.71, $\underline{SD}$ = 1.74, $\underline{n}$ = 45, vs. $\underline{M}$ = 7.00, $\underline{SD}$ = 1.88, $\underline{n}$ = 53), perceived control (M = 5.71, SD = 2.36, $\underline{n}$ = 45, vs. $\underline{M}$ = 7.15, $\underline{SD}$ = 2.02, $\underline{n}$ = 53), and confidence ($\underline{M}$ = 6.04, $\underline{SD}$ = 2.01, $\underline{n}$ = 45, vs. $\underline{M}$ = 7.23, $\underline{SD}$ = 2.03, $\underline{n}$ = 53), $t_{BS}(282)$ = 3.47, 3.07, 3.06, ps < .03 (see Figures 3, 4, 5). However, no differences were observed on measures of recall ($\underline{M}$ = 12.07, $\underline{SD}$ = 3.86, $\underline{n}$ = 45, vs. $\underline{M}$ = 13.34, SD = 4.35, $\underline{n}$ = 53) or student interest in attending another class with the instructor (M = 4.65, SD = 2.71, n = 43, vs. M = 3.64, $\underline{SD}$ = 2.64, n = 53), $t_{BS}(281)$ = 1.68, 2.01, ps > .03. Based on these analyses, high, in comparison to low, test-anxious students, were unable to benefit from organized instruction on measures of recognition, perceived control, and confidence.

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The third comparison did not support the hypothesis that high, as compared to moderate, test-anxious students would be less likely to benefit from organized instruction. For instance, no differences were observed on measures of recall ($\underline{M}$ = 12.07, $\underline{SD}$ = 3.86, $\underline{n}$ = 45, vs. $\underline{M}$ = 13.11, $\underline{SD}$ = 3.68, $\underline{n}$ = 45), perceived control ($\underline{M}$ = 5.71, $\underline{SD}$ = 2.36, $\underline{n}$ = 45, vs. $\underline{M}$ = 6.07, $\underline{SD}$ = 2.26, $\underline{n}$ = 45), confidence ($\underline{M}$ = 6.04, $\underline{SD}$ = 2.01, n = 45, vs. $\underline{M}$ = 6.69, SD = 1.87, $\underline{n}$ = 45), or interest in attending another class with the instructor ($\underline{M}$ = 4.65, SD = 2.71, $\underline{n}$ = 43, vs. $\underline{M}$ = 4.51, $\underline{SD}$ = 2.43, $\underline{n}$ = 45), $t_{BS}(281)$ = 1.33, 0.74, 1.61, 0.27, ps > .03. Based on these analyses, high test-anxious students learning outcomes were not different from moderate test-anxious student when receiving organized instruction. However, moderate, as compared to high, test anxious students benefited from organized instruction on the measure of

recognition ($\underline{M}$ = 5.71, $\underline{SD}$ = 1.74, $\underline{n}$ = 45, vs. $\underline{M}$ = 6.80, $\underline{SD}$ = 1.77, $\underline{n}$ = 45), $t_B(284)$ = 2.82, $\underline{p}$ < .03 (see Figure 3). Thus, moderate test-anxious students were able to benefit from the facilitative effects of organized instruction.

The fourth comparison demonstrated that high, versus low, organized instruction enhanced low test-anxious students' recall ($\underline{M}$ = 13.34, $\underline{SD}$ = 4.35, $\underline{n}$ = 53, vs. $\underline{M}$ = 11.00, $\underline{SD}$ = 3.68, $\underline{n}$ = 42) and recognition scores ($\underline{M}$ = 7.00, $\underline{SD}$ = 1.88, $\underline{n}$ = 53, vs. $\underline{M}$ = 5.50, $\underline{SD}$ = 2.05, $\underline{n}$ = 42), $t_B s(284)$ = 3.04, 3.96, $\underline{p}s$ < .03 (see Figures 6,3). However, no differences were found for measures of perceived control, ($\underline{M}$ = 7.15, $\underline{SD}$ = 2.02, $\underline{n}$ = 53, vs. $\underline{M}$ = 6.55, $\underline{SD}$ = 2.54, $\underline{n}$ = 42), and confidence ($\underline{M}$ = 7.23, $\underline{SD}$ = 2.03, $\underline{n}$ = 53, vs. $\underline{M}$ = 6.36, $\underline{SD}$ = 1.81, $\underline{n}$ = 42), or interest in attending another class with the instructor ($\underline{M}$ = 3.64, $\underline{SD}$ = 2.64, $\underline{n}$ = 53, vs. $\underline{M}$ = 3.54, $\underline{SD}$ = 2.80, $\underline{n}$ = 41), $t_B s(281)$ = 1.26, 2.20, 0.20, $\underline{p}s$ > .03. Thus, organized instruction increases recall and recognition scores for low test-anxious students, but has little influence on cognitive, affect, and motivation.

The fifth comparison demonstrated learning related differences between moderate test-anxious students receiving low, as compared to high, organized instruction on measures of recognition ($\underline{M}$ = 5.58, $\underline{SD}$ = 1.84, $\underline{n}$ = 45, vs. $\underline{M}$ = 6.80, $\underline{SD}$ = 1.77, $\underline{n}$ = 45) and student interest in attending another class with the instructor ($\underline{M}$ = 2.29, $\underline{SD}$ = 2.00, $\underline{n}$ = 45, vs. $\underline{M}$ = 4.51, $\underline{SD}$ = 2.43, $\underline{n}$ = 45), $t_B s(281)$ = 3.16, 4.30, ps < .03 (see Figures 3, 2). However, no differences were found for measures of recall ($\underline{M}$ = 11.33, $\underline{SD}$ = 3.72, $\underline{n}$ = 45, vs. $\underline{M}$ = 13.11, $\underline{SD}$ = 3.68, $\underline{n}$ = 45), perceived control ($\underline{M}$ = 5.79, $\underline{SD}$ = 2.14, $\underline{n}$ = 43, vs. $\underline{M}$ = 6.07, $\underline{SD}$ = 2.26, $\underline{n}$ = 45), confidence ($\underline{M}$ = 6.34, $\underline{SD}$ = 1.75, $\underline{n}$ = 44, vs. $\underline{M}$ = 6.69, $\underline{SD}$ = 1.87, $\underline{n}$ = 45), $t_B s(282)$ = 2.27, 0.57, 0.86, $\underline{p}s$ > .03. Thus, organized instruction increases recognition and motivation for moderate test-anxious students, but has little impact on student attention, cognition, and affect.

Based on the above results, a number of patterns emerge. First, test anxiety differences tend to predict differences in adaptive and less adaptive learning orientations. In most cases, high test-anxious students tend to reflect less adaptive learning orientations, whereas low and moderate test-anxious students tend to portray adaptive learning orientations. Second, organization interacted with the student difference--test anxiety. High test-anxious students were less likely to benefit from effective teaching. However, both low and moderate test-anxious students were likely to benefit from organized instruction. Thus, the combined effects of student differences and effective teaching impact student learning outcomes.

Discussion

The purpose of the present thesis was to provide a better understanding of the relationship between effective teaching and student learning. This was accomplished by exploring the combined effects of student differences and effective teaching. First, the present data supports the hypothesis that student differences, namely test anxiety, influence student learning outcomes. Second, student differences interact with effective teaching behaviors, as defined by organization, to have an influence on student learning and related outcomes.

Test Anxiety

The test anxiety main effects confirm the initial hypothesis, and replicate and extend previous studies that high, as compared to low or moderate, test anxiety predicts poorer learning outcomes, such as a history of poorer high school GPAs (Prociuk & Breen, 1973). Once in the classroom, high test-anxious students' learning is characterized by reduced lecture attention and lecture achievement (Galassi, Frierson & Sharer, 1981). Further, students' perception of control is minimized (Rapaport, 1984). In turn, this perception can yield negative affects such as helplessness (Dweck & Wortman, 1982; Schwarzer, Jerusalem, & Stiksrud, 1984). Helplessness in turn, is thought to further impair students' cognitions, affects, and behaviors (Abramson, Garber, & Seligman, 1980). However, these results should be interpreted cautiously by the reader given that only the student perception of control and the helplessness affect demonstrated practical effect sizes (i.e., $\omega^2 > .03$).

Albeit the non practical effect sizes, these results do provide patterns that tend to show differences in learning orientation associated with test anxiety. As mentioned above, high test-anxious students tend to be characterized by poorer learning and related outcomes. Their attention may be minimized, due to what researchers have labeled the interference model (Cullar & Holahan, 1980; Darke, 1988). These students are known to excessively ruminate about their failure and vulnerability (Beck & Emery, 1985; McKeachie, Pollie, & Spiesman, 1985; Sarason, 1984; Wine, 1971), and thus, may be distracted from critical learning requirements such as attending to the lecture. Disadvantaged because of the cognitive interference associated with high test anxiety, their less adaptive learning orientations "cripples" them academically. In contrast to high test-anxious students, low and moderate test-anxious students tend to be endowed with adaptive learning orientations, as exemplified by higher scholastic outcomes.

According to Domino (1975), anxiety has two sides to it: an "energizing source" and a "crippling obstacle" to scholastic achievement. As an "energizing source", low and moderate levels of anxiety are facilitative, enhancing learning. However, too much anxiety, especially if the task at hand is highly self-relevant or ego-involving (Schwarzer, 1981), substantially reduces effective learning. In such cases, the task will be perceived as a challenge, a threat, or an event that causes loss of control (Lazarus & Launier, 1978). Repeated exposures of unexpected failure may increase a students' loss of control in a particular situation, causing increased levels of anxiety. In this case, higher levels of anxiety serve as a debilitating state or trait (Schwarzer et al., 1984), "crippling" effective learning. The student no longer feels challenged, but rather, threatened, and experiences higher levels of anxiety, with repeated exposure resulting in depression and eventually, helplessness (Schwarzer et al., 1984).

Contrary to initial hypotheses, it was surprising to find differences between moderate and low test anxiety. Although both yield higher learning outcomes in comparison to high test anxiety, the ensuing outcomes are not consistent. For instance, moderate, in comparison to low, test-anxious students, demonstrate lower perceptions of control. Even though moderate test-anxious students display an adaptive learning orientation which provides maximum potential for learning, they also worry more and therefore experience lower perceptions of control. Their higher level

of test anxiety (M = 20.29; SD = 1.96), in comparison to low test anxiety (M = 9.68; SD = 4.01), $t_B(285)$ = 23.01, p < .05, may be causing the difference in perceptions. In other words, moderate test anxiety is conducive for maximizing achievement opportunities, but at the expense of higher levels of worry and lower levels of control.

In summary, high test anxiety tends to represent a less adaptive learning orientation. It not only interferes with achievement performance, but also reduces students' perception of control. Low and moderate test anxiety, on the other hand, tend to demonstrate an adaptive learning orientation, conducive to learning and related outcomes.

Organization and Test Anxiety

Organization interacts with test anxiety to yield somewhat consistent patterns on student learning related outcomes. First, high test-anxious students are unable to benefit from high, as compared to low, organized instruction. Second, high, as compared to low, and high, as compared to moderate, test-anxious students are also unable to benefit from high organized instruction. These results replicate those found with expressive instruction. Effective teaching has little influence on high test-anxious students' learning. A dysfunctional component of high test-anxious students' learning orientation may interfere with the facilitative effects of effective instruction, placing these students "at-risk" academically. However, the combination of adaptive learning orientations and effective instruction proves to be optimally beneficial scholastically for low and moderate test-anxious students. Thus, low or moderate test anxiety in conjunction with high organization provides an optimal learning condition, whereas high test anxiety minimizes any learning potential from the facilitative effects of high organization.

Although unable to compensate for these students' less adaptive learning orientations, organized instruction does increase high test-anxious students' motivation to attend future classes, thereby reducing potential attrition rates among these students. Highly motivated to return to future classes may, in the long run, enhance students' learning experience. For instance, over an extended period of time, such as a semester, repeated exposure to highly organized instruction may result in the modeling of adaptive learning strategies, such as the "chunking" of course material (Perry, 1991). In other words, the highly test-anxious student may vicariously learn from the organized presentations, how to effectively organize lecture stimuli, and thus, be better able to process and recall the material that is presented. Therefore, organized instruction may indirectly impact students' learning.

Finally, the last two comparisons demonstrate that low and moderate test-anxious students do better scholastically when presented with high, as compared to low, organized instruction. These findings suggest that the adaptive learning orientation associated with low and moderate test anxiety is not "inoculating" students from the deficits associated with low organization. Previous studies have postulated "buffer" effects of adaptive learning orientations to be associated with Type As (Perry & Tunna, 1988), internal locus of control (Perry & Magnusson, 1989) and students with high perceptions of success and control (Schonwetter et al., 1994). However, these studies manipulated expressive teaching behaviors and not

organization. Moreover, the present findings may allude to the importance of organization as a teaching behavior.

In other words, the presentation of organized knowledge may be crucial for learning to occur and cannot be "buffered" by any adaptive learning orientation. More specifically, organization of course material, as demonstrated through well-structured presentations, syllabi, and lecture outlines, may act as a specific orienting stimulus, providing cues for what is considered relevant and needs to be recorded. In addition to being a specific stimulus cue, organization in the form of outlines represents a knowledge structure. As such, it enhances students' integration of content topics by providing a "chunking" strategy, a quick and logical method of structuring lecture material (Perry, 1991). When the course material is novel, as in the case of the present study, students with adaptive learning orientations may have the necessary strategies to learn, but may not have a well-developed knowledge structure of the lecture stimuli and thus, are less able to integrate the material efficiently. Therefore, organized instruction enhances learning of novel stimuli, whereas unorganized instruction, regardless of students' adaptive learning orientations, thwarts learning of novel stimuli.

Based on the above findings, organization demonstrates a consistent pattern of student learning outcomes. First, high organization facilitates the learning of students with adaptive learning orientations, while providing no compensation for high test-anxious students. Second, it increases high test-anxious students' motivation. Third, a poorly organized instructor makes it difficult for students with adaptive learning orientations to do well. Low and moderate test-anxious students are unable to buffer themselves against the detrimental effects of low organization. Thus, "teaching that helps students find a framework within which to fit new facts [i.e., lecture organization] is likely to be more effective than teaching that simply communicates masses of material in which the student can see no organization" (McKeachie, 1986, p. 229).

Summary

In essence, major advances in the understanding of the characteristics of effective instruction, student differences, and student learning are addressed. Combining the results of the present thesis implies that when certain theoretically relevant student differences (i.e., test anxiety but not eye color or weight) are included into the research design, the present teaching behavior has a differential effects on students exhibiting more extreme dispositions on such variables. For instance, a pattern of interactions between student differences and organization is demonstrated on a number of learning outcomes: lecture attention, achievement, perceptions of control, affect, and motivation. Students with more adaptive learning orientations benefit from highly organized instruction. Not unexpectedly, organized instruction is effective for students with the more positive qualities, such as those with low or moderate levels of test anxiety, but not for those with the more negative qualities, such as the high test-anxious student. However, in some cases, students with less adaptive learning orientations benefit from the facilitative effects of high organized instruction. Therefore, the key in understanding the teaching/learning phenomenon must lie in the differential impact of Feldman's teaching behaviors on the

information processing system in relation to student variables and other classroom conditions. In order to better understand the latter, more research is required.

Research Implications

Research attempting to effectively and efficiently identify "at-risk" students may be of great help to educators. Such an emphasis might be accomplished through the development of an instrument that utilizes the fewest, most salient dimensions through which most "at-risk" students can be identified. These students, in turn, would be given the option of receiving remedial programs designed to modify their less adaptive learning orientations. By doing so, the college setting may provide the means for their scholastic success. Also, an investigation as to why certain students, specifically low and moderate test-anxious, are sometimes able to endure ineffective instruction and still maintain academic excellence may provide keys for modification programs for high test-anxious students.

Educational Implications

Students seeking potentially effective instructors and administrators searching for potentially facilitative teaching should focus on organization skills. Instructors concerned with the scholastic welfare of their students should focus on refining their organizational teaching skills. In order to reduce the debilitating effects of test anxiety, material presented by the instructor should be well organized. Ambiguity and unclear expectations may cause anxiety and/or induce a sense of loss of control, whereas organized instruction, such as lecture outlines, may provide students with what is to be expected, reducing anxiety and increasing perceived control.

Students with adaptive learning orientations perform well, clearly benefiting from a combination of their control predisposition and effective teaching. However, effective lecturing behaviors may not be equally as effective for students with less adaptive learning orientations. These findings have important implications for educators. Remedial programs designed to modify students with maladaptive learning orientations should be made available to "at-risk" students. For instance, attributional retraining programs have successfully modified externals' control predisposition to a more internal outlook and thereby have enhanced students' learning experiences (Menec, Perry, Struthers, Schonwetter, & Eichholz, 1994; Perry & Penner, 1990). Cognitive training involving the reduction of the debilitating aspects (i.e., worry) of test anxiety in a testing situation has resulted in high test-anxious students achieving as well as their low test-anxious counterparts (Wine, 1982). Thus, scholastic improvement may be facilitated by specific cognitive strategies that modify students' less adaptive learning orientations to more adaptive ones.

Finally, readers are cautioned when applying these results directly to the college classroom for the following reasons. First, learning occurred in a simulated, not actual college classroom. Second, students were exposed to a "one-time" lecture episode, and tested immediately without the chance of studying for the test or seeking additional help or resources. Finally, video-taped lectures, as compared to live teaching, were used to present the stimulus material. Thus, the limitations of the study would suggest that the results be used with caution.

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Table 1.

Test Anxiety by Organization Means and Standard Deviations of Student Learning Outcomes

	LOW TEST-ANXIOUS		MODERATE TEST-ANXIOUS		HIGH TEST-ANXIOUS	
	LO	HO	LO	HO	LO	HO
Recall*1						
MEAN	11	13.34	11.33	13.11	10.51	12.07
STD	3.68	4.35	3.72	3.68	3.16	3.86
N	42	53	45	45	55	45
Recognition*2						
MEAN	5.5	7	5.58	6.8	5.33	5.71
STD	2.05	1.88	1.84	1.77	1.63	1.74
I.	42	53	45	45	55	45
Control*3						
MEAN	6.55	7.15	5.79	6.07	5.58	5.71
STD	2.54	2.02	2.14	2.26	2.5	2.36
N	42	53	43	45	55	45
Confidence*4						
MEAN	6.36	7.23	6.34	6.69	5.64	6.04
STD	1.81	2.03	1.75	1.87	1.98	2.01
N	42	53	44	45	55	45
Motivation*5						
MEAN	3.54	3.64	2.29	4.51	3.05	4.65
STD	2.8	2.64	2	2.43	2.27	2.71
N	41	53	45	45	55	43

Note. LO = Low Organization; HO = High Organization. *1Five minute free recall of key words presented during the lecture (range 2 - 23 words). *2Total of 20 multiple-choice recognition items based on the lecture presentation. *3"How much control did you have over your performance on these tests?" (1 = "very little control"; 10 = "completely under my control"). *4"Rate the extent to which you experienced each of the following feelings as a reaction to the achievement tests" (i.e., 1 = "helpless"; 10 = "confident"). *5"To what extent would you be interested in taking other economic classes with this professor?" (i.e., 1 = "not at all interested"; 10 = "very much interested").
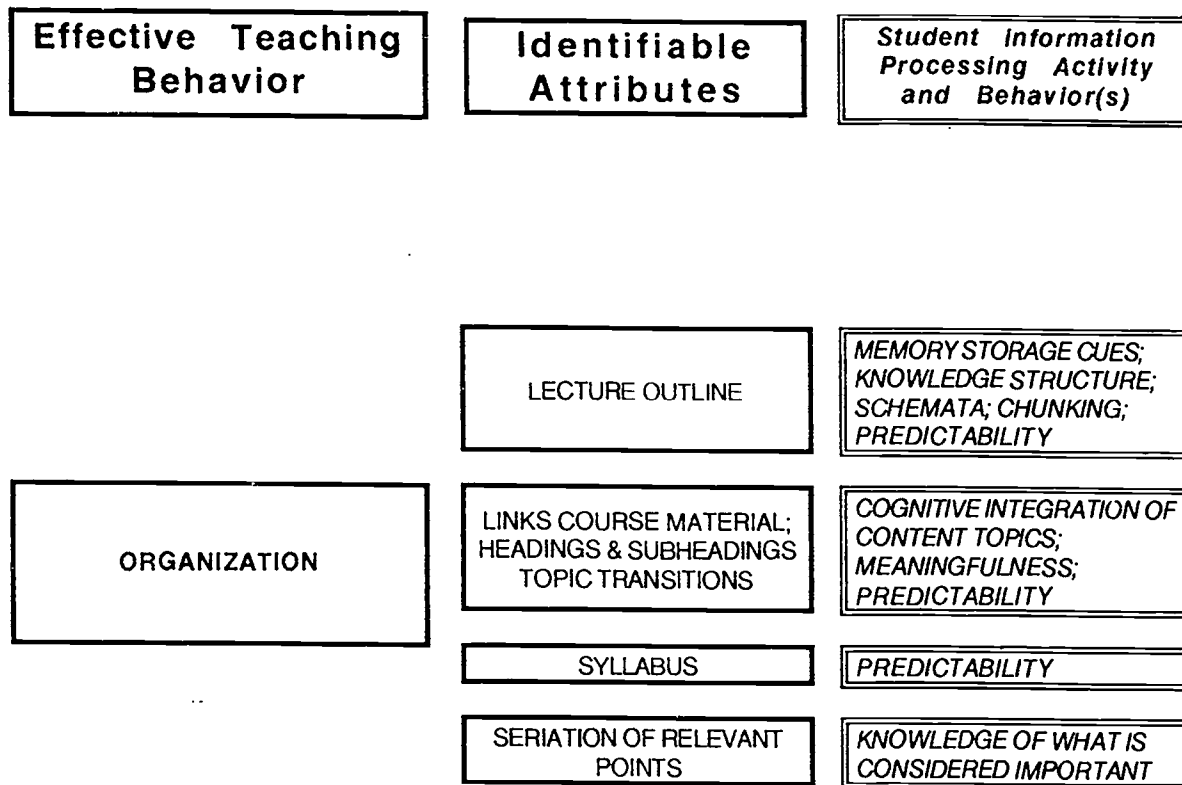
Effective Teaching Behavior	Identifiable Attributes	Student Information Processing Activity and Behavior(s)
	LECTURE OUTLINE	MEMORY STORAGE CUES; KNOWLEDGE STRUCTURE; SCHEMATA; CHUNKING; PREDICTABILITY
ORGANIZATION	LINKS COURSE MATERIAL; HEADINGS & SUBHEADINGS TOPIC TRANSITIONS	COGNITIVE INTEGRATION OF CONTENT TOPICS; MEANINGFULNESS; PREDICTABILITY
	SYLLABUS	PREDICTABILITY
	SERIATION OF RELEVANT POINTS	KNOWLEDGE OF WHAT IS CONSIDERED IMPORTANT

Figure 1. Effective teaching behaviors' influence on student learning and behavior (adapted from Perry, 1991).

Figure 2. Test anxiety by organization interaction for students' willingness to take another class.
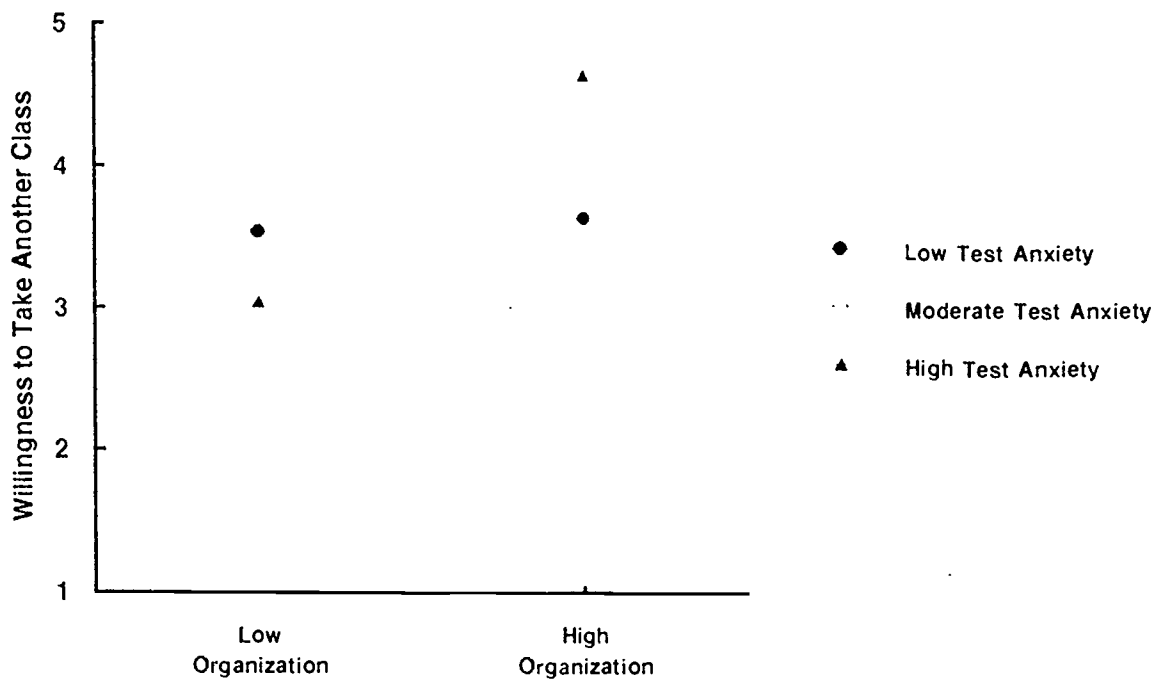

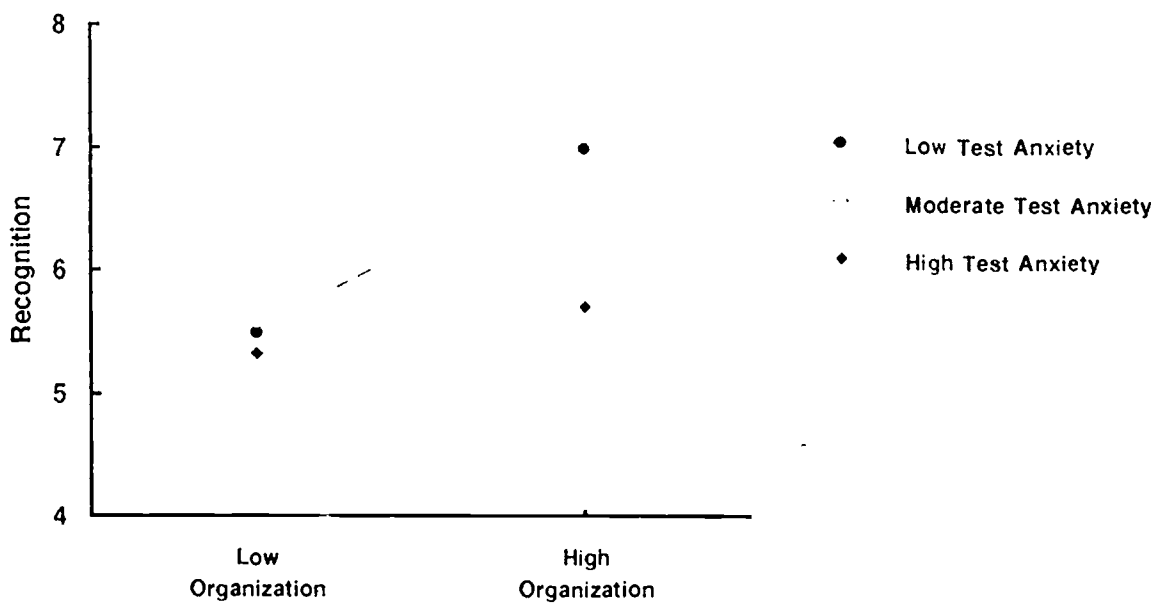Figure 3. Test anxiety by organization interaction on recognition.

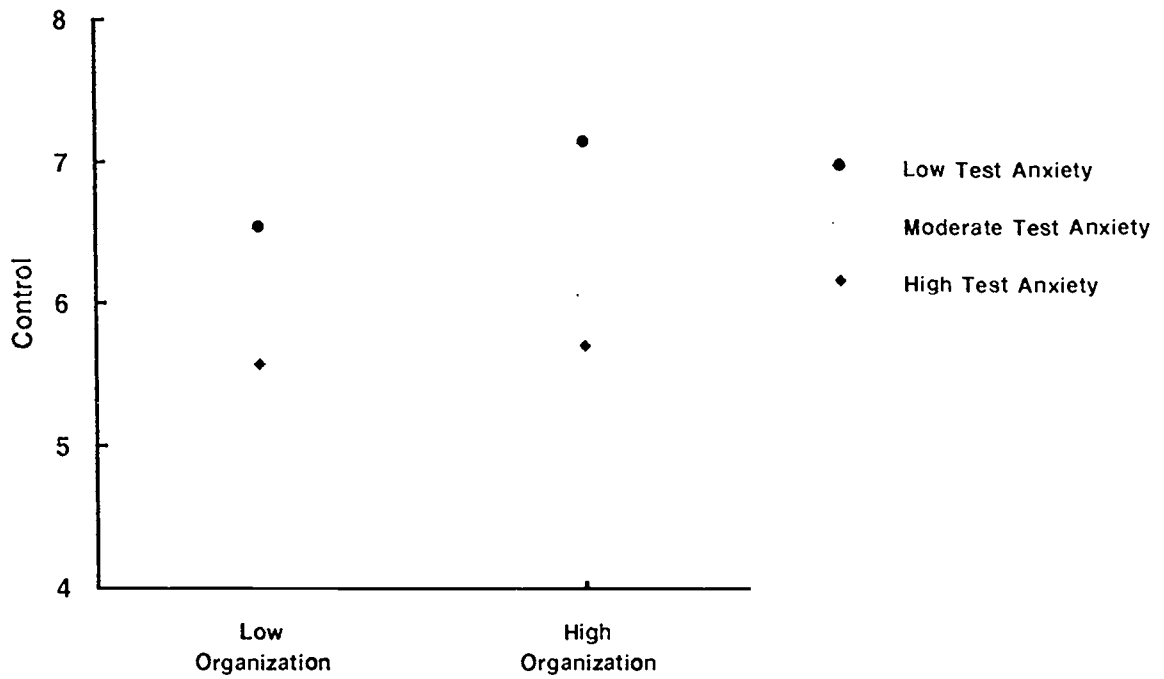Figure 4   Test anxiety by organization interaction on perceived control

Figure 5. Test anxiety by organization interaction on student confidence
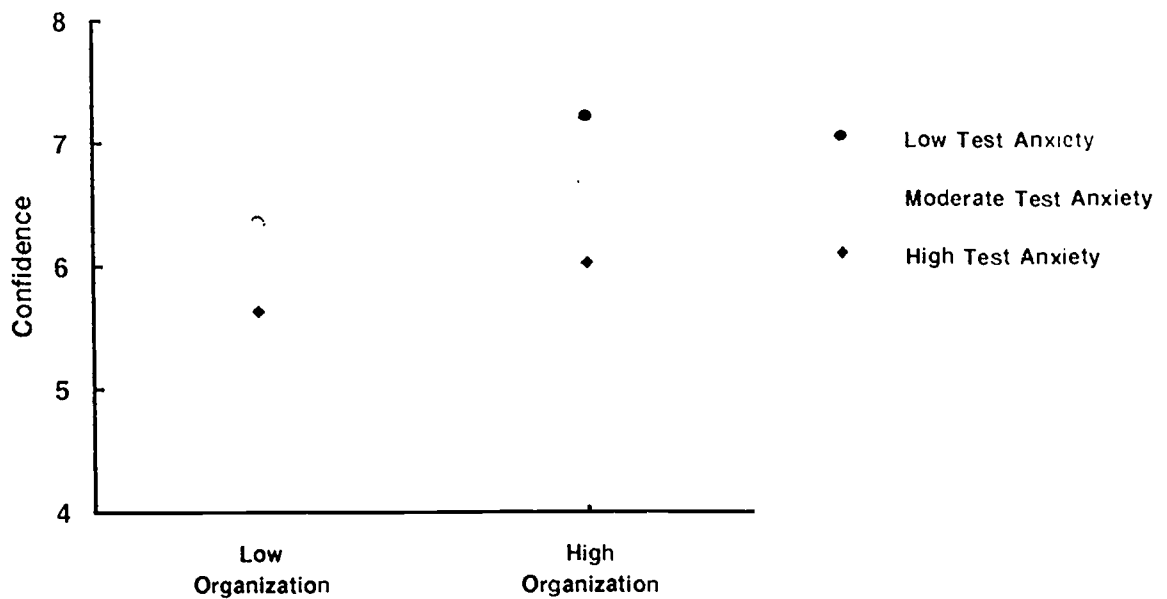

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Figure 6. Test anxiety by organization interaction on recall.

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